Providing support in relation to the implementation of soil and land related Sustainable Development Goals at EU level

Final report

Keesstra, S.D., Muro, M., Maring, L., Arellano Jaimerena, B., van Eupen, M., Elbersen, B., McNeill, A., Tugran, T., Markowska, A.

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Increasing land take, soil sealing and loss of ecosystem functions due to soil and land degradation have been recognised as major environmental and socioeconomic challenges, both in the EU and worldwide. In 2015, the UN put forward the 2030 Agenda, with 17 interdependent Sustainable Development Goals (SDGs). Many of the SDGs reflect challenges related to land and soil. This report comprises of a review of the state of affairs in the EU related to the implementation of the land and soil related SDGs. Literature reviews, policy mapping, EU wide soil data analysis, combined with national surveys and targeted interviews were carried out. A set of recommendations for related to the way forward to more effective implementation and widespread uptake of sustainable land and soil management addressed to the following four stakeholder groups are given: (i) practitioners and end-users; (ii) scientist; (iii) policymakers and (iv) citizens.

Toenemend ruimtebeslag, bodemafdekking en verlies van ecosysteemfuncties als gevolg van bodem- en landdegradatie worden zowel in de EU als wereldwijd gezien als grote ecologische en sociaaleconomische uitdagingen. In 2015 hebben de VN de Agenda 2030 voorgesteld, met 17 samenhangende duurzame ontwikkelingsdoelstellingen (SDG's). Veel van de SDG's hebben een relatie met opgaves die verband houden met land en bodem. Dit rapport bevat een overzicht van de stand van zaken in de EU met betrekking tot de implementatie van de land- en bodemgerelateerde SDG's. Dit overzicht werd tot stand gebracht door literatuuronderzoek, een beleidsanalyse, analyse van bodemgegevens in de hele EU, gecombineerd met nationale enquêtes en gerichte interviews. Er wordt een reeks aanbevelingen gedaan gericht op vier doelgroepen om de implementatie en acceptatie van duurzaam land- en bodembeheer in de EU te bevorderen: (i) eindgebruikers; (ii) wetenschappers; (iii) beleidsmakers en (iv) burgers.

Keywords: Soil threats, ecosystem functions, land degradation neutrality, policy mapping, fostering uptake of sustainable land and soil management

The pdf file is free of charge and can also be downloaded at https://doi.org/10.18174/531395 or via the website www.wur.nl/environmental-research (scroll down to Publications – Wageningen Environmental Research reports). Wageningen Environmental Research does not deliver printed versions of the Wageningen Environmental Research reports.

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Photo cover: Soil profile under grazing land (photo taken by Saskia Keesstra)

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Abbreviations

AECMs	Agri-Environment-Climate Measures
AEnZ	Agri-Environmental Zonation
CAP	Common Agricultural Policy
CCS	Carbon Capture and Storage
DEM	Digital Elevation Model
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EAP	Environmental Action Programme
EASAC	European Academies Science Advisory Council
EEA	European Environment Agency
EEB	The European Environmental Bureau
EIA Directive	Environmental Impact Assessment Directive
ELD	Environmental Liability Directive
ELSUS	European Landslide Susceptibility Map
EnS	Environmental Stratification
EnZ	Environmental Zones
EQS	Environmental Quality Standards
ESR	Effort Sharing Regulation
EU SEG	EU Soil Expert Group
FAO	Food and Agriculture Organization of the United Nations
FAS	Farm Advisory Service
GAEC	Good Agricultural and Environmental Conditions
GSP	Global Soil Partnership
HLPF	UN High Level Political Forum
IAEG-SDGs	Inter-Agency and Expert Group on SDG indicators
IED Directive	Industrial Emissions Directive
ILSWE	Index of Land Susceptibility to Wind Erosion
INSPIRE Directive	Infrastructure for Spatial Information in the European Community
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
LDN	Land-Degradation-Neutrality
LULUCF	Land use, land-use change, and forestry
MFF	Multi-Annual Financial Framework
MSFD	Marine Strategy Framework Directive
NECD	National Emission Ceiling Directive
PCA	Principal Component Analysis
PPPR	Plant Protection Products Regulation
RDPs	Rural Development Programmes
RED	Renewable Energy Directive
SDGs	United Nations Sustainable Development Goals
SEA Directive	Strategic Environmental Assessment Directive
SLM	Sustainable Land Management
SMRs	Statutory Management Requirements
SNAC	National Strategy for Adaptation to Climate Change
SNBD	National Strategy for Biodiversity
SNDD	National Strategy for Sustainable Development
SOC	Soil Organic Carbon
SOM	Soil organic matter
SSD	Sewage Sludge Directive
SUPD	Sustainable Use of Pesticides Directive
SWD	EC Staff Working Document
UBA	German Environment Agency

UNCCD	UN Convention to Combat Desertification
UNSC	United Nations Statistical Commission
VGSSM	Voluntary Guidelines for Sustainable Soil Management
WFD	Water Framework Directive

Executive summary

Increasing land take, soil sealing and loss of ecosystem functions due to soil and land degradation have been recognised as major environmental and socioeconomic challenges, both in the EU and worldwide. In 2015, the UN put forward the 2030 Agenda, with 17 interdependent Sustainable Development Goals (SDGs). Many of the SDGs reflect challenges related to land and soil, particularly SDG 15, concerning life on land. SDG 15 strives to achieve a land degradation-neutral world and is a key enabler for many other SDGs, including SDG 2 (zero hunger), 6 (clean water and sanitation), and 11 (sustainable cities and communities).

Since the adoption of the 2030 Agenda, the European Commission has published several strategic documents outlining the plans to implement the SDGs in the EU. In the Communication on 'Next Steps for a Sustainable European future' (2016), the Commission stressed its intention to mainstream the SDGs into EU policies. More recently, the reflection paper 'Towards a sustainable Europe 2030' (2019) presents the enabling factors and challenges to implementation of the SDGs in the EU. However, in 2006, EU initiatives on soil and land-related challenges started with the EU Soil Thematic Strategy, which was the first policy document at EU level uniquely dedicated to soil protection. The strategy aims to protect soil and its sustainable use, prevent further soil degradation, and restore degraded soils. The document highlights eight main threats to soils in the EU: erosion, organic matter decline, compaction, soil biodiversity loss, sealing, landslides, contamination and salinisation. Four key pillars were defined to achieve the goals of the strategy: 1) framework legislation; 2) integration of soil protection in other policies; 3) research; and 4) raising public awareness of soil-related challenges. In addition, soil and land related challenges have been integrated into a wider EU policy focusing on the sustainable use of resources.

The Roadmap to a Resource Efficient Europe adopted in 2011 aims for the achievement of sustainable resource management, including land and soil management, by 2050. It also sets a target of **no net land take by 2050**. This target has been repeated in the 7th EU Environment Action Programme that came into force in 2014. Other targets established in the 7th EAP aim to increase efforts to reduce soil erosion and to enhance soil organic matter as well as the integration of land use aspects in coordinated policies involving all relevant levels of government.

In December 2019 **the European Green Deal**[6] was launched as the new cornerstone that serves to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. Within the Green Deal elements such as the new EU Biodiversity Strategy for 2030 set targets and actions for nature protection and restauration, integrating as well as land degradation neutrality.

Despite these high-level initiatives, EU policies targeted at the prevention of land and soil degradation remain fragmented and rely on sectoral policies. Some of the sectoral policies can be very helpful in the implementation of soil and land related SDGs by establishing environmental standards and safeguards, promoting good practices and supporting sustainable approaches to natural resource management.

The policy mapping exercise in this study shows that few Member States have dedicated land or soil policies. Many of these policies set clear provisions for improving the condition of soil and land and have the potential to contribute significantly to the implementation of the land and soil-related SDGs. However, most policies at both EU and national level have been shaped before the adoption of the SDGs and therefore, they may not fully reflect the targets as formulated by the UN in 2015. Hence, there is a need to revise, update or reformulate the existing policies. New policy instruments need to be devised that can help to adjust the socioeconomic development to the limitations of our planet in line with the SDGs.

In light of the COVID-19 crisis that started in 2020 in Europe, it has become even more evident that resilience is key to sustainability. Resilience is needed on all three main levels of the SDGs: the Biosphere, Society and Economy. The recovery from this crisis places a strong focus on increasing the resilience in society and economy, but it is important to keep in mind that many of the SDGs rely on sustainably managed soil and land. Therefore, action towards the long-term sustainable use of land and soil is essential to reach all SDGs; without that, there is no basis for the rest.

Measuring progress towards the achievement of the SDGs poses numerous challenges. The target accepted for SGD 15.3 **(Land Degradation Neutrality (LDN))** has three sub-indicators focusing on land cover, land productivity and carbon stocks) may be a useful tool for tracking progress in achieving LDN in the different countries and environmental zones. At EU level, the Commission is currently developing a methodology and guidance to monitor the progress towards LDN. The adoption of **quantitative targets** (such as LDN and zero net land take) at Member State level would be a good step to making land and soil-related SDGs more operational.

Also, for **other soil degradation processes, the methodology in Europe for monitoring and assessing the land and soil SDGs should be more clearly defined and elaborated**. Although many countries have started to measure and monitor the land and soil SDGs, there is little coordination and no standard approach yet. Moreover, important soil degradation processes are not taken into account in comprehensive monitoring schemes for all ecosystems; while soil is part of all terrestrial ecosystems and therefore needs well-defined targets that can be assessed with a good set of indicators to assess the impact of measures taken for protection and restoration.

Essential for the success of the achievement of land and soil related SDGs is raising awareness for sustainable land and soil management. **Better awareness of the importance of land and soils** will promote region-specific but interdisciplinary land use planning at Member State level, in which the soil and landscape should play an important role. Moreover, it is important to assess the impact of new projects on the surrounding area, including off-site and on-site effects. In addition to a land-use plan, there should be a long-term vision, i.e. how will the implementation of the plan affect the area itself and its surroundings in 20 years?

For this, awareness needs to be raised on different levels and targeted for each specific stakeholder group to give all stakeholders an action perspective by showing good, real-life examples that are connected to them and which they could implement themselves:

- For practitioners and end-users: show and tell how land restoration is the best contribution to achieve the SDGs. **Exchanging region-specific solutions** (such as the lighthouse example approach in this report) will enhance local people's awareness of the importance of land and soil. They know their area and are emotionally attached to it. Seeing sustainable solutions implemented in their own region will raise the awareness of the potential and possibility of sustainable land and soil management. This can be helpful to make the transition to a truly new system which can replace an 'old and unsustainable' system of soil and land management.
- For science: the science community has to step out of its comfort zone and show what soil can bring to society. Scientists need to learn to communicate about soil: attract, interest, desire, action, as scientific evidence alone will not move policy.
- For policymakers: political leadership is needed to promote soil and land-related SDGs if we are to make real progress. Assisting countries to achieve their LDN target by showing good examples of countries where successful policies have already been implemented.
- Education: at all levels of education, starting at a young age, soil and land should be brought to their attention to show the importance of this for society in terms of food security, water resources, climate change and human health. The climate change action has a head start and can also serve the soil awareness by showing how system Earth works and how a healthy soil forms an important basis for this.

Recommendations: Create an enabling environment for transitional change

1. Institutional coordination and implementation

The European Green Deal and its associated actions, as well as other overarching strategic documents, need to provide the framework driving the implementation and operationalisation of the soil and land SDGs

Whilst broad ambitions provide a high-level framework for soil and land protection, they clearly need to be translated into measurable, action-oriented policy targets, specifying incremental steps to be taken to ensure their realisation. A starting point for formulating targets is a robust understanding of the pressures impacting the state of land and soil and thus the SDGs. On this basis, sector or land use-specific targets could be formulated. The update of key strategic policy documents, including the Soil Thematic Strategy and the 8th Environmental Action Programme, as well as actions planned under the Green Deal (e.g. the Zero Pollution Action Plan, the Strategy for a Sustainable Built Environment) offer opportunities to define SMART[1] targets for specific sectors or types of land use.

Existing policies targeting the prevention of land and soil degradation remain fragmented and rely on sectoral interventions

- While environmental mainstreaming that incorporates soil and land aspects is important and can be effective, its results are dependent on the extent to which clear objectives and targets relating to land and soil can be incorporated in other policies, and on the effectiveness of their implementation. Ongoing and upcoming policy reviews, including for example the Sewage Sludge Directive, Industrial Emissions Directive and the Sustainable Use of Pesticides Directive, need to integrate the ambitions and targets formulated by the high-level strategic documents identified above.
- At Member State level, the adoption of quantitative targets (such as LDN and zero net land take) would be a good step to making land and soil-related SDGs more operational. It would be useful to share Italy's experience with the UNCCD's LDN Target Setting Programme with the other Member States.
- National sustainable development plans or strategies need to be updated to integrate the SDGs and should include explicit targets and actions for sustainable land and soil management.

Member States have adopted national sustainable development plans or strategies but not all address the SDGs as adopted in 2015

Member States that have not yet updated their national strategic documents following the adoption of the Sustainable Development Goals adopted in 2015, are encouraged to initiate a strategy review to ensure that their national frameworks guiding their activities serve the ambitions of the UN's Agenda 2030, but also contribute to the achievement of EU objectives such as no net land take or climate neutrality by 2050 and the zero pollution ambition.

Member States have adopted coordinated and participatory approaches to implement the SDGs but focus on the involvement of organised interests

- Information about the SDGs, their relevance to society as well as the individual, and the important role land and soil play in realising these ambitions, need to be widely communicated. To engage people, we should use the current momentum on climate and biodiversity to put soil and land on the agenda by showing how they link to food security and the mitigation and adaptation of climate change impacts.
- The update of the STS (planned in 2021) offers an opportunity to build on its positive experiences with raising awareness for soil. Mirroring recent initiatives in other policy fields[2], 'soil literacy'[3] may be a concept which could be developed and promoted at EU level as a way of delivering a more coordinated approach to soil awareness activities in Europe. Such an initiative could involve the setting up (and financing) of a new platform connecting relevant organisations and projects or may

[1] Specific, Measurable, Achievable, Realistic, and Timely

[2] See for example the EU4Ocean Coalition for Ocean Literacy which aims to bring together organisations, projects and people that contribute to ocean literacy in order to create awareness and trigger action for sustainable ocean management, build capacity and put ocean literacy on the policy agenda. Information available at: https://webgate.ec.europa.eu/maritimeforum/en/frontpage/1482

[3] The Global Soil Biodiversity Initiative notes that "The world needs more citizens who are soil literate—who understand how soils and humanity depend on each other for their mutual long-term existence. The insufficiency of such understanding (at societal levels) is due, in part, to the world's "soil education gap"—the shortage of soil education efforts relative to the scale of the societal need for them." (https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2018/10/2/overcoming-challenges-of-the-soil-education-gap-part-2

build on the work of existing groups such as the European Network for Soil Awareness[4] and the European Soil Bureau Network[5].
- The increased emphasis on communication and dissemination introduced with the Commission's Research Framework Programme Horizon 2020 needs to be maintained, expanded, and refined to ensure widely supported outcomes that will improve uptake or research results in practice.

2. Land degradation/land degradation neutrality definitions and indicators

The SDGs and their associated targets for land and soil should be elaborated at EU level in order to develop a clear framework for data collection, monitoring, analysis and target setting.
- The methodology in Europe for monitoring and assessing the land and soil SDGs should be more clearly defined and elaborated for all soil degradation processes. Although many countries have started to measure and monitor the land and soil SDGs, there is little coordination and no standard approach yet.
- An LDN indicator based on the three UNCCD sub-indicators (land cover, land productivity, and carbon stocks) provides a good starting point for measuring progress in relation to the land and soil-related SDGs but further guidelines and coordination, as the Commission is currently working on, is necessary for this indicator to become fully operational. The standard indicators as defined by the UNCCD are not sufficient for the European context as they do not take into account several important issues:
  - For most of the UNCCD sub-indicators there is more detailed information available in Europe than the generally used Tier 1 data.
  - The mosaic landscape in most European countries is not represented in the large pixels that are used in the UNCCD indicator set.
  - Important soil degradation processes are not taken into account in the UNCCD methodology, such as biodiversity decline (e.g. afforestation with single species); soil erosion (from terraced landscapes to large fields on sloping areas) or contamination.
- Design and implement a comprehensive monitoring scheme for all ecosystems; soil is part of all terrestrial ecosystems and therefore needs well-defined targets that can be assessed with a good set of indicators to assess the impact of measures taken for protection and restoration.

3. Measures to prevent, reduce or reverse degradation

Availability of examples:
- Exchange region-specific solutions to enhance awareness of the importance of land and soil for local people, who know their area and are emotionally attached to it. Seeing sustainable solutions implemented in their own region will raise the awareness of the potential and possibility of sustainable land and soil management. For example:
  - Land and soil degradation and restoration measures as contributions for achieving sustainable development and with that, the SDGs
  - Nature-based solutions and agro-ecology principles contribute significantly to climate mitigation and adaptation, at the same time addressing biodiversity loss and land degradation
  - Measures to maximise resource efficiency: reusing and recycling soil and land resources
- Make new examples of region-specific solutions available via databases like WOCAT[6] and/or the new EU Soil observatory of JRC (in line with the activities of the Horizon Europe Mission 5 Soil Health and Food[7]).The development and exchange of good examples should be promoted on natural, urban and industrial land as well as for agricultural soils.

Shared methodologies:
- Develop tailored good practices for specific regions. This can be helpful to make the transition to a truly new system which can replace an 'old and unsustainable' system of soil and land management.
- Use a **concrete methodology** (for instance the lighthouse methodology proposed in this report) to assess the impact of the specific land management measures on soil and land-related SDGs, to demonstrate the trade-offs and synergies between the different SDGs impacted by those measures.
- Design a methodology for evaluating the costs and benefits for specific measures for the realisation of the SDGs.

[4] http://www.bodenbuendnis.org/en/
[5] https://ec.europa.eu/jrc/en/network-bureau/european-soil-bureau-network
[6] WOCAT is a global network on Sustainable Land Management (SLM) that promotes the documentation, sharing and use of knowledge to support adaptation, innovation and decision-making in SLM. Available via https://www.wocat.net/en/.
[7] https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme/mission-area-soil-health-and-food_en

1 Introduction

Land and soil are essential for several ecosystem services and functions. This is reflected in the UN Sustainable Development Goals (SDGs), where land and soil play an important role in achieving half of the SDGs, specifically SDGs 2, 3, 6, 11, and 13–15, which relate to food security, human health, land management, water security, urban development, climate change and sustainable ecosystem services (EASAC, 2018; Keesstra et al, 2016).

Land and soil are limited and unrenewable natural resources and yet, according to the EEA Dashboard on land take, the area's agricultural, forest and other semi-natural and natural land taken into urban and other artificial land development ('land take') exceeds 500 km^2 per year in the EU[8] for the period 2012-2018 (EU28 countries only). Increasing land take, loss of soil function and ecosystem services have been recognised as some of the major environmental and socioeconomic challenges in Europe. In 2006, the EU adopted a Soil Thematic Strategy, aiming to protect soil and ensure its sustainable use (European Commission, 2006), while the 2011 Roadmap to a Resource Efficient Europe (European Commission, 2011) included the goal of achieving no net land take by 2050. This was echoed by the 7th EU Environment Action Programme as adopted by the European Parliament and the Council in 2013, which called on Member States to put policies in place by 2020 to achieve 'no net land take' by 2050 and to reduce soil erosion and the loss of soil organic matter (EC 2011a).

A recent comprehensive review of the state of the world's soils observed that most of these resources are in fair, poor or very poor condition, with 33% of land 'moderately to highly degraded'. The chief threats to the integrity and quality of Europe's soil resources have been identified as climate change, soil sealing, salinisation, compaction, acidification, chemical pollution, loss of organic carbon and soil biodiversity erosion (FAO and ITPS, 2015). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) states that 'avoiding, reducing and reversing land degradation is essential for reaching the majority of the Sustainable Development Goals and would deliver co-benefits for nearly all of them' (IPBES, 2018). Figure 1.1 shows expert judgement of how efforts to address land degradation impact on the SDGs.

[8] Land take 2000-2018, average annual data for the period 2012-2018, https://www.eea.europa.eu/data-and-maps/dashboards/land-take-statistics.

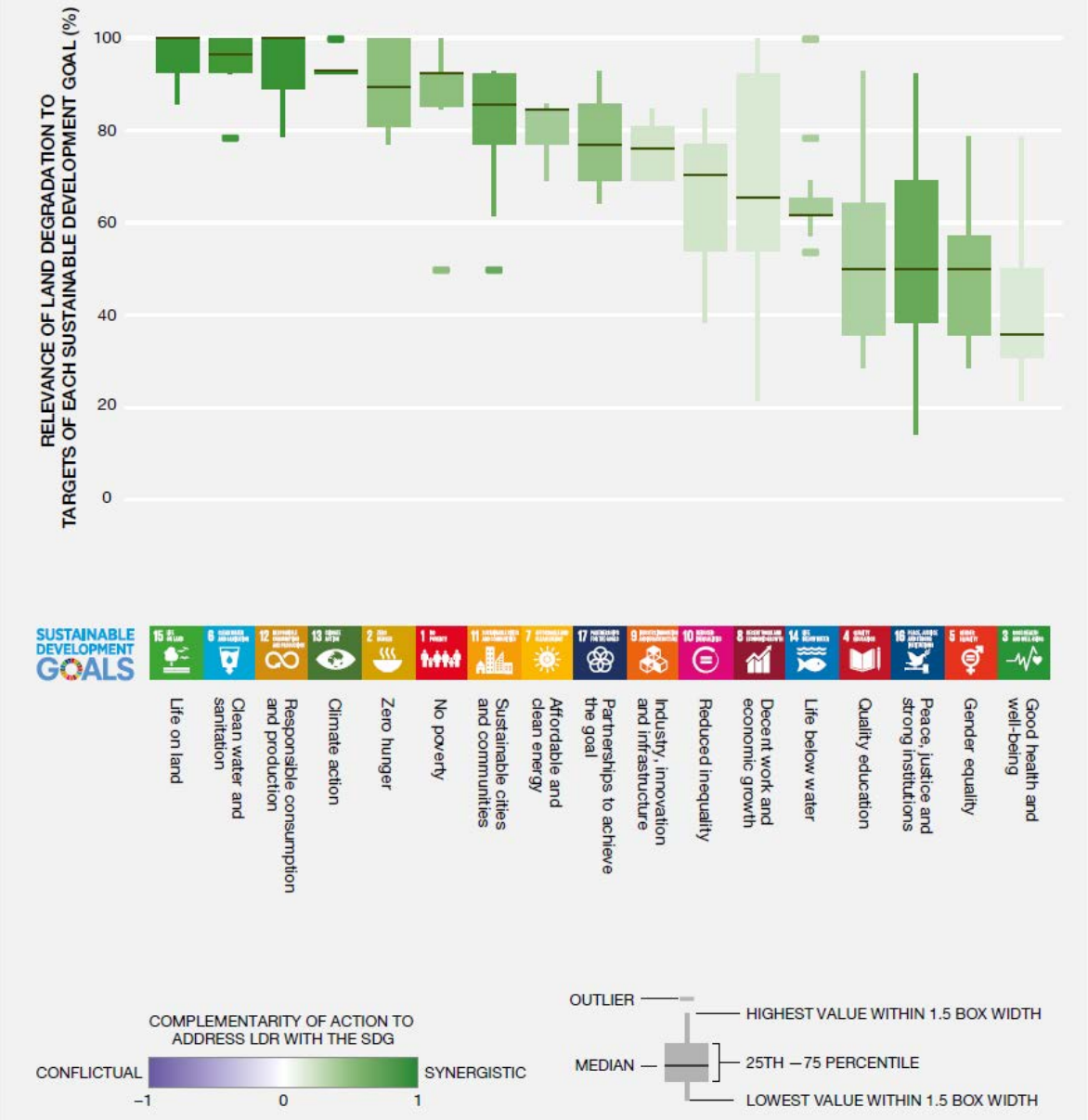


Figure 1.1 *Relevance of land degradation to targets of each SDG*
Vertical axis: % of experts indicating that halting land degradation and restoration is relevant to achieving that goal. Green colours: indicate the degree to which the targets are synergistic with progress to address land degradation: dark green = all targets are aligned, lighter green boxes = potential trade-offs between targets and efforts to address land degradation and restoration. Nowhere was the relationship between efforts to address land degradation and meeting the SDGs judged to be more conflicting than synergistic.

With the adoption of the SDGs by the UN General Assembly in September 2015, the EU and the Member States committed to achieving land degradation neutrality (LDN) in the EU by 2030.

However, the most recent assessment of land take (i.e. the loss of agricultural land, forests and other semi-natural and natural areas to the development of buildings and other artificial surfaces) in the EU indicates that meeting the aim of no net land take by 2050 is unlikely to be achieved (EEA, 2018). It will be similarly difficult to achieve the EU's LDN objective by 2030 (European Court of Auditors, 2018). However, many organisations and Member States are developing activities towards avoiding land and soil degradation and achieving the SDGs.

This final report was drafted as part of the DG Environment (DG ENV) funded project *Providing support in relation to the implementation of soil and land related Sustainable Development Goals at EU level* (Service contract No. 07.0202/2018/792008/SER/ENV.D.1).

Guide to the Final Report

Section 2 briefly describes the project's work programme and details the methodology adopted for each task. Section 3 presents the findings of the analysis of the implementation of land and soil-related SDGs. The report concludes with a conclusion and recommendations (Section 4).

The following Annexes are submitted with this Final Report:

1. Overview of the project's research questions;
2. Questionnaire sent to the Soil Expert Group and selected experts;
3. Soil and land-related SDGs and indicators;
4. Relevance of EU policies for implementing land and soil-related SDGs;
5. Member State fact sheets; and
6. Examples of good practices/initiatives to achieve soil and land-related SDGs.

2 Description of work and deliverables

This section will briefly describe the aims and objectives of the study as well as the methodology adopted to meet the objectives.

2.1 Research aims and questions

The aim of this study is to analyse progress on the implementation of land and soil-related SDG targets in the EU, taking due consideration of the 2030 Agenda commitments, and to provide a platform for exchanges on best practices between Member States on the implementation of land and soil-related SDGs.

The specific objectives of the study are to:
- Analyse the state of play of the implementation of land and soil-related SDGs in the EU, in particular on the LDN target (15.3).
- Support the organisation of a conference on the implementation of land and soil-related SDGs in the EU to discuss the findings of Task 1.
- Compile and communicate good practices and provide recommendations for the implementation of land and soil-related SDGs in the EU.

Project outputs will support the Commission in identifying opportunities for action at EU level to facilitate and promote the implementation of land and soil-related SDGs in the Member States.

2.2 Organisation of the work and methodology

The work for this project is organised into three main tasks. This section presents the methodology. The sub-sections below briefly recap the objectives of each task and detail the steps to deliver the expected outcomes.

2.2.1 Task 1 - Analysis of the state of play of the implementation of land and soil-related SDGs

Task 1 aimed to analyse the state of play of the implementation of land and soil-related SDGs in the EU, in particular on the LDN target (15.3). Key areas of analysis included:
- Coordination on SDGs and leverage at EU and national level;
- Implementation of land and soil-related SDGs at EU and national level;
- Land and soil degradation target-setting at EU and national level;
- Measures to prevent, reduce or reverse degradation at EU and national level.

The data collection and analysis were guided by a set of research questions which are listed in Annex 1.

The analysis drew from a wide range of information sources, including scientific literature, national plans on sustainable development, policy documents and assessment studies, as well as previous surveys carried out by the Commission, the United Nations Convention to Combat Desertification (UNCCD) or other organisations and projects. Primary data were collected through a questionnaire circulated to the members of the EU Soil Expert Group (EU SEG) and national experts who were contacted to strengthen the response rate. The questionnaire (see Annex 2) included ten open-ended questions that reflected the main research questions, plus one question to elicit information on respondents' Member State and institutional affiliation. Overall, 18 questionnaires were returned, of which 1 of them only filled in the first question, so it was not further used in the analysis. The

questionnaires are, covering 15 countries. Several countries submitted two replies (Italy - two from EU SEG; Slovakia - two national experts (one of which sent in the incomplete response); Denmark – one EU SEG, one national expert). Of the 18 questionnaires, 13 were completed by representatives of national authorities and agencies, with the remaining five returned by the national experts.

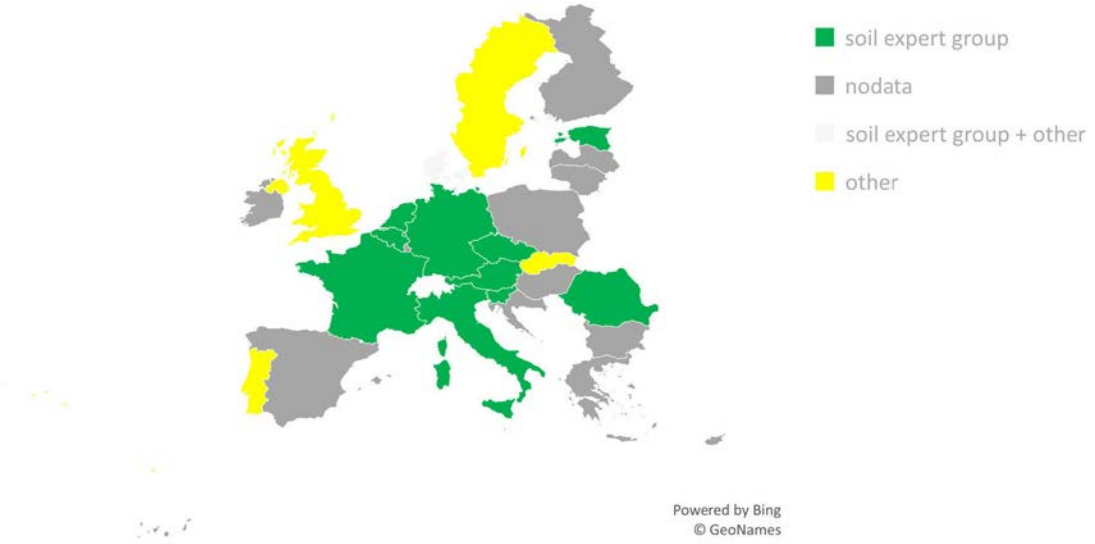


Figure 2.1 *Geographical coverage of questionnaire responses*

2.2.2 Task 2 - Support the organisation of a conference

A conference on the implementation of land and soil-related SDGs was organised on 25 November 2019 in Brussels. The conference pursued the following objectives:

- Provide an opportunity for stakeholder exchanges;
- Validate and complement the findings from Task 1 in order to identify and share good practices;
- Provide an opportunity for stakeholders to exchange their experiences, ideas and prospects for the implementation of land and soil-related SDGs.

The conference brought together 250 participants from a variety of backgrounds, including EU and national decision makers, researchers, managing authorities, industry, and representatives of civil society organisations. The agenda, as well as summaries of presentations, panel discussions and interactions, were documented in the conference proceedings. The proceedings can be accessed at https://www.soil-conference.org[10].

2.2.3 Task 3 - Compilation and communication of good practices and recommendations

Task 3 extracted and formulated the key findings of the Task 1 analysis, together with the main learning points from the Task 2 conference. These were gathered in a brochure on the implementation of land and soil-related SDGs in the EU, together with examples of good practices. The brochure illustrates how land and soil-related targets and indicators are implemented in various Member States. The examples were gathered from literature, the conference presenters and attendees, and completed with targeted requests to organisations and networks such as the Soil Expert Group. Lessons learned and recommendations are tailored to the policy, research and practice communities and citizens. The brochure is available in English, Spanish, French and German and shared widely, through several channels of communication[11].

[9] The conference proceedings were submitted to the Commission and disseminated to all conference participants in January 2020.
[10] The conference proceedings were submitted to the Commission and disseminated to all conference participants in January 2020.
[11] Online at https://ec.europa.eu/environment/soil/index_en.htm

3 State of play of the implementation of land and soil-related SDGs in the EU

This section presents an analysis of the state of play of implementation of land and soil-related SDGs at EU and national level. The data collection and analysis focused on information related to the SDGs on food security (SDGs 2 and 6), human health (SDG 3), sustainable cities (SDG 11), climate change (SDG 13), land-based nutrient pollution of the seas (SDG 14), and sustainability of terrestrial ecosystem services (SDG 15) (see Annex 3). Other SDGs rely on the availability of land and healthy soil resources, but the links between these SDGs and soil are somewhat weaker (Bouma, 2019).

Findings are organised along the following themes:

- Coordination and implementation of land and soil-related SDGS at EU and national level (Section 3.1);
- Soil and land degradation target-setting at EU and national level (Section 3.2);
- Measures to prevent, reduce or reverse degradation (Section 3.3).

Preliminary findings of the analysis were discussed with stakeholders at the conference on 25 November 2019 and subsequently updated for this Final Report.

3.1 Coordination and implementation of land and soil-related SDGs

The EU is a permanent observer at the UN General Assembly and played an active role in the development of the SDGs (European Commission a, no date). Since the Adoption of the 2030 Agenda, the European Commission has published a series of documents outlining how it envisages implementing the SDGs. Key among these are the Communication on 'Next Steps for a Sustainable European future' (European Commission, 2016 a), and an accompanying Staff Working Document on 'European actions supporting the 2030 Agenda and the SDGs' (European Commission, 2016 b) (see Box 3.1).

Box 3.1 Implementation of the SDGs at EU level – key steps and documents

Implementation of the SDGs at EU level

In November 2016, the European Commission issued a Communication on 'Next steps for a sustainable European future. European action for sustainability' (European Commission, 2016a), in which it states the Commission's intention to mainstream the SDGs 'into EU policies and initiatives, with sustainable development as an essential guiding principle for all its policies', to report regularly on the EU's progress towards the implementation of the 2030 Agenda from 2017, and to launch a 'reflection work on developing further a longer-term vision in a post-2020 perspective' (European Commission, 2016a). The Commission also emphasised the importance of including the SDGs as guidance in the actions taken within the European Semester (European Commission, 2017a) and the intention that the next Multi-Annual Financial Framework (MFF) (2018) will be in the context of sustainable development.

In 2017, the Commission established the Multi-stakeholder Platform, which saw a collaborative process to prepare a joint contribution to the Commission's reflection paper 'Towards a sustainable Europe by 2030' announced in the Commission Work Programme for 2018 (European Commission, 2018a). The platform also proposed the development of an overarching Sustainable Europe 2030 Strategy to guide all EU policies and programmes. The Commission Work Programme for 2019 confirmed the planned adoption of this reflection paper, published in January 2019 (European Commission, 2019a). The paper 'presents the challenges faced by the EU, the key enablers of an effective transition towards sustainability, and three possible scenarios for integrating SDGs within EU policies' (IEEP, 2019).

Since 2016, Eurostat has published reports providing an overview of progress towards the SDGs in the EU. The 2019 report (Eurostat, 2019) was at the core of the EU's reporting to the UN High Level Political Forum (HLPF) in July of that year. 'The report uses the EU SDG indicator set, which was developed to monitor SDG progress in the EU context and adopted in May 2017 by the European Statistical System Committee' (IEEP, 2019). In particular, the EU reported that it was making progress on most of the SDGs. The Eurostat website offers interactive tools where data can be compared (Eurostat, no date).

The Commission also presented the HLPF with 'the 2019 Joint Synthesis Report on the European Consensus on Development' (European Commission, 2019b), which provides an overview of the EU and Member State actions for the implementation of the 2030 Agenda in developing countries through development cooperation; and the '2019 report on Policy Coherence for Development (PCD)' (European Commission, 2019 c), which 'illustrates contributions by the EU and its Member States to support achievement of the SDGs in partner countries over the period 2015-2018. The report stems from the new European Consensus on Development (2017), which foresees that PCD is applied across all policies and all areas covered by the 2030 Agenda' (IEEP, 2019).

At the end of 2019, the European Commission published its Communication on the European Green Deal which sets out the roadmap for making the EU's economy sustainable. It is considered an integral part of this Commission's strategy to implement the United Nation's 2030 Agenda and the SDGs. The Roadmap annexed to the Communication identifies key actions to be implemented under the Green Deal, of which the Biodiversity Strategy for 2030, the Zero Pollution Action Plan, as well as the Soil Sealing Action and Brownfield Action will be crucial in advancing land and soil protection in Europe.

This section presents a cutting-edge review of the implementation of land and soil-related SDGs in the EU Member States. Section 3.1.1 will present EU actions and policies enabling the implementation of land and soil-related SDGs at EU level. This will be followed by an overview of the Member States' institutional arrangements for implementing and coordinating land and soil-related SDGs, as well as the most relevant policies and strategies at national level (Section 3.1.2). Member State fact sheets are annexed to this report (Annex 5) and detail each country's progress towards SGD implementation.

3.1.1 EU policies enabling the implementation of land and soil-related SDGs

Land and soil degradation have long been recognised as a problem, both at EU and international level (see Box 3.2), yet policy responses remain fragmented, with more emphasis on awareness-raising than on targeted and comprehensive policies to change management practices. The protection, maintenance and improvement of land and soil at EU level relies heavily on sectoral and environmental policies. In addition, not all soil threats are equally well targeted by existing instruments. A recent European Court of Auditors' report notes that there is no EU-level strategy on desertification, and land degradation in general. The report emphasises that there are "a range of strategies, action plans and spending programmes at EU level […], which are relevant for combating desertification, but which do not focus on it". The Court of Auditors subsequently calls on the

Commission to "assess the appropriateness of the current legal framework for the sustainable use of soil across the EU, including addressing desertification and land degradation" (ECA 2018, p. 44).

Box 3.2 Overview of the international soil and land policy framework

The International soil and land policy framework

The UNCCD, adopted in 1994, was the first legally binding UN international agreement relevant to soil (UNCCD a, no date). The aim of the UNCCD is to prevent or reverse issues of drought, soil productivity and living conditions in the world's drylands (UNCCD b, no date). Parties to the Convention can declare themselves 'affected' countries, which then requires them to implement national, regional and sub-regional action programmes to reverse land degradation (UNCCD a, no date). The EU is a party to the UNCCD (since 1998) and all EU Member States are also individually either accession countries or ratified parties (UNCCD c, no date). Thirteen EU Member States, all located in Central and Eastern Europe, currently have 'affected country' status[12], and must therefore prepare Regional and National Action programmes identifying contributing factors and measures to combat desertification.

Progress on the UNCCD was reviewed at the 2012 UN Conference on Sustainable Development. The outcome document, 'The Future We Want' (United Nations, 2012), included a section on 'Desertification, land degradation and drought'. It recognised the global problem of land degradation, the importance of soil management to sustainable development, and the need to take urgent action to reverse land degradation. It set a target of achieving a land-degradation-neutral world and called for the development of scientific indicators, scientific research and sharing of information relevant to land degradation. The target of land-degradation-neutrality (LDN) was taken up as one of the UN Sustainable Development Goals in 2015, making this target legally binding for all signatories.

In 2012, the Food and Agriculture Organization of the United Nations (FAO) Global Soil Partnership (GSP) was established, a voluntary, non-legally binding partnership that functions as a global platform for stakeholders to discuss and address global soil issues, mandated to improve governance and promote sustainable management of soils, including through awareness-raising (FAO, 2012). In 2013, the Intergovernmental Technical Panel on Soils was established as the scientific advisory body of the GSP. It is also responsible for producing the Status of World Soil Resources, a report delivered in December 2014 to mark the beginning of the International Year of Soils, looking at the threats to soils and ways to combat soil degradation.

In 2013, the European Soil Partnership was established by the GSP as the Regional Soil Partnership for Europe. Its Secretariat is hosted by the European Commission's Joint Research Centre (JRC). Its aim is to coordinate soil-related networks and activities and to contribute to the European chapter of the Status of World Soil Resources report (FAO, no date). It aims to bring together all of the stakeholders and institutions in Europe willing to adopt the principles of the World Soil Charter (see below), to give guidance on goals and priorities tailored to specific regions, and to develop relevant activities in those regions (ESDAC, no date).

The original World Soil Charter was adopted by the FAO in 1982 and revised in 2015. It sets out key principles relating to soil functions, threats, and sustainable management, as well as guidance for action towards sustainable soil management. It aims to ensure that soils are managed sustainably and that degraded soils are rehabilitated or restored. It also states that governments should support and develop initiatives to aid the adoption of sustainable soil management, support research programmes, contribute to national and global soil information, monitor sustainable soil management, and 'explicitly consider the role of soil management practices in planning for adaptation to and mitigation of climate change and maintaining biodiversity' (FAO, 2015). The World Soil Charter is complemented by the Voluntary Guidelines for Sustainable Soil Management, published by the FAO in 2017, which translate its principles into practice for policy makers, farmers, and other stakeholders (FAO, 2017).

[12] Bulgaria, Croatia, Cyprus, Hungary, Italy, Greece, Latvia, Malta, Portugal, Romania, Slovakia, Slovenia, and Spain. The EU has not declared itself as a party affected by desertification.

3.1.1.1 Analytical framework and policy mapping

In order to identify the main EU policies enabling the implementation of LDN target and other soil and land related SDGs, we analysed the existing EU policy framework. In the absence of a clear definition of land degradation and operationalisation of the SDGs at EU level, we mapped the relevance of different soil threats and functions for the SDGs as the focus of this study. We then reviewed how different policies contribute to reducing soil threats and improving soil functions respectively as a means of gauging the extent to which current policies enable progress towards meeting the SDGs. Linking the soil functions and threats to the land and soil-related SDGs highlights the potential opportunities and shortcomings of existing policies to enable progress towards meeting the SDG (see Figure 3.1).

Figure 3.1 *Analytical framework adopted for the EU-level policy analysis*

Table 3.1 *Links between soil function, soil threats, and the SDGs (Keesstra et al, 2016; 2018; Glaesner et al. 2014; Oenema et al., 2017; Stolte et al., 2016)*

							
SOIL FUNCTIONS							
Biomass production, including agriculture & forestry: Soil is the medium by which food for people and feed for farm animals is produced (SDG 2, 3). It is also a key resource for meeting the increased demand for biomass for energy and fibre products (SDG 15).							
Storing, filtering & transforming nutrients, substances & water: Soil acts as a storage reservoir for nutrients and wastes, as a filter for water and air contaminants and as a transformation medium for chemicals. This soil function affects water quality (SDG 6; 14) because chemical inputs to soil may cause severe water pollution if they are not captured by the soil. Providing this function is therefore particularly important for food and energy security, climate action and resource efficiency (SDGs 2, 3, 11, 13, 15).							
Biodiversity pool, such as habitats, species & genes: Soil organisms play an important role in the release and/or retention of nutrients during the decomposition of organic matter. These organisms affect soil fertility (SDG 15) and therefore food production (SDG 2). The soil fauna additionally serves as a large gene pool that could be a source of new drugs to fight infectious human diseases (SDG 3).							
Physical & cultural environment for humans / human activities: Soil provides the physical and cultural environment for human activities and infrastructures (SDG 3 and 11), particularly human settlements, recreation, and nature tourism (SDG 2 and 15).							
Source of raw material: Soil functions as a source of minerals (SDG 3), fertilisers, construction materials, and other elements that are extracted or excavated by different industries (SDG 3, 11 and 15).							
Acting as carbon pool: Soil carbon sequestration is especially important for the mitigation of climate change impacts. Peatlands store particularly large amounts of carbon, and conversion of peatlands to arable land releases vast amounts of CO^2 into the atmosphere (SDG13). Carbon storage by soil is also very important for the soil ((SDG15), which ensures food (SDG 2) and energy security.							
Archive of geological/archaeological heritage: Soil provides a geological and archaeological archive of natural and human history and is important for multiple sectors, most notably tourism, research, and education (SDG 3).							
SOIL THREATS							
Erosion (wind and water): Soil erosion causes damage to land-based production (reducing crop yields) and loss of nutrient and organic matter-rich topsoil which negatively affects food security (SDG 2), and to some extent carbon storage capacity (SDG13) water bodies (SDG6 and 14) and destruction of wildlife habitats (SDG 15) cause negative impacts on the aquatic environment, and ultimately human health (SDG 3).							

	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND
Decline in organic matter: Soil organic matter affects water retention (SDG 6), nutrient cycling contaminant retention (SDG 3) and decay and providing habitats for soil organisms (SDG15). The loss of soil organic matter therefore impacts food production (SDG 2), water quality (SDG6 and 14), as well as human health (SDG 3) and reduces the soil's carbon storage capacities (SDG 13).	■	■	■			■	■
Sealing: Most human activities involve the construction and maintenance or occur on sealed areas and developed land. Sealing of soil causes a near complete loss of soil biodiversity impacting on organic matter and nutrient cycles, increases the risk of flooding, and landslides. Construction work can cause soil compaction due to heavy machinery. In addition, urbanisation usually increases contents of pollutants in the soil. Soil sealing reduces the soil's function as a sink and diluter for pollutants and reduces its capacity to store water. The near complete loss of all soil functions means that soil sealing negatively impacts food security by reducing the area of arable land, water quality and thus ultimately human health, as well as the climate impact mitigation capacities of soil and with that all soil related SDGs.	■	■	■	■		■	■
C**ompaction**: Compaction reduces water infiltration, increases water run-off and erosion and reduces crop root growth. Decreased root growth may substantially decrease water and nutrient uptake efficiency, which decreases food production (SDG 2 and3). Soil compaction affects the soil pore system (SDG 15), including water storage and filtering capacity and thus water quality (SDG 6 and 14).	■	■	■			■	■
Decline in biodiversity: Activities of the soil biota (SDG 15) are essential to most of the soil functions. These stretch beyond supporting food and fibre production, controlling erosion and attenuating pollution (SDG 2and 3). As well as sequestering carbon in the soil (SDG 13).	■		■				■
Floods/ landslides: Floods and landslides affect the stability and functionality of (man-made) structures and sometimes destroy them (SDG 11). The actual movement of soil mass can have negative effects on food production (SDG 2), biological habitats (SDG 14, 15), environment interaction, physical and cultural heritages (SDG 3) and sources of raw material (SDG 6).	■	■	■			■	■
Local/diffuse contamination: Soil contamination affects biomass production, and especially food crop quality and safety (SDG 2), the storing and cycling of water (SDG 6), nutrients and carbon (SDG 13), biodiversity (SDG 14, 15) as well as the physical and cultural environment for humans and human activities (SDG 3 and 11).	■	■	■	■		■	■
Acidification/Salinisation: Soil pH affects the soil's physical, chemical, and biological properties and processes, as well as plant growth (SDG 2). Acidification negatively affects crop yield and quality. Salinisation negatively impacts soil structure and lowers soil fertility, biomass production, soil biodiversity (SDG 15) and microorganisms' activity. Saline and sodic soils often have a low water infiltration rate, leading to more runoff and erosion (SDG 6, 14, 15).	■		■			■	■
Desertification: Degraded soils lose their capacity to capture and store water (SDG 6), nutrients, and carbon (SDG 13), and to support microbiological processes (SDG 15). Desertification has negative effects on all soil functions. Evidently, desertification has devastating effects on crop production and thus food security (SDG 2).	■	■	■				■

The policy selection was limited to strategies, policies and instruments with at least an indirect link to soil and land. Since most EU policies predate the adoption of the SDGs, the mapping exercise first drew from recent studies which broadly investigated the extent to which current EU policies promote the protection, maintenance and restoration of various soil and land functions or the reduction of soil degradation in general (Frelih-Larson et al., 2016; Vrebos et al., 2017; McNeill et al., 2018; Paleari, 2017; Frelih-Larson et al., 2016; Glæsner et al., 2014). This initial list was then evaluated and complemented by a quick review of those policy documents referenced by the policies already identified under the previous step. In addition, we explored information collected through a 2018 survey of the members of the Soil Expert Group[13]. Finally, we closely monitored new policy developments to capture any policy initiatives that could potentially increase soil and land protection as a basis for meeting the SDGs. There are several actions planned under the new Green Deal and which are to be further developed. These are not included in the analysis presented here (see Box 3.3).

Box 3.3 New EU-level policy initiatives relevant to soil and land

The Soil Thematic Strategy
To fulfil EU and international commitments on land-degradation neutrality, the Commission will update the EU Soil Thematic Strategy[14] in 2021.

The 8th Environmental Action Programme (EAP)
The 7th EAP, 'Living well, within the limits of our planet' came into force in 2014 and runs until the end of 2020.The 7th EAP formulated the objective that "Land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway" and called for actions to increase efforts to reduce soil erosion, enhance soil organic matter, remediate contaminated sites as well as to integrate land use aspects in coordinated policies at all levels of government. The EAP called on Member States to put policies in place to achieve no net land take by 2050[15]. The evaluation concluded that some progress towards achieving the objectives on land management and soil set out in the 7th EAP have been made, citing the lack of a comprehensive instrument protecting soil, common definitions, targets, priorities, and harmonised monitoring methodologies.as the key challenges to fully achieving the formulated soil objectives[16].

In October 2019, the Council of the European Union presented its conclusions of a meeting on the 8th EAP[17] and called upon the Commission *"to present at the latest by early 2020 an ambitious and focused proposal for the 8th EAP for the period 2021-2030 […] and stresses that the 8th EAP should build on the findings of the evaluation report of the 7th EAP, as well as the latest available science and knowledge, including the European environment – State and outlook 2020 report (SOER 2020)"* (p.5). In its conclusions, the Council *"underlines the need to take urgent additional action to protect and restore terrestrial, fresh water and marine biodiversity and ecosystem services, to promote nature-based solutions and to continue to promote sustainable management of soil"* (p.8). In January 2020, the Commission published its new work programme which announced the upcoming launch of a legislative proposal for an 8th Environmental Action Programme (EAP).

[13] In March 2018, the Commission administered a survey to the members of the EU Soil Expert Group which included the following two questions on the SDGs related to land and soil: (1) Do you agree that the objective of SDGs related to land and soil should be reflected in EU policies, in particular the 'Land Degradation Neutrality' target? If so, do you have any suggestions on how to do so? (2) Do you consider that there should be a coordinated approach at EU level to develop and implement Land Degradation Neutrality objective? Do you have any suggestions on how to do so?

[14] COM (2006) 231. Thematic Strategy for Soil Protection. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52006DC0231

[15] Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet'. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1597142785391&uri=CELEX:32013D1386.

[16] SWD(2019) 181 final COM(2019) 233 final. Evaluation of the 7th Environment Action Programme to 2020 "Living well, within the limits of our planet" Accompanying the document Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the evaluation of the 7th Environment Action Programme COM(2019) 233 final. Available at: https://ec.europa.eu/environment/action-programme/pdf/SWD_2019_181_F1_OTHER_STAFF_WORKING_PAPER_EN_V3_P2_1022341.pdf.

[17] Council of the European Union. 2019. The 8th Environment Action Programme: Turning the Trends Together - Council conclusions. Available at: https://www.consilium.europa.eu/media/40927/st12795-2019.pdf.

The European Green Deal[18]

The European Green Deal sets out the roadmap for making the EU's economy sustainable and sets out several key actions which will be crucial in advancing land and soil protection in Europe. The Zero Pollution Action Plan for Air, Water and Soil that the Commission will adopt in 2021 will address pollution of soil and land. Soil sealing, the re-use of excavated soil and rehabilitation of contaminated brownfields will also be addressed in the upcoming Strategy for a Sustainable Built Environment. As part of the Commission's Zero Pollution Ambition for a toxic-free environment, a new EU Chemicals Strategy for Sustainability will be put forward.

The recently published Farm to Fork[19] and the Biodiversity Strategy[20] set out the following targets and commitments:

- to promote the objective of zero pollution from nitrogen and phosphorus flows from fertilisers by at least 50% and fertiliser use by at least 20%. This should be achieved by strengthening the full implementation and enforcement of relevant environmental and climate legislation, and an action plan for integrated nutrient management (by 2022) %;
- to reduce the overall use of and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030;
- to recognise at least 10% of agricultural land as high-diversity landscape features;
- at least 25% of the EU's agricultural land must be organically farmed by 2030;
- commitment to significant progress in the remediation of contaminated soils.

Horizon Europe: Mission on soil health and food

The new European Research and Innovation Framework Programme, Horizon Europe, will commence in 2021. The European research and innovation missions, which are an integral part of the Horizon Europe framework programme, aim to deliver solutions to some of the greatest challenges facing our world, including one on soil health and food. The mission is still under development. Currently the aims of this mission are: (i) become the key tool to raise society's awareness of the importance of soils, engage with citizens, (ii) put Europe on a path towards sustainable land and soil management, (iii) create and combine knowledge and develop solutions for restoring soil health and soil functions. This is aimed to allow full use of the potential of soils to mitigate the effects of climate change and have wide-reaching impacts on food, people, and the planet. The results of the mission will directly feed into the new European Green Deal and contribute to the implementation of the SDGs.

Policies were organised into different policy clusters[21] and then further categorised by type of policy instrument[22]. In total, this scoping exercise generated a list of 28 policies (see Table 3.2). We acknowledge that this is not an exhaustive list of all policies at EU level which directly or indirectly impact on land and soil quality. They represent those policies most frequently cited by existing assessments reviewed for this analysis and found to be most relevant by the authors of this report.

[18] COM(2019) 640 final. The European Green Deal. Available at: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf.

[19] COM(2020) 381. final A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381.

[20] COM(2020) 380 final. Biodiversity Strategy for 2030 Bringing nature back into our lives. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380.

[21] The organisation of the policies identified into different policy clusters is based on the author's judgement and does not necessarily align with other classifications.

[22] Regulatory instruments (European legislative acts, including direct regulations, directives and decisions, targets, standards, bans, permits/quotas, planning/zoning) impose obligations, prohibitions or restrictions, introduce standards; Planning instruments (Action programmes, strategies, communications (e.g. green papers, white papers, roadmaps) provide orientation for policy-making; Economic instruments (Pricing, such as tariffs, taxes and charges and tradable allowances, subsidies, risk liability schemes, green public procurement, voluntary agreements) sanction or reward behaviour through market mechanisms; and Information instruments (Information campaigns, labelling, stakeholder and public participation, training, advisory services) aim to stimulate changes in public preferences and behaviour; generate information for policy formulation and evaluation.

Table 3.2 *Policies selected for analysis*

Policy document	Reference number	Policy Area
Regulatory instrument		
Sewage Sludge Directive (SSD)	86/278/EEC	Waste
Sustainable Use of Pesticides Directive (SUPD)	2009/128/EC	Chemicals
Water Framework Directive (WFD)	2000/60/EC	Water
Floods Directive	2007/60/EC	Water
Nitrates Directive	91/676/EEC	Water
Birds and Habitat Directives	2009/147/EC and 92/43/EEC	Nature
Strategic Environmental Impact Assessment (SEA) Directive	2001/42/EC	Horizontal
Environmental Impact (EIA) Directive	2011/92/EU	Horizontal
Environmental Liability Directive (ELD)	2004/35/EC	Horizontal
Renewable Energy Directive (RED II)	2009/28/EC recast by 2018/2001/EU	Energy
Industrial Emissions Directive (IED)	2010/75/EU	Climate Action
Landfill Directive	1999/31/EC recast by 2018/850/EU	Waste
Waste Framework Directive	2018/851/EU	Waste
Fertilising Products Regulation	2019/1009/EU	Chemicals
Organic production and labelling of organic products regulation	2018/848/EU	Agriculture
Effort Sharing Regulation (ESR)	2018/842/EU	Climate action
National Emission Ceilings Directive (NECD)	2016/2284/EU	Climate action
Plant Protection Products Regulation (PPPR)	91/414/EEC	Chemicals
Land Use, Land Use Change and Forestry Decision (LULUCF) Regulation	2018/841/EU	Climate action
Strategic instruments		
EU Forest Action Plan and Forest Strategy	COM/2013/0659	Forest
Roadmap to Resource Efficient Europe	COM/2011/571	Horizontal
EU Strategy on Adaptation to Climate Change	COM/2011/571	Resource
Soil Thematic Strategy	COM/2006/231	Soil
Farm to Fork Strategy	COM/2020/381	Food
Biodiversity Strategy to 2020 (Biodiversity Strategy for 2030[23])	COM/2011/244 (COM/2020/380) [24]	Nature
Economic instruments		
CAP Direct payments and market measures (Pillar I) and Rural Development (Pillar II) [25]	1305/2013/EU 1306/2013/EU 1307/2013/EU (COM/2018/392[26]) (COM/2018/393[27]) (COM/2018/394[228)]	Agriculture
LIFE Programme (LIFE+ Programme[29])	1293/2013/EU (COM/2018/385[30])	Environment
Information instruments		
Soil Sealing Guidelines	SWD/2012/101	Soil

[23] The analysis presented in this document covers both the Biodiversity Strategy to 2020 and the new EU Biodiversity Strategy for 2030 which was published in May 2020.

[24] COM(2020) 380 final Biodiversity Strategy for 2030 Bringing nature back into our lives. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380.

[25] In June 2018, the proposal for the post-2020 CAP was tabled; the analysis presented in this document covers both the existing and proposed regulations (as they were published in June 2018).

[26] Proposal for a Regulation establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans) COM/2018/392 final.

[27] Proposal for a Regulation on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU) No 1306/2013. COM/2018/393 final.

[28] Proposal for a Regulation amending Regulations (EU) No 1308/2013 establishing a common organisation of the markets in agricultural products, (EU) No 1151/2012 on quality schemes for agricultural products and foodstuffs, (EU) No 251/2014 on the definition, description, presentation, labelling and the protection of geographical indications of aromatised wine products, (EU) No 228/2013 laying down specific measures for agriculture in the outermost regions of the Union and (EU) No 229/2013 laying down specific measures for agriculture in favour of the smaller Aegean islands COM/2018/394 final/2.

[29] The analysis presented in this document covers both the current legislation as well as the proposal for a new regulation which was tabled in June 2018 and provides for a date of application as of 1 January 2021.

[30] Proposal for a Regulation establishing a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EU) No 1293/2013 final. COM/2018/385 final.

Having identified the policies potentially relevant for implementing land and soil-related SDGs, the next step was to examine the extent to which the selected policies address – directly or indirectly – different soil functions or threats. The analysis was recorded in a policy inventory, and included:

- Name of policy and official number
- Policy area (Nature, Water, Soil etc.)
- Type of interventions/measures
- General description
- Objectives/targets/priorities that are directly or indirectly relevant for soil/land
- Interventions/measures that are directly or indirectly relevant for soil/land
- Soil threats and functions that the policy may directly or indirectly improve/maintain (soil function) or reduce/prevent (soil threats)
- Relevance of policy for ensuring progress towards meeting SDGs

The review and description of these policies mainly drew from the original policy text as well as existing analyses**Fout! Bladwijzer niet gedefinieerd.** as these provided a comprehensive and detailed overview of relevant EU policies, links to soil threats and function, opportunities, and weaknesses.

3.1.1.2 Relevance of EU policies for meeting the SDGs

This section presents a summary of the potential contributions of EU policies to improving soil and land protection and management as a basis for meeting selected SDGs. A detailed analysis of how the different policies analysed here might contribute to meeting the SDGs by preventing and reducing soil threats as well as maintaining and improving soil functions can be found in Annex 4. It is important to note here that our assessment of the relevance of a given policy does not consider its actual effectiveness in the implementation of soil and land related SDGs. Many of the existing policies were created before the adoption of the SDGs and therefore do not explicitly reference the SDGs. An assessment of policy effectiveness is beyond the scope of this project.

The table below illustrates the large number of policy instruments that enable the implementation of SDGs, either through defining objectives and targets that – directly or indirectly – promote the protection or restoration of soil and land, or the provision of specific instruments and measures that could contribute to meeting the SDGs. Out of the 28 policy instruments reviewed, 14 contribute directly (in bold) to meeting at least three of the seven SDGs covered by this analysis.

Table 3.3 *Extent to which existing EU-level policy instruments for contributing to the achievement of the SDGs*

Policy	Relevance for progress towards meeting SDGs							Total		
	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	++	+	+/-
Regulatory instruments										
SSD	+	++	+/-		+	+/-	++	2	2	2
SUPD	+	++	++		+	++	++	4	2	
WFD	+	++	++	+	+	++	+	3	4	
Floods Directive	+	+	+	+	+	++	++	2	6	
Nitrates Directive	+	++	++		+	++	+	3	3	
Birds and Habitat Directive		+	+		+	+	++	1	5	
SEA Directive	+	+	+	+	+	+	+		7	
EIA Directive	+	+	+	+	+	+	+		7	
ELD	++	++	+	++		+	++	4	2	
RED II	+	+	+	+	+/-	+	+/-		5	2
IED	++	++	++	++	+	++	++	6	1	
Landfill Directive		++	++	++		++	++	5		
Waste Framework Directive	+	++	++	++		+	++	4	2	
Fertilising Products Regulation	+	+	+	+	+	+	+		7	
Organic Regulation	+	+	+		+	+	+		7	
ESR	+	+	+		++	+	++	2	4	
NECD	++	++	+		+	+	++	3	3	
PPPR		++	+	++		+	++	3	2	
LULUCF Regulation	+	+	+		++	+	++	2	4	
Planning instruments										
EU Forest Action Plan and Forest Strategy					++		++	2		
Roadmap to Resource Efficient Europe	++	+	++	++	++	++	++	6	1	
EU Strategy on Adaptation to Climate Change	+	+	+	+	+	+	+		7	
Soil Thematic Strategy	++	++	++	++	++	++	++	7	1	
Farm to Fork Strategy	++	++	+	+	++	+	++	6	1	
Biodiversity Strategy	++	++	++	++	++	++	++	7		
Economic instruments										
CAP Direct payments and market measures (Pillar I) and Pillar II (Rural Development)	++	+	+	+	++	+	++	3	4	
LIFE Programme	+	+	+	+	+	+	+		7	
Information instruments										
Soil Sealing Guidelines	+	+	+	+	+	+	++	1	6	

Key to table

++	A policy is highly relevant for a specific SDG, meaning that that its objectives and measures may directly contribute to meeting the respective SDG.
+	A policy has an indirect and somewhat weaker link to a specific SDG.
+/-	A policy might both facilitate and hinder meeting a specific SDG

Many of the policies assessed to have the strongest direct links to land and soil, and to most of the relevant SDGs, are mainly of a strategic nature, meaning that whilst they might explicitly address land and soil, they serve as a framework for other policies. This includes the Soil Thematic Strategy from 2006 that continues to form the cornerstone of EU-level policy on soil, the Roadmap to Resource Efficient Europe as well as the recently published Farm to Fork and Biodiversity Strategies. With the adoption of the last two Strategies, there is now a set of quantitative targets at EU level which take the form of broad ambitions (see table below). Whilst broad ambitions provide a high-level framework

for soil and land protection, they clearly need to be translated in measurable, action-oriented policy targets, specifying incremental steps to be taken to ensure their realisation.

Table 3.4 *Overarching quantitative soil and land targets at EU level*

Policy	Targets
Roadmap to a Resource Efficient Europe[31]	By 2050, all resources are sustainably managed, including land and soil: • By 2020, the area of land in the EU that is subject to soil erosion of more than 10 tonnes per hectare per year should be reduced by at least 25%, and • By 2020, SOM levels do not decrease overall and increase for soils currently with less than 3.5% organic matter.
Farm to Fork[32] and the Biodiversity Strategy[33]	• to promote the objective of zero pollution from nitrogen and phosphorus flows from fertilisers by at least 50% and fertiliser use by at least 20% by 2022 • to reduce the overall use of and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030 • to recognise at least 10% of agricultural land as high-diversity landscape features • at least 25% of the EU's agricultural land must be organically farmed by 2030.

Despite the lack of any legislative instruments specifically targeting the protection, maintenance and improvement of land and soil at EU-level, there is an array of sectoral and environmental policies that directly or indirectly address different aspects of land and soil management, thus providing opportunities to enable the implementation of the land and soil-related SDGs. In a 2018 Commission survey on soil policy development (EEA, 2016), half of the responding Member States acknowledged the comprehensive policy framework at EU level and highlighted the need to integrate land and soil-related SDGs into existing instruments.

Our assessment identifies the following regulatory, planning, and economic instruments as highly relevant for meeting the soil and land-related SDGs[34]:

- The **Sustainable Use of Pesticides Directive**: the Directive contributes directly to **SDGs 3, 6 and 14** by reducing the amount of harmful chemicals entering the soil, the aquatic and marine environment and agricultural products. Integrated pest management and other practices promoted by the Directive support **SDG 15**. Pesticides reduce soil microorganisms, resulting in reduced soil biodiversity and soil organic matter content. Low organic matter content results in lower water retention and reduced yields especially during drought and reduces the soil's carbon storage capacity. Thus, the SUPD is also likely to contribute to **SDGs 2 and 13** to some extent.
- The **Water Framework Directive:** the WFD does not explicitly address soil protection; however, its objectives will indirectly deliver several co-benefits for soil health and is likely to contribute towards meeting all SDGs to some extent: reducing soil contamination (**SDG 3 and SDG 11**), as less pollution means a lower risk of contamination for agricultural and urban areas; lower pollution levels along with erosion control also means lower harmful inputs into the marine environment (**SDG 14**), and minimisation of landslides/floods reduces land and soil degradations (**SDG 15**). The WFD's impacts on soil health in general will ultimately also benefit food production (**SDG 2**) and mitigating climate change impacts (**SDG 13**).
- The **Nitrates Directive** aims to protect surface waters and groundwater against pollution by nitrates from agricultural sources by establishing limit values and promoting good farming practices. Measures contained in the Codes of Good Agricultural Practice, albeit voluntary outside designated Nitrate Vulnerable Zones, may halt land degradation (SDG 15) and mitigate climate change impacts (**SDG 13**). Reduced runoff and leaching should decrease input into the aquatic and marine

[31] Qualitative targets were first established by the 7th EAP which states that, by 2020, land is managed sustainably and soil is adequately protected, requiring in particular 'increasing efforts to reduce soil erosion and increase soil organic matter,' and enhancing 'the integration of land use aspects into coordinated decision-making involving all relevant levels of government, supported by the adoption of targets on soil and on land as a resource, and land planning objectives'.

[32] COM(2020) 381. final A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381.

[33] COM(2020) 380 final. Biodiversity Strategy for 2030 Bringing nature back into our lives. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380.

[34] An analysis of all policies reviewed in this study can be found in Annex 4.

environment, thus benefitting **SDGs 6 and 14**. Better soil health will ultimately ensure sustained food production and thus contribute to **SDG 2.**

- The **Environmental Liability Directive:** the Directive establishes a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. The Directive covers damage to land, water, and biodiversity with (or under) land. It directly contributes to reducing soil contamination, and the loss of soil biodiversity. Reducing soil contamination ensures that soil can be safely used for human activities and biomass production. The Directive therefore contributes to **SDGs 2, 3, 11,** and 15. Decreased soil pollution can indirectly lower levels of contaminants entering the aquatic and marine environment (**SDG 6 and 14**).
- The **Industrial Emissions Directive**: the Directive aims to reduce and prevent emissions to air, water and land and reduce environmental impacts from industrial activities through a system of integrated permitting. The Directive covers both diffuse as well as point source pollutants from industry/combustion plant/waste installations and explicitly covers impacts on soils. Reduced soil contamination ensures that soil can be used safely for human activities and the production of biomass. The policy therefore contributes to **SDGs 2, 3, 11, and 15**. Reducing contamination to land and water will also indirectly contribute to fewer contaminants entering the aquatic and marine environment **(SDGs 6 and 14).**
- **The Landfill Directive**: the Directive aims to reduce and prevent emissions to air, water and land and reduce environmental impacts from industrial activities through a system of integrated permitting. The Directive covers both diffuse as well as point source pollutants from industry/combustion plant/waste installations and explicitly covers impacts on soils. Reduced soil contamination ensures that soil can be used safely for human activities and the production of biomass. The policy therefore contributes to **SDGs 2, 3, 11, and 15**. Reducing contamination to land and water will also indirectly contribute to fewer contaminants entering the aquatic and marine environment **(SDGs 6 and 14**).
- The **Waste Framework Directive**: the Directive aims to reduce the negative impact of waste generation and management on the environment and to increase the efficiency of resource use. Member States must take measures to ensure that waste management is carried out without endangering human health or the environment, including water, air, soil, plants, or animals. Measures are likely to reduce both local and diffuse contamination through deposition from water courses, run-off etc. Reducing soil contamination will ensure land can be used safely for human activities, and contribute directly to **SDGs 3 11, and 15** and to at least some extent, **SDGs 6 and 14**. The Directive promotes using biowaste for composting or anaerobic digestions, which could potentially contribute to improving soil organic matter, especially on agricultural land (**SDG 2**).
- **The National Emissions Ceiling Directive**: the NECD sets emission reduction commitments for 2020 and 2030 for five major air pollutants. It does not establish any soil-specific targets; however, Member States must draw up National Air Pollution Control Programmes containing an assessment of the likely impact of national emissions on air quality and identify mitigation measures. By limiting emissions, the carbon storage capacity of soil may be improved, and healthy fertile soils maintained for food production **(SDG 2 and 15**). Reducing emissions to soil will also contribute to **SDG 3**, and maintaining and protecting the carbon storage function of soils will contribute to **SDG 13**. Additional benefits will include a reduction of pollution in marine and aquatic environments.
- **The Plant Protection Products Regulations**: the PPPR requires that plant protection products have no unacceptable effects on the environment, specifically mentioning the contamination of soil and establishes procedures and criteria for the approval of active substances, safeners and synergists. The Regulation aims to protect human and animal health and the environment and prevent soil pollution from pesticides. It thus directly contributes to **SDGs 3, 11, and 15**. Minimising soil pollution will also reduce harmful substances in freshwater and the marine environments, thus contributing to SDGs 6 and 14.
- The **Roadmap to Resource Efficient Europe**: the Roadmap for Resource Efficient Europe provides strategic direction for the Member States by urging them to take action to achieve sustainable soil management by 2050. Actions target soil erosion, sealing and land take in general, contamination, and the decline of soil organic matter. The Roadmap promotes further research into ways of improving fertilisers, food production and bio-waste issues which could reduce dependence on mined phosphate. This will benefit soil protection, especially soil fertilisation. Finally, the Roadmap promotes further integration of resource-efficiency considerations into water policy and setting water efficiency targets. This could eventually minimise the impacts of droughts and floods by increasing

water retention in soils and efficient irrigation, which would therefore lead to better soil protection and contribute to minimising the risk of desertification. The Roadmap is likely to contribute to **all SDGs**. However, it is non-binding and only recommends Member States adopt soil and land protection actions.

- The **Farm to Fork Strategy:** the strategy is part of the 'European Green Deal' and aims to ensure sustainable food production, food security and fighting against food loss and waste. The strategy sets the objective of allocating at least 25% of EU agricultural land to organic farming by 2030 and to significantly increase the share of organic aquaculture, achievable through incentives complementary to the CAP, fiscal incentives and mandatory minimum criteria for sustainable food supplies from public authorities. Regarding chemical pesticides, the Commission intends to take additional measures to reduce the overall use and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030. On excessive nutrients (nitrogen and phosphorus), the Commission will work to reduce nutrient losses by at least 50% while ensuring that soil fertility does not deteriorate. These targets and associated actions will contribute significantly to **SDGs 2, 3, 13, and 15.** They will also provide important co-benefits for **SDGs 6, 11, and 14.**
- The **Biodiversity Strategy:** the EU Biodiversity Strategy for 2020 defines the EU's 2050 long-term vision for biodiversity and sets specific targets for 2020. The Strategy does not explicitly address land and soil but Target 2, "By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems", is indirectly relevant for soil protection. Sub-targets and associated actions are expected to have indirect positive impacts on soil health overall, and thus all SDGs. The new Biodiversity Strategy for 2030 formulates a number of new soil-relevant targets (see Box 2.3) which aim to significantly reduce soil pollution from fertilisers and pesticides, make significant progress with the remediation of contaminated soils, and increase the share of organically farmed land. According to the Strategy, at least EUR 20 billion per year (from public and private funding at EU and national levels) should be spent on nature spending and a significant proportion of the 25% of the EU climate action budget will be devoted to biodiversity and nature-based solutions. If all these targets of the Biodiversity Strategy can be realised, it will greatly contribute to **all SDGs**.
- **CAP Direct payments and market measures (Pillar I) and Pillar II (Rural Development**): The CAP aims to integrate ambitious standards on climate change, environmental services, and animal welfare into common farming practices. The current system deploys several instruments to this end. Direct payments are tied to cross-compliance and greening, both of which include practices that are good for the environment (and soil in particular) (Pillar I). Under Pillar 2, voluntary practices that contribute to the same objectives are rewarded with additional financial support. Direct payments are payed to farmers based on land area, with some exceptions. Cross compliance is the mechanism that links direct payments to compliance by farmers and includes two elements: statutory management requirements and good agricultural and environmental condition (GAEC). More specifically: GAEC 4 concerns minimum soil cover; GAEC 5 concerns minimum land management (important to prevent landslides/floods and thus **SDGs 2 and 15);** GAEC 6 concerns maintenance of organic soil matter (directly relevant for maintaining carbon storage capacities and biomass production and thus for **SDGs 2 and SDG 13**); in addition GAEC 1 concerns establishment of buffer strips along water courses which might reduce nutrient/chemical inputs to surface/groundwater and eventually the marine environment, this also reducing soil contamination (relevant for **SDGs 6 and 14);** GAEC 7 concerns retention of landscape features (indirectly contributing to preventing loss of biodiversity and potentially which are relevant for **SDGs 2 and 15**). Another important element that links direct payments to environmental protection is the so-called greening measures. In order to receive the last 30% of their land-based payments, farmers must comply with conditions relating to a) crop diversity b) permanent pasture c) Ecological Focus areas. Rural development measures (Pillar II) finance more demanding activities relating to farming, the environment and the reduction of greenhouse emissions ('agri-environment-climate measures'). From a soil protection and management perspective two of the six defined priorities, upon which Member States should build their RDPs, are the most relevant: restoring, preserving and enhancing ecosystems related to agriculture and forestry (focus area 4(c) - preventing soil erosion and improving soil management); and promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in the agriculture, food and forestry sectors (focus area 5(e) - fostering carbon conservation and sequestration in agriculture and forestry). In June 2018, the European Commission published a legislative proposal for the CAP post-2020. The current

system identifies six priorities and 18 focus areas for rural development which does not change the current structure substantially, other than incorporating the Rural Development Regulation into the CAP under Article 65. Currently, the AECMs are an important tool to deliver on environmental objectives and are the second most important measure in terms of financial allocation. The AECMs (now called AECH; incorporating organic, Natura 2000, water framework directive payments, animal welfare, forestry and non-productive investments) are allocated between 30-43% of the Pillar 2 budget. As in the current system, these practices must go beyond what the farmers are already doing to fulfil enhanced conditionality. In the new system, enhanced conditionality replaces the cross-compliance and greening requirements but building on the current system of Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Conditions (GAECs). New conditions with the potential to improve soil health have been added. Some of the new conditions incorporate greening requirements: permanent grassland is incorporated as GAEC 1, ecological focus areas are reflected in GAEC 9, and crop rotation is introduced to replace crop diversification as GAEC 8. Other new additions include the protection of wetlands and peatlands (GAEC 2). Eco-schemes are an important part of the new system. In their SPs, Member States will be required to set up voluntary eco-schemes for farmers, aiming to improve the climate and environmental ambition of the CAP. Such schemes will be available to farmers based on a list of practices (established by the Member States) that are beneficial for the environment and climate. Effective implementation of the CAP should lead to a decrease of all soil threats and an improvement of soil functions but will rely to a large extent on the Member States' SPs and their specification of the various GAECs. Similar to the existing CAP, the new CAP is expected to significantly contribute to meeting SDGs **2, 13, and 15,** with smaller co-benefits for **SDGs 3, 6, and 14.**

The analysis shows that the existing policy framework is expected to contributes to meeting the SDGs at the focus of this study. Soil threats which potentially hamper progress towards meeting SDGs 3 and 15 are directly targeted by several policies, except for compaction, salinisation and, soil sealing. None of these are addressed by existing EU legislation (c.f. EEA 2020)[35]. Progress towards meeting the remaining SDGs is (to date) likely to be a result of policies indirectly addressing relevant soil functions and threats (see figure below).

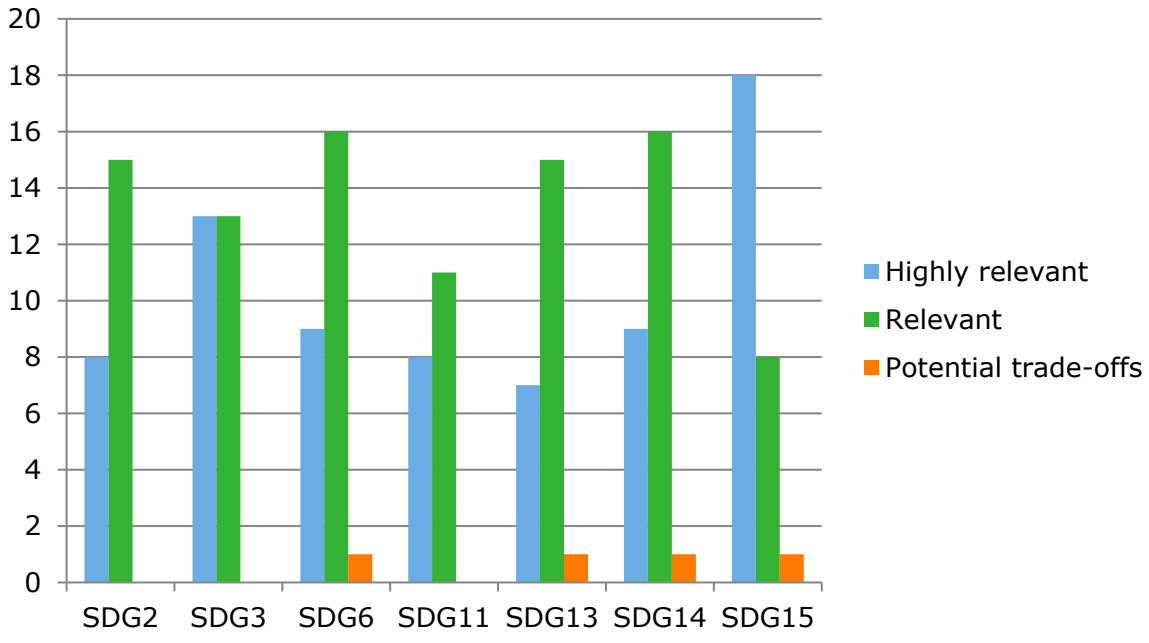


Figure 3.2 *Number of relevant policies broken down by SDG*

[35] Our analysis shows that these threats may indirectly be reduced through a number of horizontal policies, such as the EIA and SEA Directives as well as for example the Floods Directive (compaction) or the current CAP (salinisation). Soil Sealing is explicitly addressed by the Soil Sealing Guidelines which is however is a non-binding guidance document for the Member States.

A general conclusion we can draw from our assessment is that many of the EU policies reviewed here focus on limiting or preventing soil threats rather than setting targets aiming to improve soil functions and soil health in general. This is particularly relevant for urban soils where policy focus is on preventing soil threats, most notably contamination and sealing, whilst the maintenance and improvement of soil functions which could ultimately benefit multiple SDGs remain largely ignored.

Finally, our analysis can only confirm and reiterate the conclusions offered by previous studies into the EU policy framework for land and soil (see e.g. Frelih-Larson et al 2016a and b; Glaesner et al 2014; Vrebos et al 2017): as it stands, there is no overarching, binding policy document which would clearly define EU-level priorities. Existing policies regulate various soil threats and functions; however, most land and soil outcomes are achieved as 'co-benefits' of policies on water, waste, agriculture, or climate action. Whilst this means soil protection through EU policies might not be effectively targeted, it also demonstrates that multiple environmental benefits could be realised, and subsequently a range of SDGs could be met by setting land and soil targets and through policies promoting sustainable land use and soil management.

3.1.2 Member State actions and policies promoting land and soil-related SDGs

The analysis of the state of play of implementation of land and soil-related SDGs in the EU Member States was carried out in two steps:

1. Data collection and analysis by Member State.
2. Comparative analysis and synthesis across all EU Member States.

Step 1 used a simple Member State template structured around the key research questions. These templates were then populated with both primary data and information from existing studies (Niestroy et al, 2019) as well as Member State reports compiled to contribute to various UN reporting exercises. The latter included Voluntary National Reviews (VNR) submitted by most Member States to the UN[36], as well as reports put forward under the UNCCD's 2017-2018 Performance Review and Assessment of Implementation System (PRAIS) process[37]. Primary data were collected through a survey administered to the members of the EU SEG in 2019. This was complemented by information from other surveys, including a questionnaire (disseminated to the same group in 2018) on their input to preparatory work on EU soil policy development as well as a questionnaire administered within the context of the SURFACE project[38].

Following the data collection phase, the templates were revised, and a factsheet produced for each Member State (see Annex 5). Step 2 aggregated Member State findings at EU level to gain a summary overview of the state of play of implementation. The table below gives an overview of the Member State coverage of the information sources consulted for each one. Whilst these sources provided enough information to deliver a snapshot of the implementation of land and soil-related SDGs within individual Member States, it failed to provide an EU-wide overview. We therefore used information available on the Soil Wiki which was produced under a previous study funded by DG Environment[39]. The Soil Wiki compiles the policies and activities reported by Member States relating to soil, categorising each activity as either explicitly or implicitly impacting each soil threat or function.

[36] Available on the UN website: https://sustainabledevelopment.un.org/vnrs/.
[37] Available at https://prais.unccd.int/unccd/reports.
[38] The SURFACE project on "(Inter)national Standards and Strategies for the Reduction of Land Consumption" is funded by the German Environment Agency (UBA) from 20172020. More information available at: https://www.ufz.de/surface/index.php?en=44130.
[39] Service contract for updated inventory and assessment of soil protection policy instruments in EU member states. The final project report was published by on their web site: http://ec.europa.eu/environment/soil/publications_en.htm.

Table 3.5 *Overview of Member State coverage of key sources of information*

MS	SURFACE PROJECT	VNRs	2019 SEG QUESTIONNAIRE	2017-2018 UNCCD PRAIS REPORTING	2018 SEG QUESTIONNAIRE
AT					
BE					
BG					
CY					
CZ					
DE					
DK	*[40]				
EE					
EL					
ES					
FI					
FR					
HR					
HU					
IE					
IT					
LT					
LU		*[41]			
LV					
MT					
NL					
PL					
PT					
RO					
SE					
SI					
SK					
UK					

3.1.2.1 SDG implementation and coordination at national level

This section presents a summary of the findings from Member States with respect to their approaches to the implementation of the SDGs, in particular through the adoption of national sustainable development plans or strategies and the mechanisms of engaging both with authorities at various levels and other stakeholders.

Based on a recent review of SDG implementation in all EU Member States (Niestroy et al 2019), most Member States have adopted national sustainable development plans or strategies. Not all, however, address the SDGs as adopted in 2015. This may trigger the need to update these documents, a process already underway in several Member States such as Croatia, Spain, Latvia, Malta, and Lithuania (Figure 3).

[40] No relevant information
[41] In French

The main authorities in charge of SDG implementation and sustainable development typically include the office of the Prime Minister, which sometimes chairs overarching commissions for sustainable development or other horizontal bodies (e.g. Czechia, France), and the Ministry of Environment (or sustainable development). In almost all Member States, the Ministry of Foreign Affairs is the external policy lead for implementation of the SDGs. Most Member States have established inter-ministerial committees or working groups to coordinate the implementation of the SDGs across the different sectors. All the Member States engage various types of stakeholders in the preparation of their sustainable development strategies. These activities take the form of online consultations, advisory councils, and the creation of special platforms to coordinate inputs from various experts and civil society organisations.

Table 3.6 provides a summary of the findings by Member State, focusing on the four research questions listed above. More detailed Member State fiches are available in Annex 5.

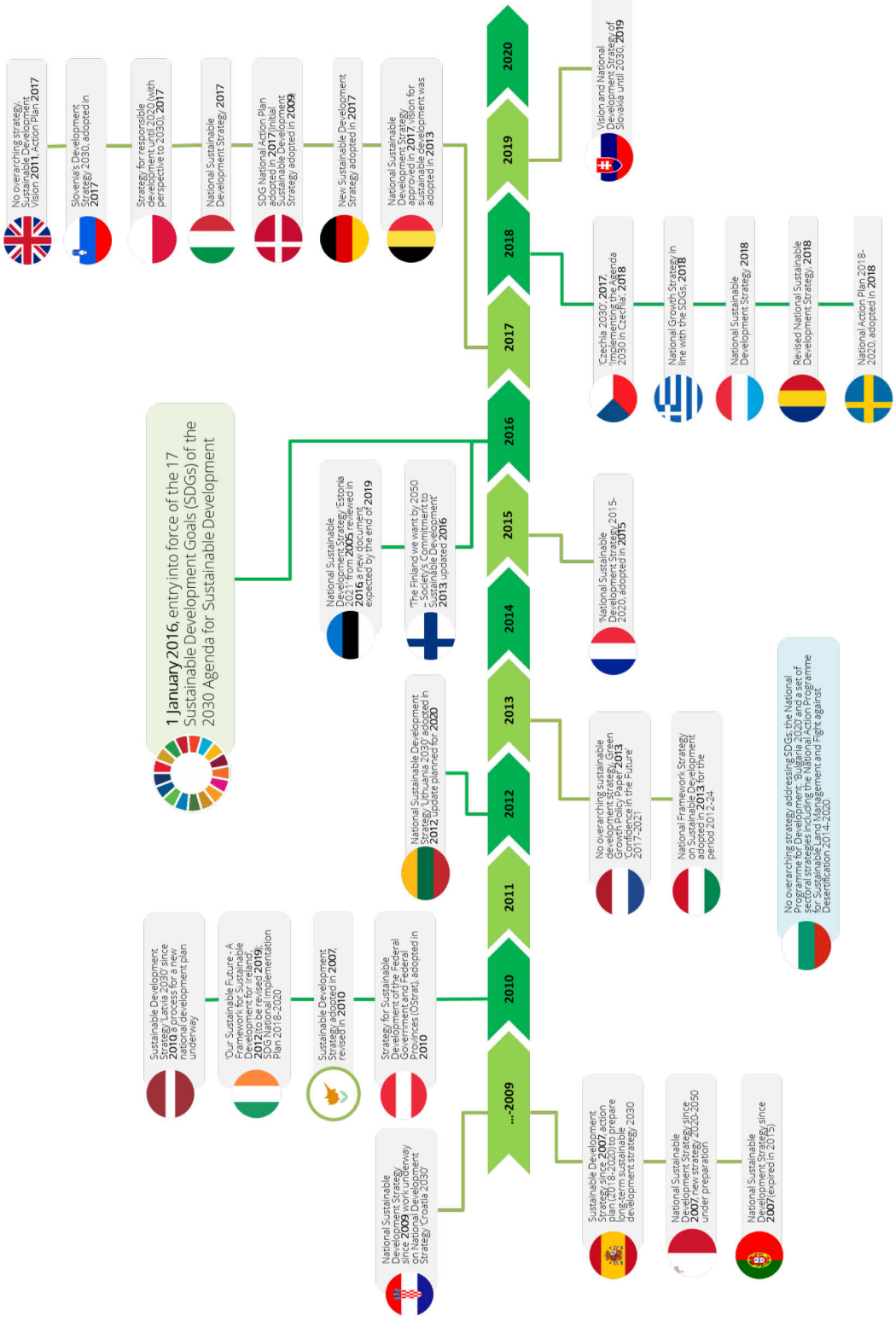


Figure 3.3 *Date of publication or adoption of key strategic document*[42]

Table 3.6 *Summary of findings on Member State approaches to implementation of the SDGs*

MS	Existence/date of national sustainable development plan	Main authorities in charge	Coordination with other authorities	Involvement of other stakeholders
AT	Strategy for Sustainable Development of the Federal Government and Federal Provinces (ÖStrat), adopted in 2010	Ministry of Sustainability and Tourism; Federal Chancellery, Ministry of Foreign Affairs; Council of Ministers (lead on SDGs)	Inter-ministerial working group with SDG focal points in each ministry	Actor Network for Sustainable Austria is part of the ÖStrat process; Committee for Sustainable Austria; stakeholder participation strategy group
BE	National Sustainable Development Strategy approved in 2017, vision for sustainable development was adopted in 2013	No ministerial lead, a coordination mechanism (Coormulti) at the Ministry of Foreign Affairs	IMCSD (Inter-ministerial Conference for Sustainable Development) gathering ministers from all governments (federal, regional, and local)	Federal Council for Sustainable Development is the main mechanism, coordinating input from nine advisory councils to the strategy
BG	No overarching strategy addressing SDGs; the National Programme for Development: 'Bulgaria 2020' and a set of sectoral strategies including the National Action Programme for Sustainable Land Management and Fight against Desertification 2014-2020	Ministry of Finance supervises the National Programme for Development; Ministry of Foreign Affairs	Coordination Committee, chaired by the Minister of Finance, accountable to the Council of Development	Standard online consultations for all interested parties
CY	Sustainable Development Strategy adopted in 2007, revised in 2010	Ministry of Foreign Affairs	Intergovernmental Committee, including contact points at each line ministry, Council of Ministers	Involvement of civil society organisations through an online survey before the first VNR
CZ	'Czechia 2030', 2017; 'Implementing the Agenda 2030 in Czechia', 2018	Government Council for Sustainable Development (GCSD) chaired by the deputy Prime Minister	14 Ministries involved in eight Committees of the GCSD, Secretariat at the Ministry of Environment	GCSD is the main platform for stakeholder participation, public consultations on the strategy
DE	New Sustainable Development Strategy adopted in 2017	Federal Chancellery; Ministry of Environment and Ministry of Development and Cooperation	State Secretaries' Committee on Sustainable Development; permanent inter-ministerial working group on Sustainable Development	Broad consultations via events and online, sustainability forum, German Council for Sustainable Development
DK	SDG National Action Plan adopted in 2017 (initial Sustainable Development Strategy adopted in 2009)	Ministry of Foreign Affairs; Ministry of Finance	All SDGs distributed across the ministries, regular coordination, ad hoc working group	VNR consultation; stakeholder conference organised ahead of the formulation of the National Action Plan
EE	National Sustainable Development Strategy 'Estonia 2021' from 2005, reviewed in 2016, a new document expected by the end of 2019	Government Office Strategy Unit; Ministry of Finance	Inter-Ministerial Working Group, Estonian Sustainable Development Commission (ESDC)	Coalition for Sustainable Development supports the ESDC, which is the main forum; conferences, informal exchange
EL	National Growth Strategy in line with the SDGs, 2018	General Secretariat of the Government; Ministry of Environment and Energy and Climate Change; Ministry of Foreign Affairs	Inter-ministerial Coordination Network for SDGs, including all ministries	Economic and Social Council of Greece provides the main platform for stakeholders, ongoing dialogue

[42] Including National Sustainable Development Strategies, Visions, and Action Plans as well as Ministerial Decisions or legal acts, where no strategies have been adopted.

MS	Existence/date of national sustainable development plan	Main authorities in charge	Coordination with other authorities	Involvement of other stakeholders
ES	Sustainable Development Strategy since 2007, action plan (2018-2020) to prepare long-term sustainable development strategy 2030	Prime Minister's Office and High Commissioner for the Agenda 2030	High Level Group, including various ministers, academics and research organisations	Sustainable Development Council, including experts, multi-stakeholder councils
FI	'The Finland we want by 2050 – Society's Commitment to Sustainable Development' 2013, updated 2016	Prime Minister's Office; Finnish National Commission on Sustainable Development (FNCSD); Ministry of Foreign Affairs	Inter-ministerial Network Secretariat, with 11 line ministries	FNCSD provides a framework for broad stakeholder participation; Development Policy Committee – multi-stakeholder and parliamentary body
FR	National Sustainable Development Strategy 2015-2020, adopted in 2015	Inter-ministerial Delegate under the Prime Minister and the Ministry of Environment	All ministries are responsible, each has a focal point responsible for the selected SDGs; Inter-ministerial Committee for Development Cooperation	National Council for Sustainable Development coordinating stakeholders' participation, participatory process of roadmap elaboration
HR	National Sustainable Development Strategy since 2009, work underway on National Development Strategy 'Croatia 2030'	Ministry of Foreign and European Affairs	Council for Sustainable Development (CSD) including all relevant ministries and the statistics bureau	CSD provides a framework for stakeholder participation, online consultations on the National Development Strategy
HU	National Framework Strategy on Sustainable Development adopted in 2013, for the period 2012-24	Prime Minister Office; Ministry of Foreign Affairs	Ministry of Technology and Innovation, Ministry of Agriculture	National Council for Sustainable Development, includes various stakeholders such as academics and civil society organisations
IE	'Our Sustainable Future - A Framework for Sustainable Development for Ireland', 2012 (to be revised 2019); SDG National Implementation Plan 2018-2020	Minister for Communications, Climate Action and Environment; Ministry of Foreign Affairs; Ministry of Trade	Senior Officials' Group, including the Assistant Secretaries from all government departments; SDG Interdepartmental Working Group	SDG Stakeholder Forum provides a framework for consultation with a broad range of stakeholders
IT	National Sustainable Development Strategy 2017	Presidency of the Council of Ministers; Ministry of Foreign Affairs; Ministry of Environment	Inter-Ministerial Committee for Economic Planning responsible for integration of sustainability across the ministries	Forum on Sustainable Development, coordinated by the Ministry of Environment, Italian Alliance for Sustainable Development engaged in strategy development
LT	National Sustainable Development Strategy 'Lithuania 2030' adopted in 2012, update planned for 2020	National Commission for Sustainable Development (NCSD) chaired by the Prime Minister, Ministry of Environment	NCSD includes other ministries and NGOs; National Progress Council (to be merged with the NCSD)	NCSD acts as the main framework, Non-government Development Cooperation Organisation provides an additional platform
LU	National Sustainable Development Strategy 2018	Minister for Sustainable Development and Infrastructure; Minister for Development and Cooperation	Inter-departmental Commission for Sustainable Development – coordination across all relevant ministries	High Council for Sustainable Development, including sectoral experts; roundtables with NGOs and private sector

MS	Existence/date of national sustainable development plan	Main authorities in charge	Coordination with other authorities	Involvement of other stakeholders
LV	Sustainable Development Strategy 'Latvia 2030' since 2010, a process for a new national development plan underway	Cross-Sectoral Coordination Centre; Ministry of Foreign Affairs	National Development Council (NDC), chaired by the Prime Minister, including Minister of Finance, Education and Science, Economics, Environmental Protection and Regional Development	NDC includes various stakeholders, regional and national forums
MT	National Sustainable Development Strategy since 2007, new strategy 2020-2050 under preparation	Ministry of Sustainable Development, the Environment and Climate Change	Focal Point Network, involving representatives of all ministries	The Sustainable Development Network provides information and training programmes, a platform for exchange with civil society
NL	No overarching sustainable development strategy, Green Growth Policy Paper 2013, 'Confidence in the Future' 2017-2021	Ministry of Foreign Affairs, including the Minister of Political Affairs and the Minister of Trade and Development Cooperation	Inter-ministerial working group, with focal points in all ministries, responsibility for all SDGs distributed across the ministries	Association of Netherlands Municipalities stimulating local governments, taking part in the inter-ministerial working group
PL	Strategy for responsible development until 2020 (with perspective to 2030), 2017	Ministry of Entrepreneurship and Technology	Coordination Committee for Development Policy (CCDP), with representatives of all ministries	CCDP may involve representatives of local authorities, academia and civil society organisations, depending on needs
PT	National Sustainable Development Strategy since 2007 (expired in 2015)	Ministry of Foreign Affairs, Ministry of Infrastructure and Planning	A network of focal points at different governmental departments	National Council for the Environment and Sustainable Development (CNADS): academics, business, NGOs
RO	Revised National Sustainable Development Strategy, 2018	Department for Sustainable Development (DSD) under the Prime Minister Office	Inter-ministerial Committee for the Coordination of the Integration of Environmental Protection into Sectoral Policies and Strategies at the National Level, led by the Minister of Environment	Federation of Romanian Non-governmental Organisations for Development (FOND), consultation and awareness-raising events organised by the DSD
SE	National Action Plan 2018-2020, adopted in 2018	Minister for Public Administration and the Ministry of Finance and Minister for International Development Cooperation at the Ministry of Foreign Affairs	Inter-departmental consultation group for the 2030 Agenda made of state secretaries from five ministries; inter-ministerial working group, including all ministries	National Committee for the 2030 Agenda – multi-stakeholder, broad dialogue with authorities, social partners, private sector and academics
SI	Slovenia's Development Strategy 2030, adopted in 2017	Government Office for Development and European Cohesion Policy; Ministry of Foreign Affairs	Permanent Inter-Ministerial Working Group on Development Planning, with two representatives from each ministry	Civil society and private sector participated in the process of drafting of the national development strategy
SK	Vision and National Development Strategy of Slovakia until 2030, 2019	Deputy Prime Minister; Ministry of Foreign and European Affairs	Government Council of the Slovak Republic for the 2030 Agenda for Sustainable Development, including all ministries; Working Group	The Government Council and the Working Group include a broad range of stakeholders; the Slovak Non-Governmental Development Organisations Platform
UK	No overarching strategy, Sustainable Development Vision 2011, Action Plan 2017	No state secretary or ministerial lead, Cabinet Office acts as an external lead	DEFRA reviews business plans of all government departments to check environmental mainstreaming	No stakeholder coordination

3.1.2.2 Integration of land and soil-related SDGs in national sustainable development strategies

Soil and land considerations are relevant for several SDGs, not just SDG 15.3. As such, there are many examples of elements of national sustainable development plans that affect – at least indirectly – soil and land, from the promotion of organic farming under SDG 2 to sustainable management of forests under SDG 12.

In some Member States, the national voluntary reviews gave insights into the national sustainable development plans themselves. In Cyprus, the National Action Plan for a Green Economy aims to exploit and enhance synergies between the environment and economic sectors, and includes measures across agriculture, water resources, biodiversity and green infrastructure, forests, energy, transport, industry, waste management, tourism, climate change and adaptation. Its key parameters include the provision of incentives to increase resource efficiency and enhance productivity.

Several Member States also included information in the questionnaires carried out as part of this project. Austria, for example, noted that there is no real link between the SDGs and the Austrian Strategy for Sustainable Development, as the latter predates the former.

In other Member States, the situation is more positive. In Czechia, the biodiversity chapter of the National Sustainable Development Plan covers:

- Promotion of hedges and buffer strips instead of fences and tracks on arable land;
- Leaving sufficient material on the land post-harvest;
- Well-managed organic fertilisation of arable land (e.g. using mining residue);
- Gradual development of gentle farming methods on forest land; and
- Prevention of further acidification of forest soils by cultivating trees suitable for the given environment instead of growing a monocrop of spruce.

In Germany, land take falls under SDG 11 and is covered in the National Sustainable Development Strategy with a target to decrease land consumption to less than 30 ha/d by 2030. The relevant indicator for this is the increase in land take for settlement and traffic purposes. The Strategy focuses on biodiversity, ecosystems and forests under SDG 15 and explicitly mentions SDG target 15.3, to reach LDN by 2030. Land sealing and land take are identified as possible indicators for the implementation of LDN. The German authorities note that a new indicator is needed to identify changes in soil quality.

Other Member States did not provide such concrete information. Romania reported that its National Strategy for Sustainable Development (SNDD) includes some objectives for implementing the LDN target and land-related SDGs. Similarly, an important part of the Development Strategy of Slovenia 2030 is the sustainable management of natural resources with actions for achieving the goals. These actions include sustainable soil management and conservation of soil ecosystem services, prevention of further degradation and rehabilitation of degraded soils.

Member States were asked about their main activities at national level. Some include coordination mechanisms (which are covered in Section 0), such as the Government Council for Sustainable Development in Czechia, that implements and analyses SDGs associated with soil. Other examples include Austria's Conference on Spatial Planning (ÖROK), which mainstreams SDG 11 and is considered a remarkable step forward in enabling the mainstream efficient use of land and delimitation of land take. Similarly, Estonia pointed to the formation of the inter-ministerial and inter-institutional Estonian soil policy working group, which is intended to involve all of the main soil-related stakeholders. In the Netherlands, a congress was organised on the soil-related SDGs, attracting 500 participants from all kinds of Dutch soil networks. The Dutch survey respondent noted that there is a 'growing' awareness of the importance of land and soil for implementing the SDGs, and an increasing need for multifunctional land use.

Other activities identified included the use of economic tools targeting soil protection, such as those falling under national and EU policies (e.g. Czechia). In Denmark, regulation is supplemented by subsidy support schemes for projects reducing the load of nitrogen to Danish coastal waters. Such

projects have a nitrogen-reduction purpose but also contribute to the protection of soils on farmland, the establishment and reestablishment of wetlands, afforestation, and set-aside of carbon-rich soils in river valleys. Despite being a sub-national activity, the Flemish subsidy scheme is also worth mentioning, where subsidies have been granted to municipalities since 2001 for:

1. Small-scale erosion control projects: the main objective of such projects is to collect as much of the surface water and sediment as possible on the plot or as quickly as possible after leaving the plot, so that the erosive effect of the water decreases, the sediment load can settle and the water can infiltrate or drain (controlled). Examples of small-scale erosion control works are: dams from plant materials; earthen dams with erosion pools; conductive earth dams; buffer basins; buffer moats; wood sides; recovery of embankments. Grass walks and grass buffer strips are also eligible for subsidies where they are physically connected to other furnishing or infrastructure works, or where construction requires the cooperation of several users.
2. the drafting of a municipal erosion control plan.
3. an erosion coordinator to guide and support the municipality in implementing the municipal erosion control plan.

Monitoring and review were also identified as activities for implementing land and soil-related SDGs. In Czechia, for example, it was noted that data from the evidence of land takes (managed by the Ministry of the Environment) is subject to annual review. In Slovenia, a project run by the Ministry of the Environment and Spatial Planning, Directorate for Spatial Planning, Construction and Housing and the Ministry of Infrastructure is seeking detailed data on built-up land.

Germany reported no new strategies for monitoring and reporting. However, initiatives on stakeholder involvement, communication, research, and development are being developed as part of the German Crop Management Strategy. Estonia noted the development of the National Soil Monitoring Programme, while Slovenia is preparing its national monitoring system for soil quality, including specific indicators.

With regard to information dissemination, Estonia's focus is on providing farmers with Big Data information and other web-based solutions to support decision-making in agriculture. At sub-national level, Wallonia's (Belgium) 'Integrated Management of Soil Erosion and Runoff' (GISER) has been in place as an Expertise and Consulting Unit since 2011. The unit makes recommendations on anti-erosion practices to municipalities dealing with erosion and mudslides. Its mission is to dissect the mechanisms of erosion and to propose effective control techniques. The team goes into the field, provides a detailed diagnosis and supports the implementation of specific solutions.

3.1.2.3 National policies enabling implementation of land and soil-related SDGs

The information in this section is drawn from a mix of data sources. The Member State questionnaire issued as part of this project was completed on a voluntary basis and generated only 18 responses from 15 Member States. Where possible, gaps were closed using other sources of information, such as the national voluntary reviews submitted by each Member State on their SDG progress. Whilst these sources provided enough information to deliver a snapshot of the implementation of land and soil-related SDGs within individual Member States, it failed to provide an EU-wide overview. We therefore used information available on the Soil Wiki which was produced under a previous study funded by DG Environment[43].

The Soil Wiki compiles the policies and activities reported by Member States relating to soil, categorising each activity as either explicitly or implicitly impacting each soil threat or function. This quantitative analysis is complemented by information reported by the Member States through the questionnaire administered by the project and under sources of information listed in Table 3.8.

It should be noted that activities may be regulatory and non-regulatory (such as 'awareness raising' or specific projects). Although each activity is described, it is beyond the scope of this assessment to determine whether an activity is national, regional, or local. Therefore, all activities, whether they are

[43] Service contract for updated inventory and assessment of soil protection policy instruments in EU Member States. The final project report was published by on their web site: http://ec.europa.eu/environment/soil/publications_en.htm.

regulatory or not, national or not, have been used for the following assessment. For this reason, the results shown in this section must be viewed cautiously.

The figures below show the number of activities targeting different soil threats as reported for the Member States on the Soil Wiki. Figure 3.4 provides an overview of the total number of activities per soil threat across all Member States; the second figure shows the same information broken out by Member State. Contamination activities were identified most often, followed by those (especially implicitly) dealing with loss of soil biodiversity. The loss of soil organic matter and erosion were also covered by a large number of activities. There are very few activities either directly or indirectly addressing desertification or acidification, perhaps because of both a lack of EU-level policy and varying geographic characteristics. When comparing activities across the different Member States, it was unsurprising that those federal or strongly regional Member States reported more activities due to a high number of regional activities.

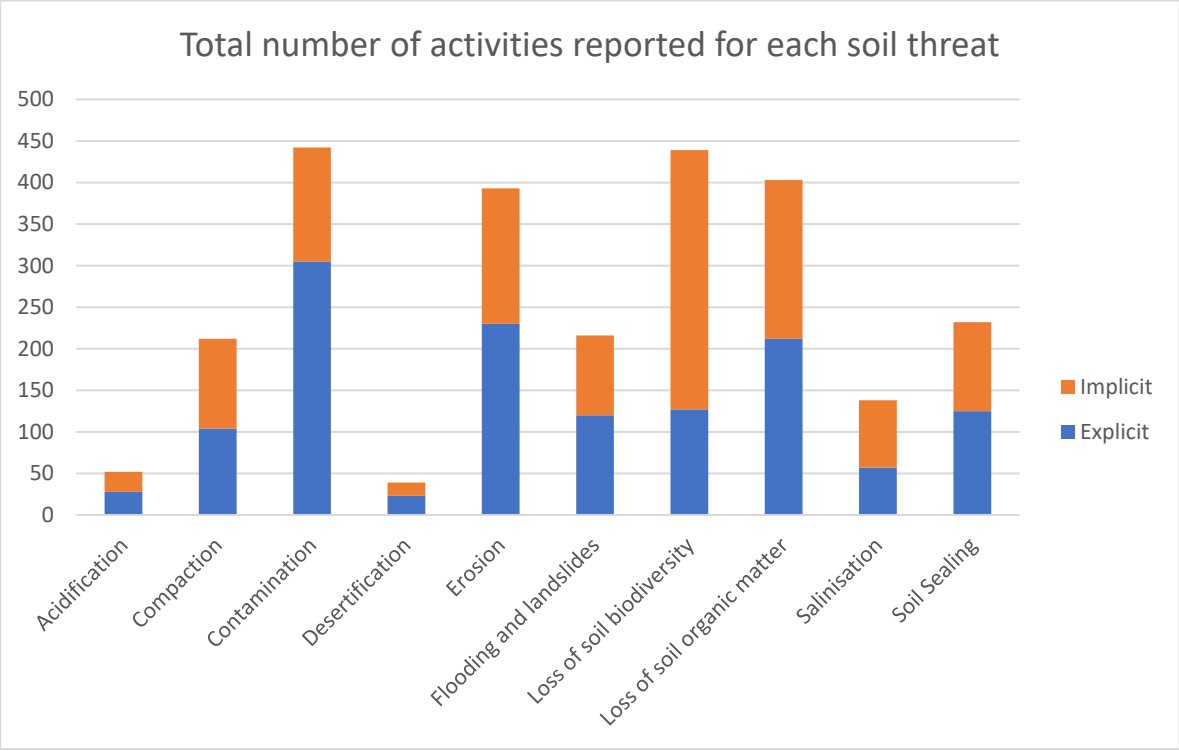


Figure 3.4 *Total number of activities reported for each soil threat (Source: Soil Wiki, accessed May 2020)*

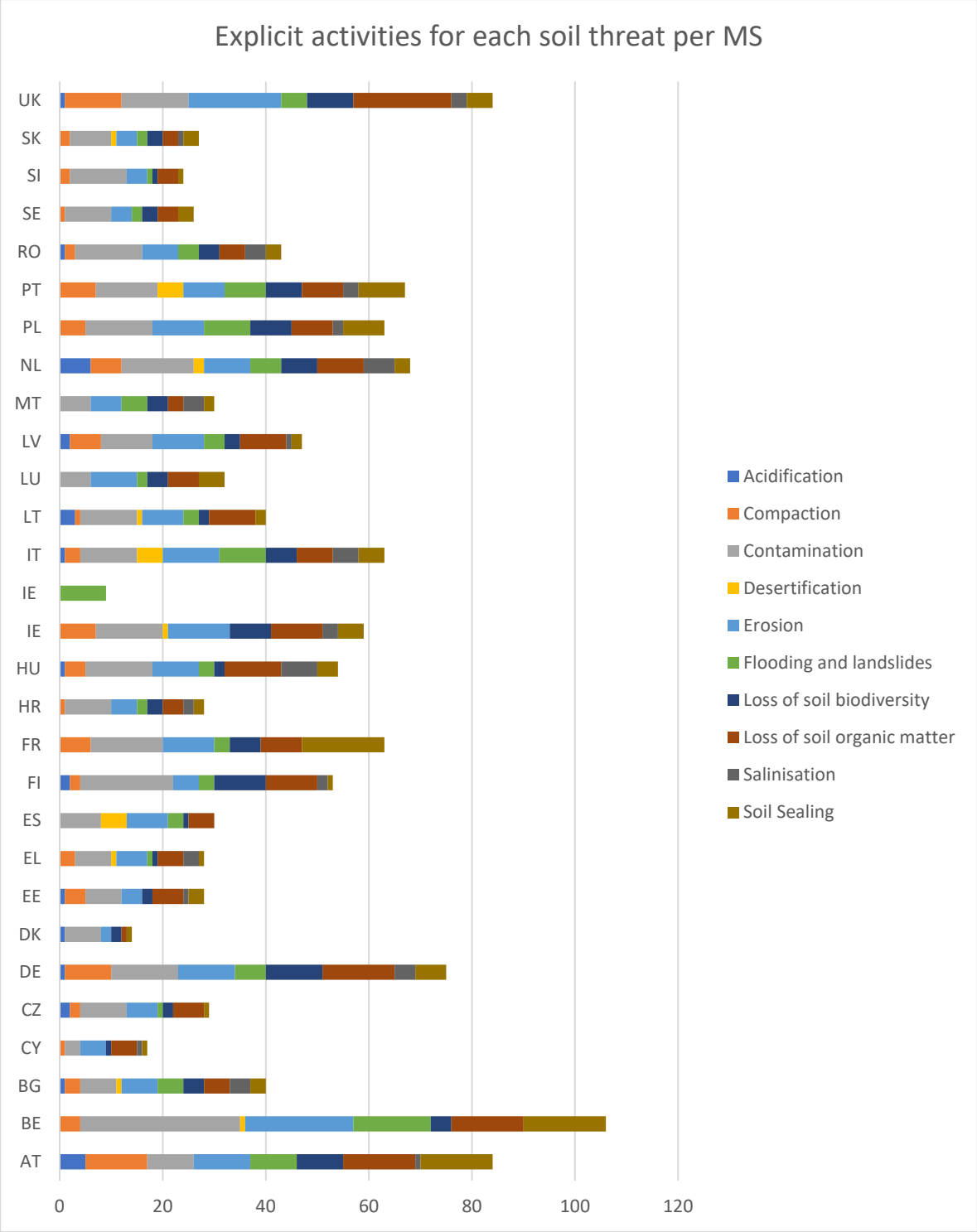


Figure 3.5 *Explicit activities reported for each soil threat broken down by Member State (Source: Soil Wiki, accessed May 2020)*

Several Member States also provided information on the soil/LDN policies in the various questionnaires. When asked about the most relevant soil and land policies at national level, these Member States often referred to sectoral polices (e.g. agriculture, forestry, nature protection), where soil and land concerns may be set out in a separate chapter. Few Member States report to have dedicated land or soil policies at national level.

One example is Portugal, which has a national law for 'public policy of soil, land use and urban planning' (LAW n. 31/2014 of May 30). In Cyprus, the Water and Soil Pollution Control Law concerns discharges to water and soil through a permitting system. Such legislation cannot be considered a general soil policy, but it certainly eliminates some direct soil threats, using national-level tools.

Several Member States refer to sub-national soil polices, for example the Flemish (Belgium) soil policy is spearheaded by contamination and erosion control measures, as these soil threats are the most prominent in the region. There are numerous measures and actions to combat soil erosion, with some targeting farmers or other landowners, while other measures are implemented by local authorities (municipalities, polders, waterways...) with or without the cooperation of landowners and land users.

In several instances, references were made to new policies to protect land and soil. In Estonia, for example, a new regulation is pending (not yet approved) that will protect the valuable agricultural land and should slow down agricultural land take, as well as reducing the sealing of fertile agricultural soil. In Malta, the main national policy enabling the implementation of the LDN targets, along with the soil and land SDGs, will be the 'National Action Plan on Desertification and Land Degradation in the Maltese Islands' (currently being finalised). Czechia has several decrees, including Decree No. 153/2016 Coll., on determining details in relation to the protection of soil quality, and a Decree on soil erosion that is currently being prepared and should be linked to Act No. 334/1992 Coll.

Many Member States have national policies related to land and soil issues. These are typically agricultural, forestry, or spatial planning policies, and are usually the remit of the relevant ministries. Romania specifically referred to the Ministry of Agriculture and Rural Development and Ministry of Water and Forest as responsible for specific targets, while the Ministry of Environment is responsible for the Law concerning contamination of land, subsoil and terrestrial ecosystems.

It cannot be assumed that all soil and land threats are covered (as these policies are assumed to be sector-specific). In Czechia, for example, the protection of agricultural soil (qualitatively and quantitatively) is set by law (see box below).

Box 3.4 Example of soil protection measures in Czechia

Soil protection measures for agricultural soil in Czechia
The qualitative protection of agricultural soil through prohibition of:
- Using agricultural land for non-agricultural purposes without a state permit;
- Using agricultural land in a manner inconsistent with the type of land plot;
- Application of banned substances or preparations on soil (e.g. fertilisers);
- Soil contamination by hazardous substances (heavy metals and hazardous elements above the established limits);
- Application of sludge or sediment that exceeds the limits for hazardous substances and elements;
- Threatening the soil with erosion;
- Soil compaction;
- Land drainage; and
- Growing plantations of fast-growing trees for more than 10 years.

The quantitative protection of agricultural soil (surface land protection) requires land users:
- To use primarily non-agricultural land for non-agricultural purposes;
- To use land firstly in built up (urbanised) areas for non-agricultural purposes;
- To withdraw only the necessary land from the agricultural land fund;
- To withdraw the least quality land as possible from the ALF (soil in Czechia is divided into classes according to its quality);
- To withdraw the best quality soil from the ALF only in special cases;
- To minimise the disruption of ALF organisation;
- After the end of the permitted non-agricultural activity, land reclamation is completed as soon as possible;
- To pay a fee for agricultural land withdrawal from the ALF;
- To address land and soil protection in spatial planning, during the determination of mining areas, in the documentation for construction location; and

To address the way the removed soil layer is used during construction, mining, industrial activities, etc.

Some policies had very clear provisions to improve soil and land, and in some cases, specific chapters dedicated to soil and land degradation. One example is in Slovenia, where the National Environmental Protection Programme (with a programme of measures up to 2030) is being prepared. Within the chapter on Conservation, the preservation and improvement of natural capital soil is addressed. In

light of the soil protection and management measures foreseen, the following objectives are set out in the draft document:

1. Increased ability to implement soil ecosystem services:
    a. controlling the degradation processes associated with the reduction of organic matter in the soil, preventing soil erosion, preventing soil contamination, and rehabilitating and revitalising degraded areas,
    b. sustainable soil and land management and reduced net annual land take.
2. Strengthening information and data on soil.
3. Increased awareness of the importance of soil.

Czechia's Strategy on Adaptation to Climate Change (Adaptation Strategy) was approved by the Czech government in October 2015. It includes general adaptation measures for relevant sectors and the agriculture sector, namely measures such as 3.2.3.3 'Standards of Good Agricultural and Environmental Conditions', 3.2.3.6 'Reducing soil erosion' and 3.2.3.7 'Measures against agricultural drought'. These agriculture measures are further developed in the National Action Plan on Adaptation to Climate Change, which was adopted by the Czech government in January 2017.

These sectoral policies thus often have clear and valuable potential to curb soil and land degradation. Another interesting point raised by the Estonian respondents was that certain sectoral policies, such as the Estonian Planning Act, stipulate that any proposed land use change must undergo public consultation and any submissions from the public must be considered. According to the Estonian survey respondent, this has the potential to reduce the amount of land that is to be converted, thus reducing land degradation.

Several Member States provided further detail on the type of information included in their sectoral polices. In Denmark, for example, most agri-environmental regulation aims to limit/reduce nutrient losses from agriculture to the aquatic environment. However, some regulations also contribute to protecting the quality of agricultural land and soils. Until 2017, Denmark had primarily general nitrate regulations, where the same rules applied to all farmers. However, a political agreement from 2015, the Food and Agriculture Package, introduced a policy shift, supplementing the general regulation with more cost-effective, targeted nitrate regulation. Measures included catch crops, energy crops, early establishment of winter crops, etc., all of which reduce the risk of soil erosion.

In Estonia, sustainable forest management is set out as a key principle in the Forestry Development Plan (until 2020) and it also handles the protection of forest soils. For example, it underlines the need to further develop infrastructure in forests, noting that restrictions to forest management are set in the Forest Act in order to protect water and soil.

The role of EU policies was mentioned in several Member States and it can be assumed that instruments like the CAP, the Nitrates Directive, and the Water Framework Directive will be relevant in all Member States. A large number of the sectoral policies discussed in the previous section stem directly from such EU policy. However, several Member States reported that they have specifically transposed EU legislation so as to maximise soil and land protection.

In Denmark, the CAP cross-compliance standards have been implemented as follows:

- GAEC 1 - Establishment of buffer strips along watercourses. The standard is implemented nationally by Standard 1.16: 2m buffer strips along natural watercourses and lakes as part of the management requirements attached to Directive 91/676/EEC. The rule applies to natural waterways, lakes, artificial streams and lakes, pursuant to the Water Framework Directive, either to satisfy the environmental objective of 'good ecological potential' or 'maximum ecological potential'. The rule does not apply for isolated lakes smaller than 100 m^2.
- GAEC 4 - Minimum soil cover. The standard is implemented nationally by Standard 1.33: establishment and maintenance of plant cover on arable land lying fallow. (1) Land concerned by the single application for IACS as lying fallow shall be covered by vegetation; (2) When an area is transferred to land lying fallow, the plant cover must be established as soon as possible and no later than the 31 of May in the year of application; (3) Land lying fallow must not be used in a way that

leads to destruction of plant cover. Temporary measures and arrangements are permitted if the plant cover is restored as soon as possible after application.
- GAEC 5 - Minimal soil cultivation reflecting site specific conditions to limit erosion. The standard is implemented nationally by Standard 1.37: protection of agricultural land against soil erosion. In the period from harvest to 15 February in the following year, inversion tillage (ploughing) is prohibited on contiguous agricultural areas over 5000 m² that (1) has a minimum slope of 12 degrees, (2) has a high risk of soil erosion by water runoff and (3) is agricultural area (according to the Ministry's Internet LPIS map).
- GAEC 6 - Maintenance of soil organic matter. The standard is implemented by Standard 1.34: straw or other similar parts of agricultural crops must not be burned on fields or uncultivated land.

Similarly, in Estonia, soil degradation is identified as one of the important issues, and thus CAP and specific soil-related measures are implemented under RDPs (current 2014-2020). These include supporting proper crop rotation, taking soil samples, supporting farmers to keep peat and eroded soils as grassland, farmers' training, etc. The new Strategic Plan for Agriculture and Fisheries for 2030 and the Strategic Plan for implementing CAP both set the policy measures and address soil degradation as part of the environmental policy and as an asset in agricultural production. Another example was found in the Wallonia region of Belgium, where the RDP for Wallonia 2014-2020 proposes measures to support afforestation and the creation of wooded areas, to restore, preserve and strengthen ecosystems linked to agriculture and forestry, to prevent soil erosion and improve soil management, and to support the introduction and maintenance of agroforestry systems

3.1.2.4 Policies with direct and indirect impacts on land and soil-related SDGs

It is also worth noting the difference between policies with a direct and indirect impact. The box below sets out the information provided by Italy, showing not only the policies with a direct impact but also those with an indirect impact. It can be assumed that all Member States have policies and legislation that directly affect soil and land, covering anything from reducing pollution to data collection and monitoring requirements.

Box 3.5 Example of soil and land protection policies in Italy

Policies on soil and land protection in Italy

In Italy, the relevant national policy is Law n. 132 (2016), which entered into force in 2017. The Law set up the National System for Environmental Protection (SNPA), assigning it the task of operating the national land monitoring system. There is no general law on soil protection, although, like water management and protection, it has long been a central theme of action of the Italian government and has been subject to multiple regulatory interventions. Given the diverse phenomena that affect soil, the evolution of Italian legislation on soil protection is particularly broad, as it is very difficult to establish a single regulatory instrument that can respond to all environmental pressures. The main Italian policies linked directly to soil protection are the CAP, Legislative Decree n. 152/2006, Legislative Decree n. 49/2010, Law 164/2014 (which promotes the implementation of 'integrated interventions' that indirectly foster soil conservation and mitigation), and policies for contaminated sites.

Regulations not directly related to soil protection include:
- National Strategy for Biodiversity (SNBD);
- National Strategy for Adaptation to Climate Change (SNAC);
- National Strategy for Sustainable Development Goals;
- Agricultural policy instruments, with GAEC standards, greening requirements, regional RDPs;
- European Decision n.529/2013 on LULUCF reporting and accounting;
- National Plan on the Sustainable Use of Pesticides;
- National Action Plan to Combat Drought and Desertification (PAN); and
- Protocol of Soil Conservation of the Alpine Convention.

In addition, there is a proposed legislative initiative to 'Limit soil consumption and reuse of built-up areas' that sets limits on soil consumption, focusing on transforming existing urban areas and not new urbanisation, through a regulatory instrument that combines constraints and incentives. The proposed text specifically recognises the soil as a 'common good' and 'resource' that ensures non-renewable ecosystem functions and services. The concepts of reuse and regeneration of existing built-up areas are defined as fundamental principles in land and urban planning.
Recently, Italy integrated SDG Target 15.3 in their National Strategy on Sustainable Development, opening up the way for adopting qualitative and quantitative targets which are in the process of being developed.

The table below shows which soil threats are explicitly or implicitly addressed by existing policies per Member State. Green cells indicate soil threats which were identified as a threat in the respective Member State through the survey carried out by the project and which are covered by a policy instrument. Red highlights those cases, where soil threats reported by a Member State are not – implicitly or explicitly – targeted by existing policy.

Table 3.7 *Explicit and Implicit policies for each soil threat per Member States (Source: Soil Wiki, accessed May 2020)*

MS	Acidification	Compaction	Contamination	Desertification	Erosion	Flooding and landslides	Loss of soil biodiversity	Loss of soil organic matter	Salinisation	Soil Sealing
AT	E/I	E/I	E/I		E/I	E/I	E/I	E/I	E/I	E/I
BE		E/I	E/I	E	E/I	E/I	E/I	E/I	I	E/I
BG	E	E	E/I	E/I	E/I	E/I	E/I	E/I	E	E
CY		E	E/I	I	E/I	I	E/I	E/I	E/I	E/I
CZ	E	E/I	E/I		E/I	E/I	E/I	E/I	I	E/I
DE	E/I	E/I	E/I	I	E/I	E/I	E/I	E/I	E/I	E/I
DK	E	I	E/I		E/I	I	E/I	E/I		E/I
EE	E	E/I	E/I		E/I	I	E/I	E/I	E/I	E/I
EL		E	E/I	E	E/I	E/I	E/I	E/I	E/I	E/I
ES			E/I	E/I	E/I	E	E/I	E/I		
FI	E	E/I	E/I		E/I	E/I	E/I	E/I	E/I	E/I
FR		E/I	E/I		E/I	E/I	E/I	E/I	I	E/I
HR		E/I	E/I		E/I	E/I	E/I	E/I	E/I	E/I
HU	E	E	E/I		E/I	E/I	E/I	E/I	E	E/I
IE	E	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I
IT	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I
LT	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I		E/I
LU	I	I	E/I		E/I	E/I	E/I	E/I		E/I
LV	E/I	E	E/I		E/I	E/I	E/I	E/I	E/I	E/I
MT		I	E/I		E/I	E/I	E/I	E/I	E/I	E/I
NL	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I
PL		E/I	E/I		E/I	E/I	E/I	E/I	E/I	E/I
PT		E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I	E/I
RO	E/I	E/I	E/I		E/I	E/I	E/I	E/I	E/I	E/I
SE	I	E/I	E/I		E/I	E/I	E/I	E/I	I	E/I
SI		E/I	E/I		E/I	E	E/I	E/I		E/I
SK	I	E/I	E/I	E	E/I	E/I	E/I	E/I	E/I	E/I
UK	E	E/I	E/I		E/I	E/I	E/I	E/I	E/I	E/I

E = Explicit activities

I = Implicit activities

E/I = Explicit and Implicit activities

Green: identified as a threat in surveys and activities in place

Red: identified as a threat in surveys and no activities in place

When looking at the soil functions, all Member States reported explicit actions to promote soil functions, except those highlighted in red below. The number shows the number of implicit activities in place (noting that some are also zero). There are only a few instances where Member States have no activities to promote specific soil functions (CY and DK), in most cases there are a number of implicit activities in place, which might collectively be sufficient to cover the soil function.

Table 3.8 *Soil functions currently not addressed by Member state policies (Source: Soil Wiki, accessed: May 2020)*

	Acting as a carbon pool	Biomass production	Hosting the biodiversity pool	Platform for most human activities	Providing raw materials	Storing the geological and archaeological heritage	Storing, filtering and transforming nutrients and water
AT	x	x	x	x	x	x	x
BE	x	x	x	x	x	x	x
BG	x	x	x	x	x	1	x
CY	x	4	x	x	0	0	x
CZ	x	x	x	x	x	4	x
DE	x	x	x	x	x	x	x
DK	x	x	x	x	0	x	x
EE	x	x	x	x	x	x	x
EL	x	x	x	x	x	x	x
ES	x	x	x	5	x	1	x
FI	x	x	x	x	x	x	x
FR	x	x	x	x	x	x	x
HR	x	x	x	x	x	x	x
HU	x	x	x	12	x	2	x
IE	x	x	x	x	x	x	x
IT	x	x	x	x	x	x	x
LT	x	x	x	x	x	x	x
LU	x	x	x	x	x	2	x
LV	x	x	x	x	x	x	x
MT	x	7	x	x	6	3	9
NL	x	x	x	x	x	x	x
PL	x	x	x	x	x	x	x
PT	x	x	x	x	x	x	x
RO	x	x	x	x	x	x	x
SE	x	x	x	x	6	3	x
SI	x	x	x	x	x	3	x
SK	x	x	x	x	5	3	x
UK	x	x	x	x	x	x	x

A total of 405 explicit activities cover soil functions in Europe. Of those activities, a number can be considered as sectoral plans. The table below shows the number of activities in each Member State which can be considered to contribute to SDGs other than SDG15. It is assumed that since all activities were identified as promoting soil functions that they all contribute to life on land[44]. The table also shows that nine MSs specifically identified their general sustainable development strategy/plan as having an impact on soil functions.

Some Member States devolve responsibility for land and soil to the sub-national authorities. This made it impossible to collect data on all policies, although several examples were noted in the questionnaires. In Lower Austria, for example, SDGs are implemented through the actions of the Lower Austrian Climate and Energy Programme 2020, by means of more than 200 different

[44] The activities in the table represent regulatory and non-regulatory activities, and were determined based on the title of the activity reported to the Soil Wiki – activities were only counted if there was a clear reference in the title to one of the sectors covered by the relevant SDGs, more general activities (with the exception of overall sustainable development plans/strategies) are not represented, although they may also be relevant for the SDGs in the table. Examples of activities include (note that some activities have been counted under more than one SDG): SDG 2: agricultural activities, including increased production (pesticide and fertiliser management) as well as promotion of organic and sustainable farming practices. All CAP activities have been counted, as have sewerage sludge activities; SDG 3: most common activities include the mitigation of contaminated land and the reduction of hazardous substances (not explicitly linked to agriculture); SDG 6 and 14: water activities have been counted together, as they often cover water for human consumption (SDG 6) and aquatic life (SDG 14). Urban wastewater activities were often listed, as were activities to reduce water contamination; SDG 11: spatial planning activities, urban waste water activities, and urban greening measures; SDG 13: specific climate activities, usually climate action plans.

instruments. In the field of agriculture and forestry alone, 29 instruments are applied. Similarly, in the Netherlands, the municipalities are responsible for land policy, with a national policy unlikely to be adopted.

Another example was given by France, which reported that the national approach does not completely match SDG 15.3. Respondents explained that the Law on Nature Protection predates the SDGs, although it does refer to land degradation (specifically a switch to artificial land/soil sealing or artificial green areas).

Several Member States have dedicated soil policies at sub-national level. In Denmark, for example, the regional Soil Plan for the Capital Region supports the implementation of SDGs 3, 6, 11, 12, 13, 15 and 17.

Table 3.9 *Number of Member State policies potentially contributing to meeting the SDGs*

MS	SDG 2: Zero hunger	SDG 3: Good health and wellbeing	SDG 6: Clean water and sanitation/ SDG 14: Life below water	SDG 11: Sustainable cities and communities	SDG 13: Climate action	Overall Sustainable development plan
AT	7	1	2	6	1	1
BE	8	2	6	9	1	2
BG	5					1
CY	3	1	3	1		
CZ	9	1	1	1		
DE	8		1	2		1
DK	9	1	1	1		
EE	5	1	1	4		
EL	5	1	3	2		
ES	6	1	1	2		
FI	8	5	3	2	1	
FR	10	3	3	3		1
HR	11		3	2		1
HU	10		4	3	1	1
IE	6	2	3	6		
IT	7		4	6	1	
LT	7	3	2	3		1
LU	5	1		4		
LV	5	1	2	4		
MT	6		2	2	1	1
NL	6		1			
PL	7	1	2	3		
PT	10		5	2		
RO	5	1	3	1		
SE	3	4		2		
SI	4	4	3	1		
SK	6		3			
UK	17	2	6	4		
Total	198	36	65	76	6	10

Whilst we cannot evaluate the effectiveness of existing policies in tackling soil threats or improving soil functions, the analysis clearly demonstrates that many Member States already have soil and land management policies in place, or that relevant objectives and measures are integrated in environmental or sectoral policies (e.g. agriculture). Reflecting EU-level findings, this suggests that the existing policy framework already contributes to meeting the SDGs, especially SDG 2 and SDG 11.

3.2 Soil and land degradation and land degradation neutrality

3.2.1 Land degradation

> ***Land degradation:*** *'The reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or rangeland, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (i) soil erosion caused by wind and/or water; (ii) deterioration of the physical, chemical and biological or economic properties of soil; and (iii) long-term loss of natural vegetation' (UNCCDb, 1994).*

The UNCCD initially focused primarily on drylands. Nowadays, however, it has extended its responsibility and aims to make a lasting global contribution to the achievement of sustainable land management in all ecosystems. Vogt (Vogt, J.V. et al., 2011) has also highlighted the need for an agreed definition for monitoring and assessing land degradation.

To show the diversity of definitions found in literature, a brief and non-exhaustive overview is presented below:

- The Millennium Ecosystem Assessment (Millennium Ecosystem Assessment, 2005) refers to land degradation as the *'the loss of primary production, often through soil erosion but also through changes in vegetation and through processes such as salinisation and shifting sand'* (p. 35).
- Reed et al. (Reed, M.S. & Stringer, L.C., 2016): *'Land degradation: i) is a phenomenon caused by human activities and exacerbated by certain climate and topographic characteristics; ii) is characterised by changes in ecosystem processes and levels of natural capital that affect the flow of ecosystem services to society; iii) causes an effectively permanent decrease in the capacity of the land system as managed to meet its user demands; and iv) is a threat to the long-term biological and/or economic resilience and adaptive capacity of the ecosystem and the populations who depend on it.'*
- EEA (2016): *'In Europe, land degradation can be considered in terms of the loss of actual or potential productivity or utility as a result of natural or anthropic factors; it is the decline in land quality or reduction in its productivity. In the context of productivity, land degradation results from a mismatch between land quality and land use.'*
- The Thematic Assessment on Land Degradation and Restoration of the IPBES (IPBES, 2015): *"'…degraded land' is defined as land in a state that results from persistent decline or loss of biodiversity and ecosystem functions and services that cannot fully recover unaided within decadal time scales. 'Land degradation', in turn, refers to the many processes that drive the decline or loss of biodiversity, ecosystem functions or services and includes the degradation of all terrestrial ecosystems. 'Restoration' is defined as any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state."*
- The Intergovernmental Panel on Climate Change (IPCC) special report for 2018, and the JRC report on land productivity dynamics in Europe (Cherlet et al., 2013), refer to land degradation in relation to desertification, indicating the seven major associated issues. Those issues are: (a) overuse of agricultural land, intensification, inappropriate agricultural practices / non-Sustainable Land Management, increased soil erosion; (b) increase in intensive irrigation, overuse of water resources, salinisation; (c) grazing mismanagement, overgrazing and decreasing NPP in rangelands, soil degradation, sand encroachment; (d) deforestation; (e) increased aridity or drought; (f) socioeconomic issues, changes in population distribution and density, rural migration/land abandonment, urban sprawl; and (g) uncontrolled expansion of mineral mining and industrial activities, extensive air and water pollution by waste materials, soil loss by contamination.
- There is a similar and ongoing debate on how to measure land degradation and land degradation neutrality (see Figure 3.6).

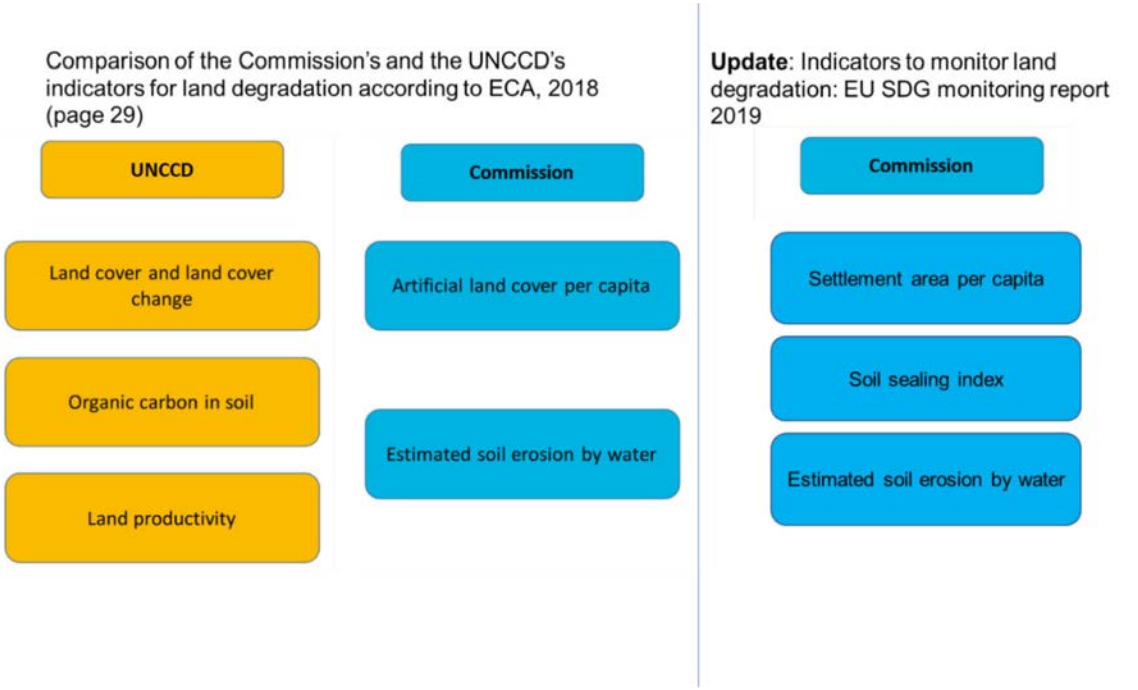


Figure 3.6 *Comparison of the UNCCD's (left) and (updated) Commission's (right) proposed (sub-) indicators for land degradation (neutrality) (ECA 2018, Eurostat, 2019)*

There is no generally accepted definition of land degradation in environmental science and policy. The policy report with scenarios for the UNCCD's Global Land Outlook (Van der Esch et al. 2017) chooses not to directly quantify 'land degradation' because of the differences between definitions and the subjectivity of the term itself. Instead, the study assessed changes in land condition and ecosystem functions relative to the natural or undisturbed state in order to determine human impact.

However, some common elements can be identified in the definitions: declining land function, threatened or declining soil function and declining ecosystem functions or services.

Together, these show the deterioration of the benefits that humans derive from terrestrial ecosystems.

The following processes have been described in respect of land degradation:

1. **Erosion:** 105 million ha (16%) of Europe's total land area (excluding Russia) were estimated to be affected by water erosion in the 1990s. 42 million ha are affected by wind erosion. A recent model of soil erosion by water constructed by the JRC has estimated the surface area affected in EU-27 at 1.3 million km². Almost 20% is subject to a soil loss in excess of 10 t/ha/yr [45, 46].
2. **Organic matter decline**: organic matter is a key component of soil, controlling many vital functions. Some 45% of soils in Europe have a low or very low organic matter content (0–2%). This is particularly evident in the soils of many southern European countries, but is also evident in parts of France, the UK, Germany, Norway and Belgium. A key driver is the conversion of woodland and grassland to arable crops. The soils of EU-27 Member States are estimated to store between 73 and 79 billion tons of carbon[47].
3. **Sealing** occurs when agricultural or non-developed land is lost to urban sprawl, industrial development or transport infrastructure. It normally includes the removal of topsoil layers and

[45] Panagos, P., Ballabio, C., Poesen, J., Lugato, E., Scarpa, S., Montanarella, L., & Borrelli, P. (2020). A Soil Erosion Indicator for Supporting Agricultural, Environmental and Climate Policies in the European Union. Remote Sensing, 12(9), 1365.

[46] Panagos, P., Borrelli, P., Poesen, J., Ballabio, C., Lugato, E., Meusburger, K., Montanarella, L., Alewell, C., 2015. The new assessment of soil loss by water erosion in Europe. Environ. Sci. Policy 54, 438–447. https://doi.org/10.1016/j.envsci.2015.08.012.

[47] Orgiazzi, A., Panagos, P., Yigini, Y., Dunbar, M.B., Gardi, C., Montanarella, L. and Ballabio, C. (2016). A knowledge-based approach to estimating the magnitude and spatial patterns of potential threats to soil biodiversity. Science of The Total Environment, Volumes 545–546, pp. 11-20. Available at: https://doi.org/10.1016/j.scitotenv.2015.12.092 Link: https://www.sciencedirect.com/science/article/pii/S004896971531247X

leads to the loss of important soil functions, such as food production, water storage or temperature regulation. On average, built-up and other man-made areas account for around 4% of the total area in the countries of the European Economic Area (EEA) (data exclude Greece, Switzerland and the UK) but not all of this is actually sealed. Between 1990 and 2000, at least 275 hectares of soil were lost per day in the EU, amounting to 1,000 km²/year. Between 2000 and 2006, the EU average loss increased by 3%, with highs of 14% in Ireland and Cyprus, and 15% in Spain. In the period 1990-2006, 19 Member States lost a potential agricultural production capability equivalent to a total of 6.1 million tons of wheat, with large regional variations.

4. **Compaction** can be induced by the use of heavy machinery in agriculture. Compaction reduces the capacity of soil to store and conduct water, makes it less permeable for plant roots, and increases the risk of soil loss by water erosion. Estimates of areas at risk of soil compaction vary, with some authors estimating that 36% of European subsoils have high or very high susceptibility to compaction. Other sources report 32% of soils as being highly susceptible and 18% moderately affected.
5. **Biodiversity decline**: soil biodiversity reflects the enormous variety of organisms, from bacteria to mammals, which shape the metabolic capacity of terrestrial ecosystems and much of soil function. Soil biodiversity is affected by all of the threats and degradation processes listed below.
6. **Landslides** can be triggered by factors such as land abandonment and land use change. They occur more frequently in areas with highly erodible soils or clay-based sub-soils on steeply sloping ground under intense and abundant precipitation. While there are no data on the total affected area in Europe, over 630,000 landslides are currently registered in national databases.
7. **Contamination**: after more than 200 years of industrialisation, soil contamination is a widespread problem in Europe. The most frequent contaminants are heavy metals and mineral oil. The number of sites where potentially polluting activities have taken place now stands at approximately 3 million.
8. **Salinisation** is the result of the accumulation of salts and other substances from irrigation water and fertilisers. High levels of salt will eventually make soils unsuitable for plant growth. It affects approximately 3.8 million ha in Europe. The main driver is the inappropriate management of irrigated agricultural land.
9. **Desertification** is a type of land degradation in arid, semi-arid and dry sub-humid regions resulting from various factors, including climatic variations and human activities.

Floods, acidification, desertification and drought can all be considered degradation processes / soil pressures or threats (see Table 3.10).

Table 3.10 *Soil pressures in the Soil Thematic Strategy (European Commission, 2006a), SOER 2020 (European Environment Agency, 2020[48]), SWSR 2015 (FAO and ITPS, 2015), and RECARE (Stolte, J., et al, 2016) studies*

#	Soil Thematic Strategy	SWSR 2015	RECARE 2016	SOER 2020
1	Erosion	Erosion by wind and water	Soil erosion by water, soil erosion by wind	Erosion
2	Decline in organic matter	Soil organic matter decline	Decline of organic matter (OM) in peat Decline of OM in minerals soils	Decline of SOC
3	Local and diffuse contamination	Soil contamination	Soil contamination	Soil contamination
4	Sealing	Sealing and capping	Soil sealing	Sealing (Land take and urbanisation)
5	Compaction	Compaction	Soil compaction	Compaction
6	Decline in biodiversity	Loss of soil biodiversity	Decline in soil biodiversity	Decline in biodiversity
7	Salinisation	Salinisation and sodification	Soil salinisation	Salinisation
8	Floods and landslides		Flooding and landslides	
9	Desertification		Desertification	Desertification
10		Soil acidification		Acidification
11		Nutrient imbalance Waterlogging*		

*Waterlogging is mostly associated with irrigation in Central Asian countries and is therefore outside the scope of this report

3.2.2 Land Degradation Neutrality (LDN)

It is similarly important to clarify the term *Land Degradation Neutrality* (LDN). The term originates from SDG 15 'Life on Land', specifically SDG target 15.3 which states: '*By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.*' The UNCCD is responsible for monitoring SDG indicator 15.3.1 ('*Proportion of land that is degraded over total land area')*[49]*.* This indicator was proposed by the Inter-Agency and Expert Group on SDG indicators (IAEG-SDGs) and adopted by the United Nations Statistical Commission (UNSC) in March 2017 to monitor progress towards achieving SDG target 15.3[50].

SDG indicator 15.3.1 is reported as a simple binary: degraded/not degraded. This is, in principle, based on comparable and standardised official national data sources. The SDG indicator 15.3.1 (the indicator') assesses changes in i) land cover, ii) land productivity, and iii) carbon stocks ('the sub-indicators'), which need to be validated and reported by national authorities.

SDG indicator 15.3.1 makes use of geospatial information and digital data from national, regional and global sources. The method of computation follows the 'One Out, All Out' statistical principle. It is based on the baseline assessment (the year 2000) and evaluation of change in the sub-indicators to determine the extent of degraded land over total land area.

These assessments were voluntary and, of the Member States, only Italy created a national plan to reach LDN.

[48] EEA. (2020). SOER 2020 – The European environment – state and outlook 2020. [online] Available at: https://www.eea.europa.eu/publications/soer-2020 (Accessed on 11 August 2020).

[49] Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton. 2017. Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany.

[50] Sims, N., Green, C., Newnham, G., England, J. R., Held, A., Wulder, M. A., ... & Vizcarra-Rossel, R. A., 2017. Good practice guidance. SDG Indicator 15.3. 1: Proportion of land that is degraded over total land area. Version 1.0.

The UNCCD has defined LDN as:

> *'a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems' (UNCCD, 2015)*

The book *Land Degradation, Desertification and Climate Change* (Reed, M.S. & Stringer, L.C., 2016.), which was endorsed by the UNCCD, defines LDN as 'the avoidance of the degradation of healthy ecosystems and the restoration and rehabilitation of degraded ones'.

For desertification and LDN at European level, the European Court of Auditors 2018 report (European Court of Auditors., 2018) concluded that:

- There is no clear picture of challenges.
- The steps taken to combat desertification lack coherence.
- There is no progress towards meeting the commitment to achieving LDN by 2030.
- There is no full assessment / data analysis at EU level, and no methodology on how to do so has been agreed.
- There is no focused EU-level strategy / action plan / spending programme.
- There is no coordination between the Member States, and no practical guidance.
- There is no clear, shared vision in the EU about how land degradation neutrality will be achieved by 2030.

They made three main recommendations: 1) understanding land degradation and desertification in the EU; 2) assessing the need to enhance the EU legal framework for soil; and 3) achieving LDN in the EU by 2030.

These recommendations include the development of a methodology and indicators (starting with the UNCCD's three indicators: land cover and land cover change, land productivity and organic carbon in soil, see Figure 3.1) to assess the extent of desertification and land degradation in the EU. They also include giving guidance to Member States on the practical aspects of preserving soil and achieving LDN in the EU, including dissemination of good practices.

3.2.3 Priorities on land degradation/LDN at national level

This project's questionnaire to the EU SEG addressed the different research questions about soil and land degradation. Of the countries that replied, only Slovakia has an official definition[51] of land degradation, while Czechia and Romania have a definition of land degradation. None of the responding countries has a definition of LDN. However, some countries state that they follow international definitions: Italy, Malta and Germany use the UNCCD definitions. Austria indicated that it is working on national definitions.

Despite the lack of common definitions, Member States nevertheless have priorities in respect of specific land and soil degradation processes[52] (see Section 3.2.1). The table below shows an overview from the questionnaires. Of the countries that mention land degradation processes, they note the top three problems as soil erosion, contamination and sealing, closely followed by declining organic matter and soil compaction.

Other land degradation priorities mentioned include unsustainable land management / over-exploitation of resources and climate change.

[51] Slovak definition: Official definition for Land degradation is anchored in Act No. 220/2004 Code (Law on Soil Protection) in the basic terms: (f) degradation of physical, chemical and biological damage and deterioration of agricultural land, such as water erosion and wind erosion, compaction, acidification, contamination by hazardous substances, harmful plant organisms and animal organisms and micro-organisms; microbial biomass and unnatural reduction of biological activity in soil).

[52] Information drawn from the questionnaire sent to the EU SEG, supplemented with expert input from non-responding countries. Information from the SURFACE project (https://www.ufz.de/surface/index.php?en=43795) (which asked about land degradation priorities in a questionnaire) was also included.

Table 3.11 *Overview of soil degradation processes in Member States (Green: soil expert group, Yellow: expert inputs, Red: SURFACE project, White: no data)*

	soil erosion	soil sealing	soil contami-nation	decline in SOM	soil compaction	desertifi-cation	flooding	soil salinization	droughts	landslides	eutrophi-cation	soil biodivesity	forest fires	soil acidification
Austria	■	■	■		■					■				
Austria		■	■	■						■				
Austria		■	■				■			■				
Belgium	■	■	■	■	■									
Flanders	■						■							
Bulgaria														
Croatia														
Cyprus														
Czech Republic	■	■	■	■	■									■
Czech Republic	■													■
Denmark	■													
Denmark														
Estonia		■		■	■									
Estonia	■			■	■	■	■							■
Finland														
France	■	■	■	■	■						■			
France		■												
Germany	■	■	■	■	■						■			
Germany	■	■	■	■	■						■			
Greece														
Greece	■	■				■	■	■			■	■	■	
Hungary														
Ireland														
Italy	■	■	■	■	■			■		■		■		
Italy	■	■	■	■										
Italy	■		■			■		■						
Latvia														
Lithuania														
Luxembourg														
Malta	■	■				■			■					
Netherlands		■	■	■	■									
Netherlands							■	■	■					
Poland														
Poland			■											
Portugal	■					■			■				■	
Portugal						■								
Romania			■			■				■				
Romania	■					■	■		■	■				
Slovakia	■		■	■	■			■						
Slovakia	■	■	■	■	■									
Slovakia	■		■		■									
Slovenia		■	■											
Slovenia		■	■	■						■		■		
Spain														
Spain	■					■	■	■	■				■	
Sweden		■	■		■									■
UK														
nr countries	*14*	*13*	*12*	*10*	*10*	*7*	*7*	*5*	*5*	*4*	*3*	*3*	*3*	*3*

3.2.4 Land and soil-related SDG indicators and sub-indicators

This section deals with the SDG indicators that relate to soil and land. Both existing literature and the responses to the questionnaire (which specifically asked about land degradation indicators) were taken into account.

According to Tóth et al (2018), there are five groups of SDGs, although not all address soil and land. They assigned indicators only to those where soil plays a central role, namely those that:

- Explicitly include productivity (SDGs 2.3, 2.4);
- Explicitly include soil degradation (SDG 15.3);
- Name soil in the SDG, although no soil-based indicator has been proposed (SDG 3.9);
- Have direct relevance to soil resources, with explicit reference to land resources but no reference to soil (SDG 11.3);
- Have direct relevance of soil to SDG without naming soil in the SDG or including soil-related SDG indicators (SDGs 6.4, 6.5, 13.2, 14.1, 15.5).

(See Annex 3 for a list of the indicators proposed by Tóth et al. 2018) and their targets.)

Questionnaire responses provided insights into Member States' approaches to soil and land degradation. While this section deals with land and soil-related SDG indicators, the interviewees were asked about land degradation, which caused a certain bias in the answers. The questionnaire addressed the monitoring of soil and land degradation, potential indicators and their baseline and data sources, among other topics. (See Annex 2 for the main questions.)

The range of responses was broad and varied considerably between Member States – and even between different regions within a Member State – in their approaches to issues related to soil and land degradation. All of the countries that replied to the questionnaire carry out some form of monitoring. Countries such as Czechia, Slovakia and Sweden have comprehensive monitoring systems in place that include several parameters associated with soil and land degradation, translated into indicators. Most countries focus on five parameters: soil erosion, soil sealing, soil contamination, decline in OM and soil compaction, and do not specify precisely how they are measured.

Several discrepancies were noted between the responses from different experts from the same country, which indicates a lack of a common understanding and a clear national approach to soil and land degradation (indicators and monitoring).

There is no consensus between different Member States on what constitutes the baseline. Some follow UNCCD guidelines (e.g. Malta), others set their own baseline according to past data (e.g. Austria), others are still debating an appropriate baseline or have not defined one yet (e.g. Slovenia and Spain), while others (e.g. Sweden) state that it is not possible to set a baseline, given that this is an ongoing process. This suggests that without a common baseline, even if there is agreement on a set of common indicators, it would not be possible to compare different Member States, complicating the definition of an EU-wide understanding of soil and land degradation.

3.2.5 National approaches to LDN

Section 3.1.3 addressed the land degradation priorities and LDN among the different Member States. While some countries have either officially or unofficially defined land degradation, use a global definition, or have no definition at all, LDN is neither defined nor addressed by the Member States.

Some interviewees from Denmark, Romania and Slovakia recognise the importance of LDN but note that there is no current approach to achieving it. One interviewee from Italy, for example, agrees with LDN as a balance between restored degraded land and newly degraded land, but emphasises that existing methodologies would first need to be updated.

Overall, there is a lack of information on LDN approaches at national and sub-national level, with half of the countries failing to respond to this question. Of those that did provide an answer, some

mentioned that these topics are dealt with at ministerial or federal (e.g. Germany) level. There was no mention of other institutions on a sub-national level.

The project proposes to assess the impact of soil and land management measures on the SDGs. The focus is therefore on developing an approach rather than simply taking a full inventory of Member State activity. This approach, which is detailed in the subsequent sections, selects successful measures for different zones/groups of countries in Europe, based on biophysical and socioeconomic settings. For each of these zones, examples of successful and unsuccessful measures will be highlighted, with an evaluation of why certain measures work well. Given the limited data availability, a sub-set of Member States and soil threats are used as illustrative examples.

3.3 A new approach to assessing measures

3.3.1 Introduction

The approach starts by connecting the SDGs to the soil threats (Figure 3.2). For each SDG, the impact of each soil threat on the achievement of that particular SDG was assessed, using the steps described by Keesstra et al. (Keesstra et al., 2016). They took a stepped approach to link the soil functions via the ecosystem services to the SDGs. The second step was to assess how much of the area of each environmental zone in Europe (Metzger et al, 2005) is affected by each soil threat. Environmental zones were preferred to countries because environmental characteristics (climate/soil/relief) do not coincide with country borders. The variability within countries would be too high to make any sensible suggestions for preferred soil management strategies. The two sources of information (impact soil threat on SDGs and soil threat occurrence in environmental zones) were combined, identifying lighthouse measures for the most urgent soil threat / environmental zone combination and how the selected measure would be of benefit. This approach would allow a handling perspective for each zone. It should be noted that the list of lighthouse measures is not complete and simply serves as an illustration for this approach. The conference will provide a forum to obtain feedback on the lighthouse measures selected and allow for discussion of the approach itself.

1. • Connect SDGs to soil threats
2. • Connect SDGs and soil threats to environmental zones
3. • Show how each management choice implies choices in which SDGs will be achieved

Figure 3.7 *Linkages between SDGs and soil and ecosystem-based approaches (Keesstra et al., 2018).*

Each selected measure was evaluated using the diagram in Figure 3.2. This method allows the assessment of a selected measure that was initially designed to achieve SDG 15 in terms of its contribution towards other SDGs. The chosen measure should be evaluated by its biophysical processes and their impact on the goal (in this case, SDG 15). In order to make the measure acceptable and sustainable, it should also be evaluated for its impact on the socioeconomic structure of the area in which it is implemented. The diagram argues that only measures designed according to these concepts (systems thinking; connectivity; nature-based solutions, regenerative economics) will be acceptable from both a biophysical and socioeconomic perspective. The final step is to evaluate the chosen measure according to its impact on serving different SDGs at the same time. The diagram

roughly groups the SDGs in goals related to: health, food, water, climate, energy and economy. In the evaluation that follows, an explanation is given of how the measure fits into this method.

3.3.2 Mapping soil threats

In order to map soil threats, a spatial analysis was undertaken, using the best available information. The eight soil threats were mapped according to the specification explained in Table 3.11. The final column of the table indicates the thresholds used to map areas as having a soil threat. Boxes 1, 2 and 3 provide further background information on the input data layers used to map the different soil threats.

Table 3.12 *Approach and data used to map soil threats*

Soil threats	Data sources used	Mapping approach: indicators and thresholds used for the final mapping of soil threat
1. Soil erosion by wind and water	Wind erosion. The map is based on an Index of Land Susceptibility to Wind Erosion (ILSWE) which was created by combining spatio-temporal variations of the most influential wind erosion factors. See further details in Box 3 and at: http://eusoils.jrc.ec.europa.eu/library/themes/erosion/winderosion/ JRC database. Main reference Borrelli et al. (2014). Soil Erosion by water– JRC database developed through the application of the WaTEM/SEDEM model long-term averages of annual soil loss and deposition rates were computed (Borreli et al., 2018). Database link: http://eusoils.jrc.ec.europa.eu/ESDB_Archive/pesera/pesera_data.html	Wind erosion: areas mapped as soil threat 'wind erosion' overlap with wind susceptibility classes (in ILSWE) 'High' and 'Very High'. To map the lands that are under threat for soil erosion by water the WaTEM class > 100 ton/ha/yr of soil loss was taken
2. Soil organic matter decline	Joint Research Centre (2013). Average Eroded SOM in agricultural soils. Data set is included in the soil threats database of ESDAC: https://esdac.jrc.ec.europa.eu/content/pan-european-soc-stock-agricultural-soils The data sets express the average eroded SOC (Mg C ha-1 yr-1) for the decade 2000–2010, in agricultural soils of the EU. Using the CENTURY model a simulation was made of SOC loss taking into account soil deposition within grid cells and the potential C export to riverine systems, in a mass balance approach. For further details see also Lugato et al. (Lugato et al., 2016).	Lands classified as having soil organic matter decline as a major soil threat are those that have: SOC loss of > 0.1 mg C/ha/yr. This overlaps with ESDAC map class 'high' and 'very high' risk for SOC loss
3. Sealing	Combination of different layers: 1. Copernicus imperviousness change (2006-2012) 2. Volante (1990-2006) dominant land use change trajectories (Levers, et al., 2014) 3. Land use intensity maps gridded in PEGASUS based on Perez-Soba et al. (2015), high, medium and low intensity farmland NDVI-HANTS phenotype dataset. (Roerink et al., 2011)	Lands classified as having soil sealing as a major soil threat are those that have: 1. PEGASUS class high and medium intensity Where built-up area increased over the assessed years based on information from 3 input layers (Copernicus, VOLANTE & NDVI-HANTS)
4. Compaction	JRC (2008). Natural susceptibility to soil compaction in Europe. Data set is included in the soil threats database of ESDAC: https://esdac.jrc.ec.europa.eu/content/natural-susceptibility-soil-compaction-europe The map of natural soil susceptibility to compaction was created from the evaluation of selected parameters from the European Soil Database (ESDB). The soil susceptibility to compaction was divided into four categories. Two additional categories represent the data concerning places where this evaluation was either not relevant or could not be provided because of lack of information. In total there are six categories: •0 - no soil. This represents water bodies, glaciers and rock outcrops	Lands classified as having risk for compaction as a major soil threat are those that have: Classes high and very high in the JRC database on natural susceptibility to soil compaction

Soil threats	Data sources used	Mapping approach: indicators and thresholds used for the final mapping of soil threat
	•1 - low susceptibility to compaction •2. - medium susceptibility to compaction •3. - high susceptibility to compaction •4. - very high susceptibility to compaction •9. - no evaluation possible. This was the case of towns, including soils, soils disturbed by man and marshes	
5. Soil biodiversity decline	JRC (2016). Potential threats to soil biodiversity in Europe. Data set is included in the soil threats database of ESDAC: https://esdac.jrc.ec.europa.eu/content/potential-threats-soil-biodiversity-europe See Box 3 for more information	Lands classified as having loss in soil biodiversity as a major soil threat are those that have: Classes moderate-high and high in at least one of the three biodiversity threat layers the soil biodiversity threats database comprises
6. Landslides	JRC (2016). European Landslide Susceptibility Map version 2 (ELSUS v2). Data set is included in the soil threats database of ESDAC: https://esdac.jrc.ec.europa.eu/content/european-landslide-susceptibility-map-elsus-v2 The spatial dataset (GIS map) shows landslide susceptibility levels at European scale, derived from heuristic-statistical modelling of main landslide conditioning factors also using landslide location data. It covers all EU Member States except Malta. The map was produced by regionalising the study area based on elevation and climatic conditions, followed by spatial multi-criteria evaluation modelling using pan-European slope angle, shallow sub-surface lithology, and land cover spatial datasets as the main landslide conditioning factors. In addition, the location of over 149,000 landslides across Europe was used for model calibration and map validation	Lands classified as having landslides threat as a major soil threat are those that score 'high' and 'very high' in the landslides database
7. Pollution	No Europe-wide data linking to a clear definition of pollution threat	-
8. Salinisation	No Europe-wide data linking to a clear definition of salinisation threat	
9.Desertification	No Europe-wide data linking to a clear definition of desertification threat	

Box 3.6 Description of the ILSWE dataset predicting wind erosion susceptibility of land in Europe

For wind erosion, we used the dataset developed by the JRC (Borrelli et al., 2014). The dataset predicts the susceptibility to wind erosion. The map is based on an ILSWE, which was created by combining spatio-temporal variations of the most influential wind erosion factors. For the assessment of understanding the sensitivity to wind erosion of marginal lands, the lands that overlapped with wind susceptibility classes (in ILSWE) 'high' and 'very high' were determined.

The ILSWE is based on the combination of the most influential parameters, i.e. climate (wind, rainfall and evaporation), soil characteristics (sand, silt, clay, CaCO3, organic matter, water-retention capacity and soil moisture) and land use (land use, percent of vegetation cover and landscape roughness). The spatial and temporal variability of factors are appropriately defined through GIS analyses. Harmonised datasets and a unified methodology were employed to suit the pan-European scale and avoid generating misleading findings that could result from heterogeneous input data. The selected soil erosion parameters were divided into three groups, namely (i) Climate Erosivity, (ii) Soil Erodibility and (iii) Vegetation Cover and Landscape Roughness. Sensitivity to the contributing group of factors was calculated using the fuzzy logic technique, which allows the sensitivity range of each factor in Europe to be unambiguously defined.

Borrelli, P., Panagos, P., Ballabio, C., Lugato, E., Weynants, M. and Montanarella, L. (2014). Towards a pan-European assessment of land susceptibility to wind erosion. *Land Degradation & Development*. In Press. Available at doi: 10.1002/ldr.2318

(Source: https://esdac.jrc.ec.europa.eu/content/Soil_erosion_by_wind)

Box 3.7 Description of the WaTEM/SEDEM dataset predicting water erosion susceptibility in Europe

The JRC, in collaboration with the University of Basel and Université Catholique de Louvain, quantified the potential spatial displacement and transport of soil sediment due to water erosion at European scale. With the WaTEM/SEDEM model, long-term averages of annual soil loss and deposition rates were computed. The findings indicate that soil loss from Europe in the riverine systems is about 15% of the estimated gross on-site erosion.

Input data: RUSLE2015 soil erosion estimates, Digital Elevation Model (DEM) at 25m.

The estimated sediment yield totals 0.164 ± 0.013 Pg yr^{-1} (which corresponds to 4.62 ± 0.37 Mg ha^{-1} yr^{-1} in the erosion area). The greatest amount of gross on-site erosion, as well as soil loss to rivers, occurs in agricultural land (93.5%). The Sediment Delivery Ration (SDR), i.e. the ratio between sediment yield (SY) and gross erosion, indicates that the sediment routed down the hillslopes to the riverine system accounts for 15.3% of the total eroded soil.

To map the lands that are under threat for soil erosion by water, the WaTEM class > 100 ton/ha/yr of soil loss was taken. For further details on the WaTEM/SEDEM water erosion risk, see: Borrelli, P., Van Oost, K., Meusburger, K., Alewell, C., Lugato, E. and Panagos, P. (2018). A step towards a holistic assessment of soil degradation in Europe: Coupling on-site erosion with sediment transfer and carbon fluxes. Environmental Research, 161, pp. 291-298.

(Source: https://esdac.jrc.ec.europa.eu/content/estimate-net-erosion-and-sediment-transport-using-watemsedem-european-union)

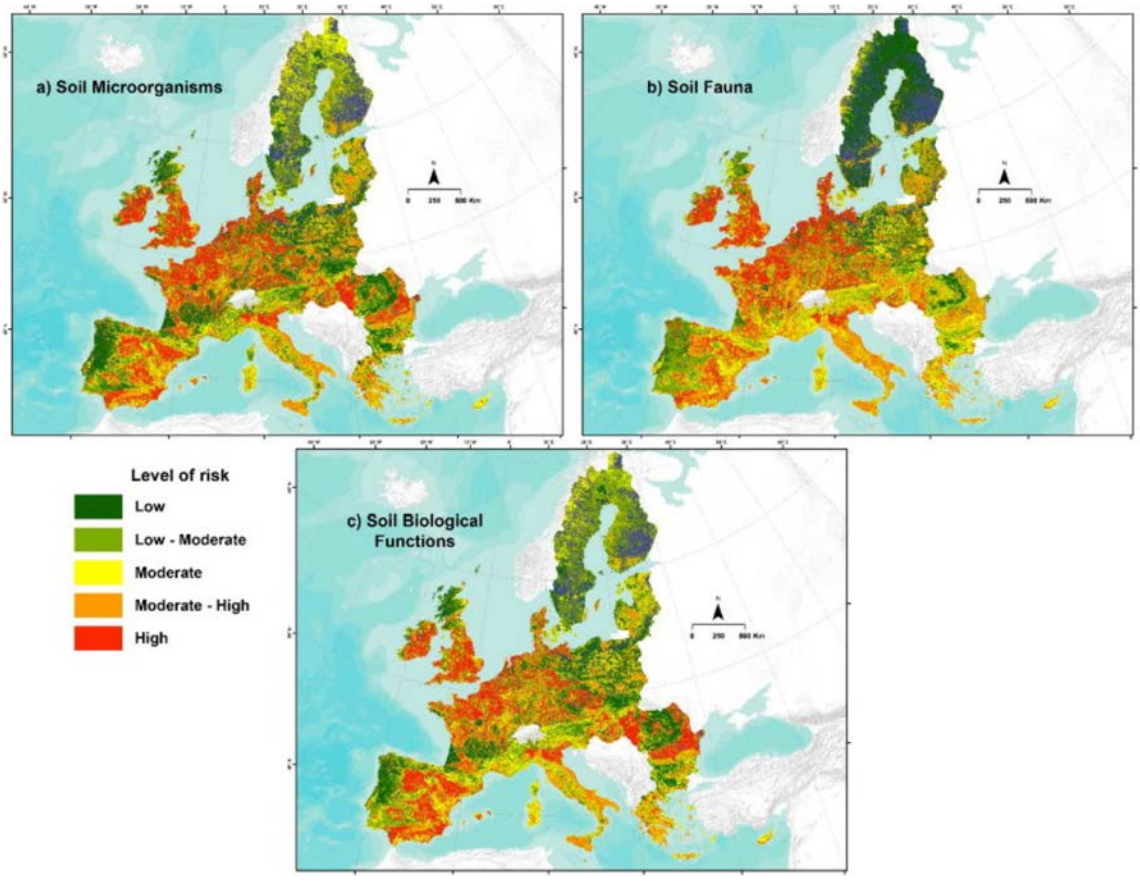
Box 3.8 Description of the soil biodiversity dataset predicting risk for loss of three types of soil biodiversity in Europe

Dataset contains three GIS maps showing potential threats to soil biodiversity in Europe for soil microorganisms, fauna and biological function. To produce the database, a list of 13 potential threats to soil biodiversity was proposed to experts in order to assess the potential threat for three major components of soil biodiversity: soil microorganisms, fauna and biological function. The 13 potential threats that were scored and then mapped in 13 sub-layers were: habitat fragmentation, use of GMOs in agriculture, introduction of invasive species, climate change, soil compaction, soil sealing, soil erosion, soil salinisation, land use change, nuclear pollution, soil pollution from industry, organic matter decline and intensive human exploitation.

The results of the mapping show that intensive exploitation was identified as the highest pressure. In contrast, the use of genetically modified organisms (GMO) in agriculture was considered as the threat with least potential. The potential impact of climate change showed the highest uncertainty. Fourteen of the 27 countries have more than 40% of their soils with moderate-high to high potential risk for all three components of soil biodiversity. Arable soils are the most exposed to pressures. Soils within the boreal biogeographic region showed the lowest risk potential.

For further details on the database see:
Orgiazzi, A., Panagos, P., Yigini, Y., Dunbar, M.B., Gardi, C., Montanarella, L. and Ballabio, C. (2016). A knowledge-based approach to estimating the magnitude and spatial patterns of potential threats to soil biodiversity. *Science of The Total Environment*, Volumes 545–546, pp. 11-20. Available at: https://doi.org/10.1016/j.scitotenv.2015.12.092 Link: https://www.sciencedirect.com/science/article/pii/S004896971531247X

Map: Areas at risk of soil biodiversity loss:



(Source: https://esdac.jrc.ec.europa.eu/content/potential-threats-soil-biodiversity-europe)

In order to understand the distribution of soil threats across Europe and identify concentration zones, the mapped results were further classified according to environmental zones. Metzger et al. (2005) was used for the classification of environmental zones (EnZ) (see Box 3.8).

Box 3.9 Description of environmental classification

The Environmental Stratification (Metzger et al., 2005) is the result of a principal component analysis (PCA) of the 20 most relevant and available environmental variables (grouped under climate, geomorphology, oceanicity and northing), combined using an ISODATA principal component analysis (PCA) clustering. The resulting 84 strata of the Environmental Stratification (EnS) are aggregated into 13 environmental zones (EnZ). The resulting Environmental Stratification is a vector dataset, hierarchically built up with environmental zones and strata.

The PCA was used to explain 88% of the variation into three dimensions, which were subsequently clustered into 84 strata using an ISODATA clustering routine. The mean first principal component values of the classification variables were used to aggregate the strata into 13 Environmental Zones (EnZ), which provides a basis for a consistent nomenclature. The EnZs are used as the climatic basis for the development of the Agri-Environmental Zonation (AEnZ).

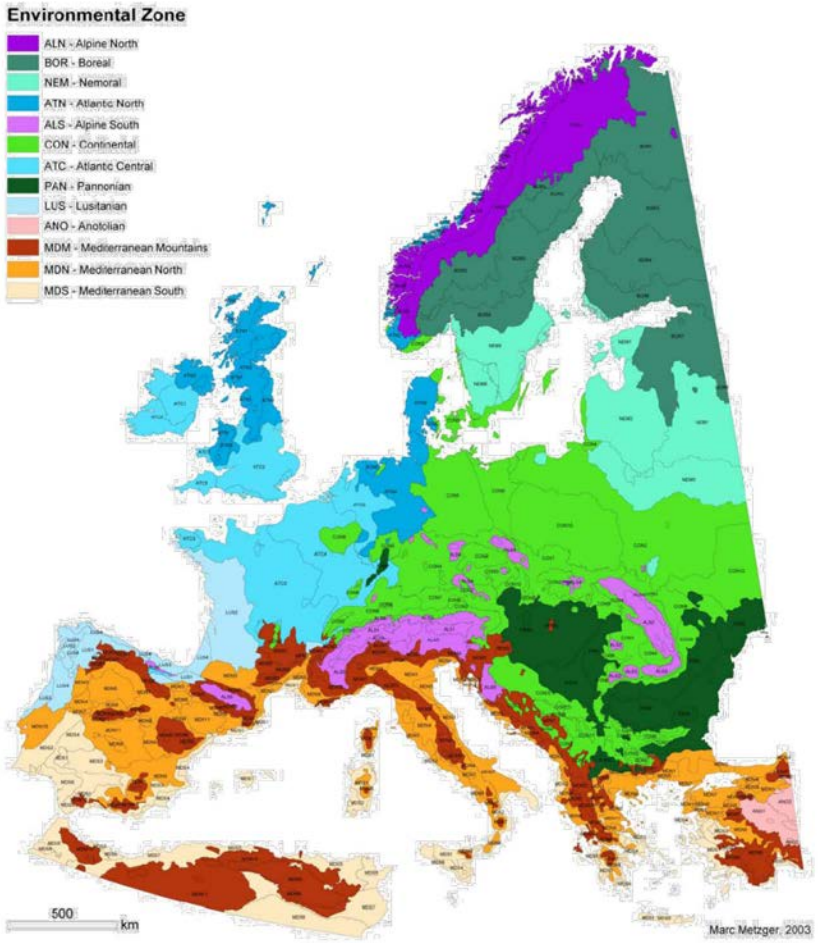


Figure 1 *The 84 strata of the Environmental Stratification (EnS) are aggregated into 13 environmental zones (EnZ)*

Reference: Metzger, M.J., Bunce, R.G.H., Jongman, R.H.G., Mücher, C.A. and Watkins, J.W. (2005). A climatic stratification of the environment of Europe. Global Ecology and Biogeography, 14, pp. 549–563. Metzger, M.J., Bunce, R.G.H., Leemans, R. and Viner, D. (2009). Projected environmental shifts under climate change: European trends and regional impacts. Environmental Conservation, 35, pp. 64-75.

3.3.3 Results of mapping soil threats

The integrated mapping of soil threats allows conclusions to be drawn on the environmental zones and countries in which specific soil threats are most dominant, as well as those where they are not relevant.

The mapped results are presented in Figure 3.4. An integrated summary view of the overlay of soil threat per environmental zone is presented in Figure 3.3. Detailed statistics on the area shares of the different soil threats per environmental zones are presented in Figure 3.8. The methodology we followed is based on data sets available for the European scale as explained in Table 3.11. It is important to realise that the results as presented in Fig. 3.7/3.8 and Table 3.12 are based on surface areas. This means that some important threats such as soil sealing do not score very high. This, however, does not mean that they are not important, as the soil threat may have a major impact on the local scale such as soil sealing is in peri-urban areas; or areas where large greenhouse fields are established. Also, the surface areas does not discriminate between irreversible degraded state (such as soil sealing) and ongoing degradation process (e.g. decline in soil biodiversity). This exercise has been carried out on the European scale; however, the lighthouse example approach as presented in the next section zooms in to the local scale. The identified soil threats per environmental zone will allow to transfer useful lighthouse examples within the same environmental zone.

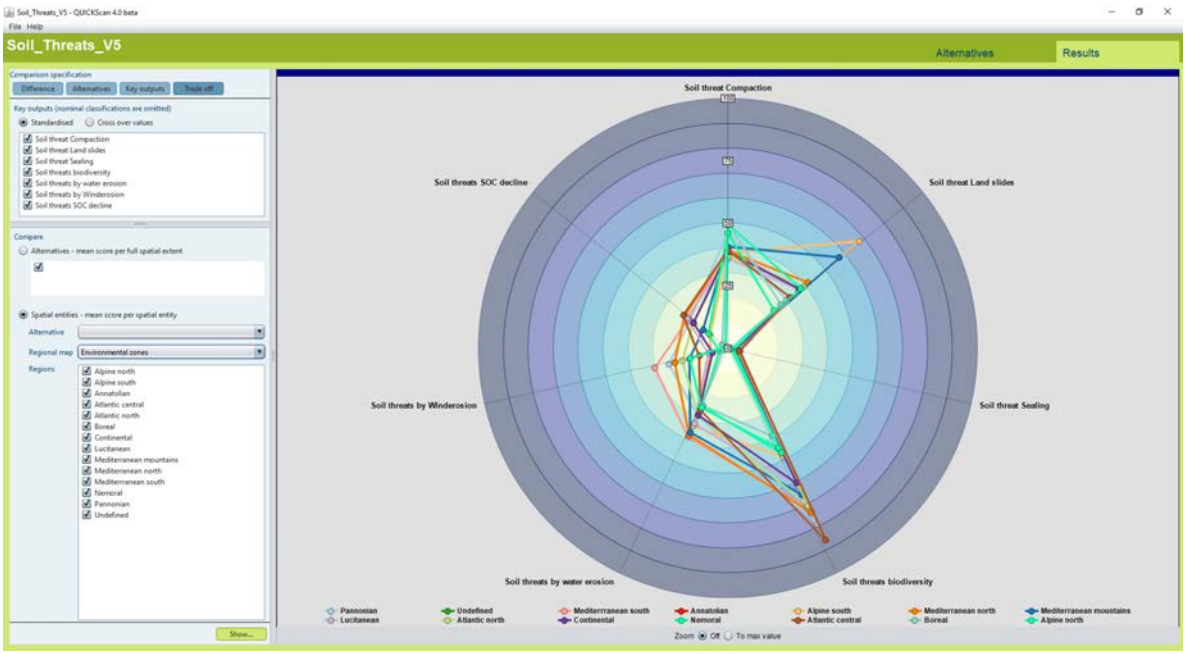


Figure 3.8 *Overview of extension of different soil threats in all 13 environmental zones in EU-28*

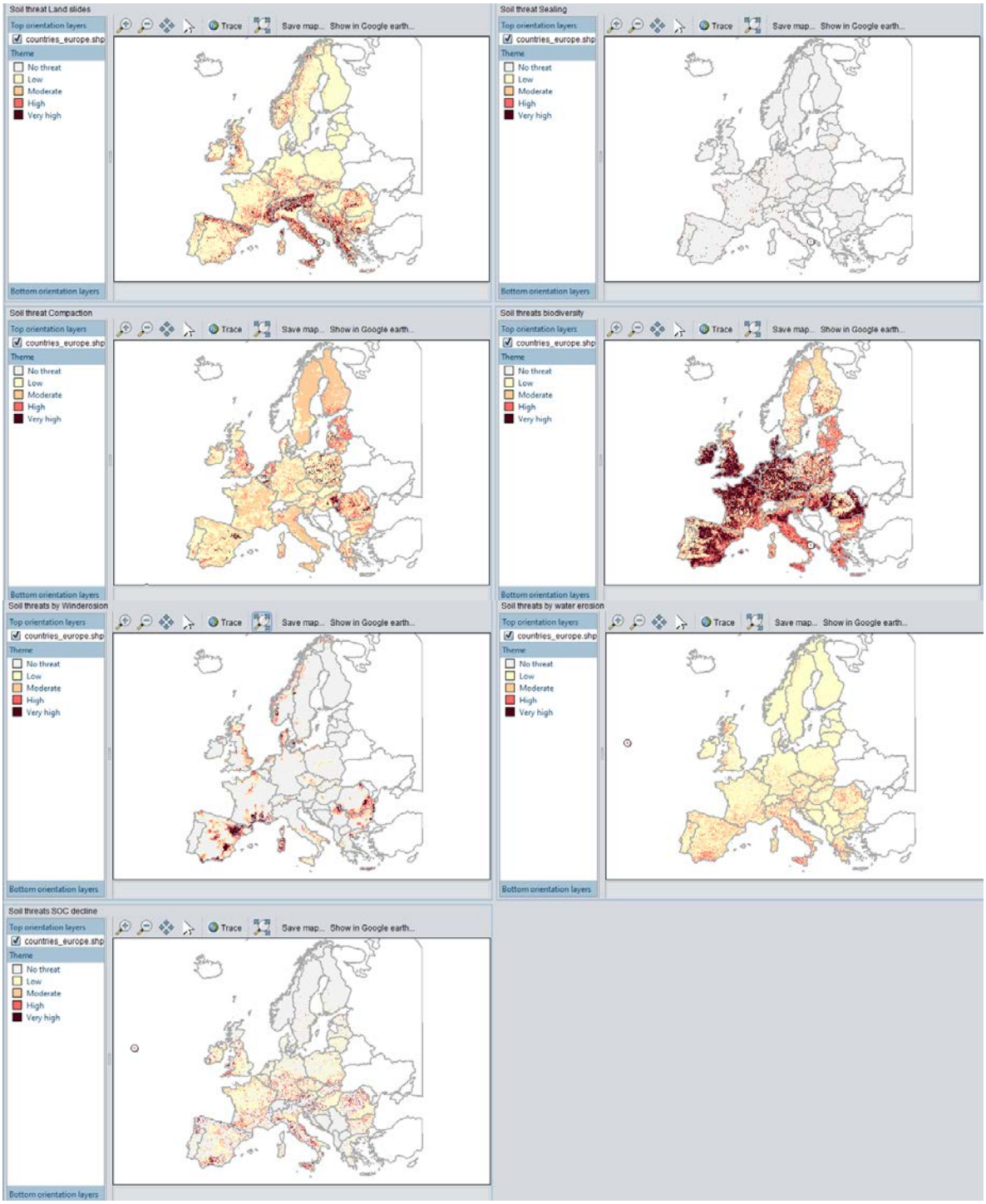


Figure 3.9 *Result maps for soil threats landslides, soil sealing, compaction, soil biodiversity, erosion and SOC decline*

Table 3.13 *Soil threat most likely to prohibit the achievement of LDN per environmental zone in Europe*

Environmental zone: Soil threats:	ALN	BOR	NEM	ATN	ALS	CON	ATC	PAN	LUS	MDM	MDN	MDS
Erosion by wind	10	0	1	11	4	3	6	20	3	11	15	25
Erosion by water	1	0	0	3	11	2	1	3	5	12	11	11
Organic matter decline	0	0	1	9	7	9	7	6	12	9	13	10
Sealing	0	0	1	1	0	1	3	1	3	1	3	3
Compaction	0	8	23	13	2	13	10	26	2	4	5	11
Soil biodiversity decline	6	13	40	62	31	40	84	47	51	55	72	71
Landslides	16	4	0	17	60	17	9	7	15	45	23	16

Area share (%/total area) per environmental zone covered by the threat.

Red numbers indicate a soil threat that affects an area greater than 10%. Soil contamination, soil salinisation and desertification are not included due to the lack of EU-wide information.

The evaluation of all soil threats across all environmental zones in Europe (Table 3.13) shows that:

- Erosion by water is most strongly a threat in the Alpine south and the three Mediterranean zones. Wind erosion is a less widespread threat in the EU but is far more prominent in certain zones, e.g. the Pannonian, Mediterranean and Atlantic and Alpine North.
- In this analysis SOM decline does not appear as a very extensive soil threat. However, in arable land and especially peatland areas it can affect soil health and productivity, which is especially evident in the Mediterranean and Lusitanian area where it can affect up to 13% of the area. Also important to know is that many soils already have a low soil carbon stock, which can therefore not decline even further[53]. It is of importance to focus on increasing soil carbon in those areas[54]; however, this is not included in this analysis.
- The soil compaction threat is occurring in almost all environmental zones but is most prominent in the Pannonion, Nemoral and Atlantic zones, where wetness is more often a challenge in agricultural soils.
- Soil sealing is the least widespread threat in terms of area coverage. It is most prominent in Atlantic central, Lusitanian and in two of the Mediterranean zones. These are generally the zones with highest urbanisation dynamics. However, even though it is not an important threat in terms of surface areas affected it is a very important threat in the most densely populated areas. Especially in peri-urban areas, industrial developments are sealing fertile soil rapidly[55]. This does not show in the analysis done with the full area of Europe; but this does not mean it is not a significant threat.
- Soil biodiversity decline is spread over a large share of the territory of all environmental zones, but is most prominent in the Atlantic, Mediterranean and Pannonian zones.
- Landslides are the second most widespread threat, particularly in zones covering many mountains, such as the Alpine south and north, and Mediterranean mountains and north. Even though this soil threat is important in terms of area covered, it is not so urgent in most countries. This is because the areas affected are not densely populated in most countries and consist of very steep mountainous areas that are now nature areas or used by extensive grazing activities. In addition, many of those areas are steep and do not have a productive soil that is threatened.

For the other soil threats, desertification, soil contamination and soil salinisation there is no EU-wide reliable spatial information available of sufficient quality to make this assessment.

3.3.4 Lighthouse examples to serve as good practice advice

The analysis took a stepped approach to assess the types of land management strategies that may be useful in addressing the most important soil threats for different environmental zones.

[53] Parras-Alcántara, L., Lozano-García, B., Brevik, E.C., Cerdá, A., 2015. Soil organic carbon stocks assessment in Mediterranean natural areas: A comparison of entire soil profiles and soil control sections. J. Environ. Manage. 155, 219–228. https://doi.org/10.1016/j.jenvman.2015.03.039.

[54] Novara, A., Pulido, M., Rodrigo-Comino, J., Di Prima, S., Smith, P., Gristina, L., ... & Keesstra, S. (2019). Long-term organic farming on a citrus plantation results in soil organic carbon recovery. Cuadernos de Investigación Geográfica.

[55] Ferreira, C. S. S., Walsh, R. P. D., Kalantari, Z., & Ferreira, A. J. D. (2020). Impact of Land-Use Changes on Spatiotemporal Suspended Sediment Dynamics within a Peri-Urban Catchment. Water, 12(3), 665.

In each case, a lighthouse land management strategy was identified, that was to be evaluated with the SDGs in mind. Figure 3.3 clarifies why these measures are suitable to promote the achievement of the SDGs. The examples highlighted as lighthouses were collected through a literature review and based on EU-funded projects RECARE and SOILCARE (www.recare-project.eu; www.soilcare-project.eu).

For each assessed strategy we have indicated in Figure 3.4 which SDGs and associated overarching societal issues the specific strategy works towards. In addition, this is also highlighted in the tables at the end of each lighthouse example description. The table indicates which SDG is working towards each specific societal issue (Health, Food, Water, Climate, Energy, Economy, Soil/Land). The numbers that have been highlighted green are those which are positively influenced by the presented lighthouse example.

3.3.4.1 Soil threat 1: soil erosion by wind and water

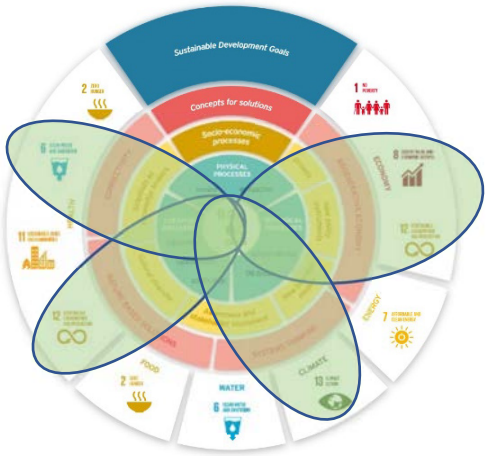
Soil erosion by wind is especially evident in the Mediterranean areas, in the Pannonian and Atlantic North.

In the current systems, after harvesting the soils are left bare and exposed to the wind during the entire winter period until seeding happens in spring. Depending on the soil type, the soil is easily eroded and transported elsewhere, where it may clog sewers and reservoirs. In addition, the soil particles may contain contaminants and pollutants that threaten human health in adjacent towns.

Lighthouse example for wind erosion

The use of stubble as a natural mulch

This system carries out annual ploughing just prior to seeding, limiting the time in which the soil is bare and vulnerable to wind erosion. During the winter period, after harvesting, the crop stubble eliminates the stress of the wind on the surface.



This approach is suitable for all areas suffering from wind erosion. As well as helping to achieve its primary goal - stop wind erosion and, with that, land degradation (SDG 15) - it also works to maintain soil fertility. Soil fertility will enhance the possibility to produce healthier food (SDG 2) in a sustainable way (SDG 12) and to allow for a better livelihood for farmers (SDG 8). Reduced tillage and leaving the roots of the harvested crops will increase the infiltration of rainfall (SDG 6), increase soil carbon stocks (SDG 13) and reduce landslide risks (SDG 15).

Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

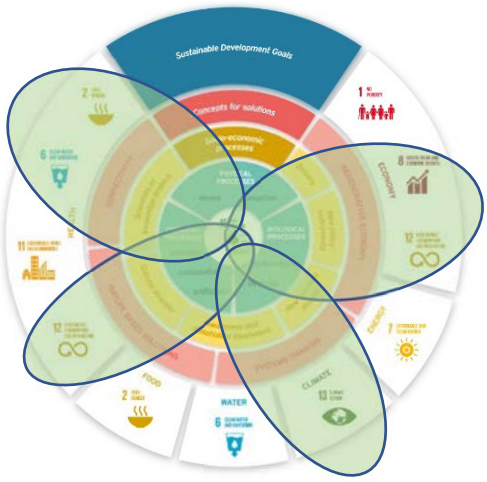
Soil erosion by water

Soil erosion by water emerges as a major threat in the Alpine South and Mediterranean areas, where relief and bare soils are combined. Under these circumstances intensive rainstorms can cause significant damage. Intense rainfall events are more common in areas with warmer climates, therefore, under climate change extreme events will occur more frequently.

Lighthouse examples for water erosion:

The use of mulching and cover crops in orchards and vineyards

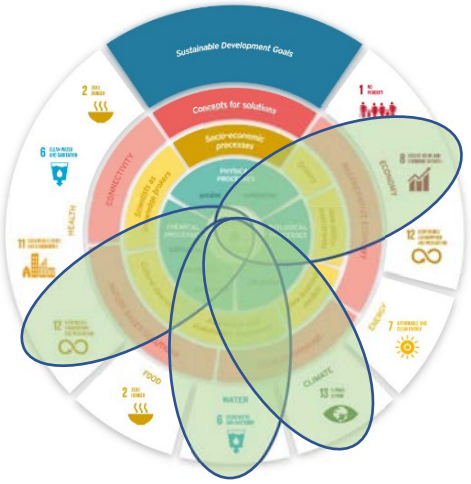
Straw mulch has proved to be an effective and potentially acceptable measure in orchards in Mediterranean Spain. In the dry summers in the Mediterranean, strong thunderstorms can cause massive erosion damage in just a few hours. Mulching or cover crops have been proven to reduce erosion by more than an order of magnitude. The implementation of this measure will help to achieve SDG 15 and will also improve water quality (SDG 6), mitigate climate change by improving the soil carbon stock (SDG 13), improve long-term crop growth and production and a sustainable livelihood for the producer (SDG 2, 8 and 12). The off-site effects will improve infrastructure in the area by not damaging roads and reservoirs.



Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

Maintained terrace structures

Well-maintained terraces are an excellent means of avoiding soil erosion by water. They also form part of the cultural heritage of a region, enhancing tourism and improving the infrastructure and livelihood of a region. This measure works towards more than its original goal (SDG 15), also helping to achieve SDG 8: decent work and economic growth and a more sustainable production (SDG 12) of agricultural products. It also enhances infiltration, which may increase water availability for crops (reducing the irrigation needs in dryland areas) and recharge the aquifer (SDG 6).



Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

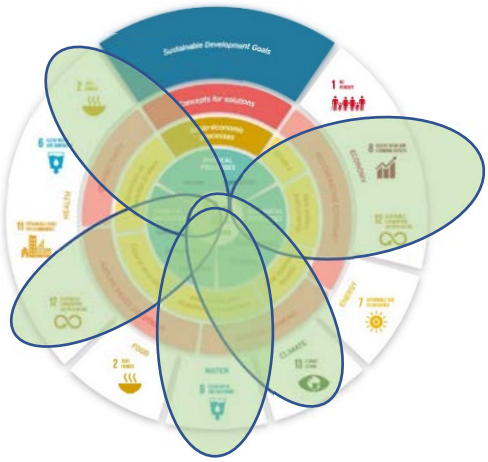
3.3.4.2 Soil threat 2: soil organic matter decline

Organic matter decline has been listed as a major problem in all Mediterranean regions and in Lusitania (which includes north Portugal, northeast Spain and southwest France). In addition, it is known to be a soil threat in arable land, especially for peat soils.

SOM can be defined as the total organic content of a soil after excluding non-decayed plant and animal remains. Carbon is the primary element of SOM, comprising about half of the total weight of the organic matter, making soil the second largest pool of carbon on Earth. To protect SOM in agricultural soils, it is important to prevent its oxidation and promote the formation of new SOM.

Lighthouse examples for organic matter

Cover crops and catch crops



To prevent oxidation of organic matter in soils, turnover of the soil should be avoided as much as possible. No, or minimum, tillage is therefore a good option. However, to eliminate the negative effects of weeds, farmers in many areas use herbicides to eliminate weeds in their fields, replacing the tillage practices used previously. Although there are sophisticated precision farming and mechanical weeding techniques available, many farmers still often excessively use herbicides. This excessive use of chemical weed eliminating products has a negative effect on soil life/biodiversity and pesticides may leach into below ground water bodies and cause diffuse pollution, which is undesirable from an SDG point of view.

The focus must be placed on combining benefits. A lighthouse for stopping SOM decline - or even enhancing SOM generation - is the use of green manure, i.e. growing a non-harvested crop between two main crop seasons. This agricultural technique improves soil fertility by fixing nitrogen from the atmosphere. Before sowing the agricultural crop, the plant material is ploughed into the soil to improve its organic matter and nutrient content.

As well as increasing SOM (which helps to mitigate climate change (SDG 13)), this method also helps to achieve a better ecological situation by improving soil health and attracting biota in the soil and above, such as pollinators (SDG 15). Limiting the use of herbicides means that soil health and water quality will be improved (SDG 6). The increased soil health will reduce the fertiliser input needed, which may help farmers with good production levels in sustainable ways, from both a biophysical and socioeconomic point of view (SDGs 2, 11 and 12).

Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

3.3.4.3 Soil threat 3: soil sealing

Soil sealing did not emerge from the analysis as a major soil threat in terms of area affected. However, in our urbanising environment, soils in peri-urban locations are under serious threat from sealing.

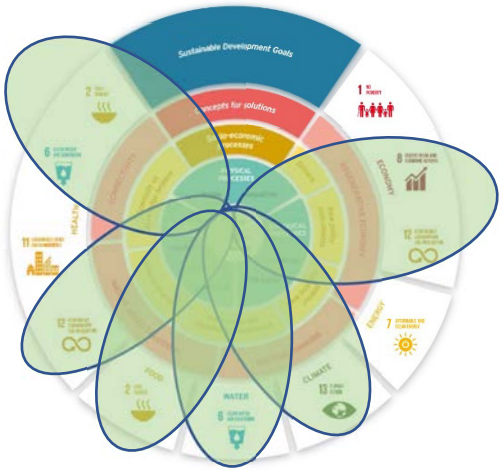
The soils under greatest threat are often the most fertile soils. Two key examples are:

1. Plaggen soils in the Atlantic North and Atlantic Central zones. These are anthropogenically improved sandy soils with extreme fertility. Typically, these soils are close to village centres, as they were used in the past as the source of crops to feed the village. Nowadays, these areas are often transformed into industrial areas.
2. Irrigated fields in the Mediterranean North and South near cities (in Spain, these are called 'huertas'). Traditionally these areas are used to produce vegetables for the city. Nowadays, more and more vegetables come from greenhouses and drip irrigation enables these crops to be grown elsewhere. As these areas are in the peri-urban zone, they are now being transformed into industrial areas or suburbs.

In all of these areas, the economic SDGs prevail over the society and biosphere-related SDGs.

Lighthouse example for soil sealing

To mitigate soil sealing in peri-urban areas we are looking for an alternative land management strategy that is an economically viable enterprise and can replace typical soil sealing activities, such as industrial developments. Pixel-farming is one example that could keep at least part of these fertile soils in production and is considered a lighthouse to mitigate the process of soil sealing by urban sprawl.



Pixel farming: a lighthouse for all peri-urban areas in Europe

Pixel Farming is an innovative entrepreneurial farming system that enables a digital approach to the full food production chain, allowing food to be produced in an environmentally friendly way by utilising the power of natural capital such as soil and biodiversity as well as robotica and big data. This lighthouse is based on a truly transitional idea: an out-of-the-box new approach in farming. The customer rents a small plot and decides what to grow, then Big Data technology and autonomous self-driving robots
take care of the land, instructed by an online system. The systems typically have a high diversity of crops, use no fertilisers or pesticides and with that attract more pollinators and keep the soil healthy. The farmer manages the robots, plots and online customer system as a true entrepreneur.

This new approach works towards much more than the original objectives: sustainable business and production (SDG 8 and 12), but also brings the source of food closer to the customer, raising awareness for food and soil (SDG 2 and 15). The small scale of this type of farming system is beneficial for soil health, which improves water availability and quality (SDG 6) and, if soil carbon is increased, will work towards climate mitigation (SDG 13).

Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

3.3.4.4 Soil threat 4: soil compaction

Soil compaction is a widespread phenomenon in agricultural soils in the Nemorial, Atlantic North and Central, Continental and Pannonian zones.

Soil compaction can be divided into two main types: superficial compaction and sub-soil compaction. Compaction is caused and exacerbated by the increasing use of large machinery in agriculture. These heavy machines and certain ploughing practices compact the soil to a depth of more than one metre.

The superficial compaction is easy to mitigate by improving soil properties (such as organic matter content) using dry manure and the use of low-pressure tyres on the agricultural machinery. However, sub-soil compaction is not as easy to relieve.

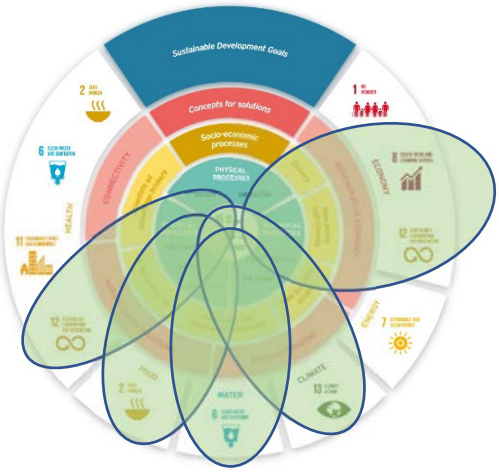
Secondly, soil compaction can be divided into clay and sandy soils, each of which requires a different mitigation approach. Clay soils are more resilient and have the capacity to restore themselves by their swelling and shrinking characteristics, once the heavy machinery has been removed from the management. Intervention is needed in sandy soils, however[56] [57].

[56] Williams, M., Brevik, E.C., 2010. Effect of traffic rate and type on soil compaction in sandy South Georgia soils. Soil Horizons 51. https://doi.org/10.2136/sh2010.3.0088.

[57] Keller, T., Sandin, M., Colombi, T., Horn, R., & Or, D. (2019). Historical increase in agricultural machinery weights enhanced soil stress levels and adversely affected soil functioning. *Soil and Tillage Research*, *194*, 104293.

Lighthouse example for soil compaction:

Deep-rooting crops in a crop rotational system
Deep-rooting crops will break the deeper plough pan that cannot be mitigated in any another way. This will improve soil biodiversity and soil health (SDG15), improve productivity of the crops, which will lead to more food production (SDG2), and a better livelihood for farmers (SDG 8 and 12). The water-holding capacity and infiltration will also improve, leading to benefits for water quantity and quality (SDG 6). Lastly, the extra roots will increase SOM which will help to mitigate climate change (SDG 13).



Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

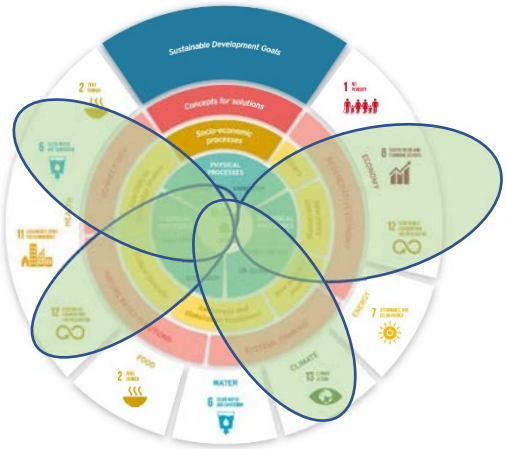
3.3.4.5 Soil threat 5: soil biodiversity decline

The analysis suggests that soil biodiversity is in a serious situation across Europe (see Table 3.13). The main reasons are agricultural practices that involve excessive amounts of fertilisers, herbicides and pesticides.

Soil biodiversity can be linked to any of the other soil threats, such as erosion, organic matter depletion, salinisation, contamination and compaction. Soil under agriculture in general has low biodiversity. With increased input of carbon and nitrogen to the soil, however, microbial populations may increase. In general, any crop management technique that increases SOM, improves soil structure and reduces soil disturbance which will increase soil health and, in turn, biodiversity.

Lighthouse example for soil biodiversity:

Diversified farming to improve soil health
Several recommendations can be made to improve soil health and enhance soil biodiversity. Firstly, pesticides and fertilisers should be minimised, and all tillage and soil traffic by heavy machinery avoided where possible. Secondly, organic matter input to the soil should be promoted, not only by using different types of mulch, but also by live organic matter created by plants growing in the soil. Cover crops in the fallow period and crop rotation will promote organic matter accumulation and improve nutrient and carbon cycling in the soil. Together, these ecological systems will improve soil health, which is essential to host healthy soil biota.



An example of this is the Dehesa agroforestry system, which combines perennial grass, chestnut trees and growing livestock (pigs and cattle). The combination of trees and perennial grass enriches the organic carbon stock better than mono-cropping systems and improves the nutrient cycle, due to the trees in the system. This enhances the soil microbial community that forms the basis of the biota community as a whole (SDG 15). This extensive system forms a sustainable livelihood for the farmers

in the region (SDG 8 and 12). Perennial grass is the best soil cover to protect against erosion (SGD 15) and store carbon in the soil (SDG 13).

Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

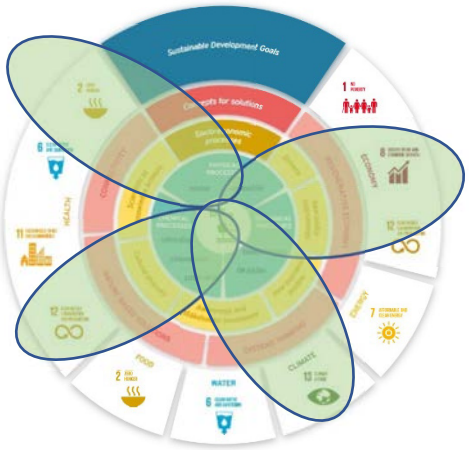
3.3.4.6 Soil threat 6: landslides

Landslides are a major threat in all environmental zones with significant relief, particularly those with high relief. They can be divided into deep landslides and shallow landslides. The very deep landslides originating from tectonic activities cannot be mitigated and the only option is to adapt accordingly, e.g. not building in these landslide-prone areas. Shallow landslides, however, are induced by the dynamics between soil and water pressure and usually follow large rainfall events or extended periods of precipitation. Landslides cause problems by removing soil but create even greater issues when they deposit the sediment, with mudflows and rockfalls harming people and infrastructures.

Lighthouse example for floods and landslides:

Tree-rich agroforestry systems

One possible solution to prevent landslides is tree-rich agroforestry systems. This measure, which combines trees and crops in the same area, offers a greater degree of slope stabilisation, especially in the shallow soils that often cover the bedrock. In Europe, the AGFORWARD project for instance is promoting the implementation of Agroforestry (AGroFORestry that will advance rural development (https://www.agforward.eu/index.php/fr/). One of the objectives is to evaluate innovative agroforestry designs and practices for locations where agroforestry is currently not-practised or is declining, and to quantify the opportunities for uptake at a field-, farm- and landscape-scale in order to promote the wider adoption.



The measures include multi-story cropping where food, herbal, botanical or decorative crops are grown underneath a forest canopy. Another example is silvopasture, which combines trees with livestock that forages underneath the trees. The trees provide timber, fruits and nuts, while the livestock is generally for meat production.

In a system like this, the primary goal is to prevent landslides (SDG 15). However, it is also sustainable from a socioeconomic point of view, with tree-rich systems working towards several other SDGs, such as 2, 8 and 12 for a sustainable economic situation. There are also environmental benefits for climate mitigation through permanent soil cover-induced carbon storage (SDG 13), better infiltration and less runoff (SDG 8).

Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

3.3.4.7 Soil threat 7: soil contamination

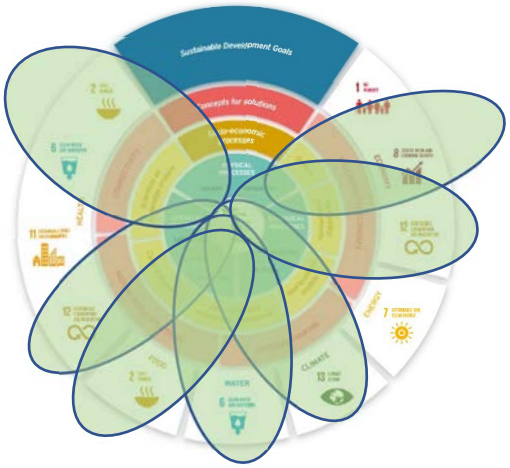
Soil contamination is mainly an anthropogenic issue, which can be relevant to all environmental zones.

Pesticides are as common nowadays as fertilisers and tractors, with this kind of chemical farming generally regarded as normal practice. This unsustainable use of natural resources is accepted, even by legislation. Organic farming or even regenerative agriculture[58] can be a good option to reduce the impact of farming on the soil system and still maintain a good agricultural production and livelihood for the farmers[59, 60]. By contrast, in order to be classified as organic, a farmer must comply with extensive bureaucracy, including ensuring that their farm is protected from their neighbours' spraying. Many farmers, therefore, do not switch to organic farming as they think it is too complicated [61, 62]. Options to switch towards regenerative agriculture can be promoted by legislation; each step towards this is a positive one[63]. However, the benefits of organic farming for the SDGs are significant.

In addition to agricultural soil pollution, there are many instances of pollution in industrial and urban areas and along infrastructures. Soil pollution in industrial areas tends to be so-called point pollution, directly correlated to a polluting source. In urban areas and along roads, more diffuse pollution is caused by continuous human pressure.

Lighthouse example for soil contamination:

Organic farming combined with minimum tillage



This lighthouse focuses on a different form of agricultural practice that avoids environmental pollution more. Organic farming does not use any environmentally harmful chemical products but, rather, relies on ecological processes adapted to local conditions that use the natural cycles and resilience of the soil system. Combined with minimum tillage, this can yield the healthy soil that is key to maintaining or restoring biodiversity, and halting and reversing land degradation (SDG15). It can also make the agricultural production system more resilient to the impact of climate change and can even help to mitigate climate change by storing carbon in the soil (SDG 13). Of course, organic farming carries risks that a farmer may not be able to fight pests attacking their crops, creating economic uncertainty. However, the ecological system will become more resilient over time. A strategy like minimum chemical input, combined with minimum tillage, could be a way forward. Organic farming would thus help to achieve better agricultural production while maintaining a good livelihood for farmers (SDGs 2, 8, 12). In addition, water quality will improve (SDG 6).

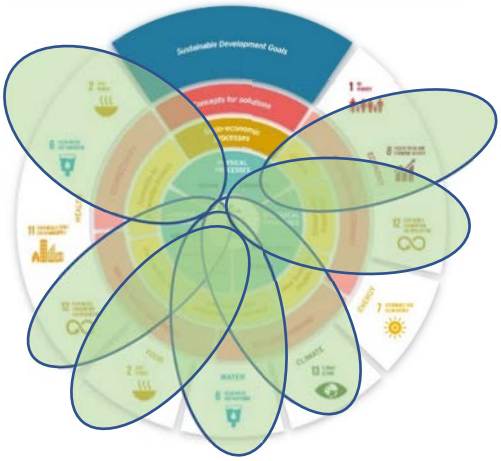
Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

[58] Rhodes, C. J. (2017). The imperative for regenerative agriculture. *Science Progress*, *100*(1), 80-129.
[59] Nair, C. M., Salin, K. R., Joseph, J., Aneesh, B., Geethalakshmi, V., & New, M. B. (2014). Organic rice–prawn farming yields 20% higher revenues. *Agronomy for sustainable development*, *34*(3), 569-581.
[60] Patil, S., Reidsma, P., Shah, P., Purushothaman, S., & Wolf, J. (2014). Comparing conventional and organic agriculture in Karnataka, India: Where and when can organic farming be sustainable?. *Land use policy*, *37*, 40-51.
[61] Cerdà, A., Rodrigo-Comino, J., Giménez-Morera, A., & Keesstra, S. D. (2017). An economic, perception and biophysical approach to the use of oat straw as mulch in Mediterranean rainfed agriculture land. *Ecological Engineering*, *108*, 162-171.
[62] Cerdà, A., Rodrigo-Comino, J., Giménez-Morera, A., & Keesstra, S. D. (2018). Hydrological and erosional impact and farmer's perception on catch crops and weeds in citrus organic farming in Canyoles river watershed, Eastern Spain. *Agriculture, Ecosystems & Environment*, *258*, 49-58.
[63] Gosnell, H., Gill, N., & Voyer, M. (2019). Transformational adaptation on the farm: Processes of change and persistence in transitions to 'climate-smart'regenerative agriculture. *Global Environmental Change*, *59*, 101965.

3.3.4.8 Soil threat 8: salinisation

Soil salinisation occurs when water-soluble salts accumulate in the soil to a level that impacts agricultural production and environmental health. Minor salinisation has a negative effect on soil organisms and on soil health in general, which may lead to reduced agricultural yields. Severe salinisation can make the soil completely infertile for all soil life and vegetation. Salinisation of agricultural soils is mainly caused by high evapotranspiration rates and soil characteristics that impede water drainage and cause salt accumulation in the upper layers. It can occur in coastal areas where seawater enters the aquifer and in inland areas where salts are naturally present in soils. The problem can be aggravated by improper management practices, poor irrigation water quality and variations in rainfall and temperature patterns due to climate change[64].

Lighthouse example for soil salinisation:



The lighthouse example for the soil threat of salinisation, while still maintaining a profitable farm, is to use a combination of salt tolerant crops with salt tolerant cover crops for the fallow period. Salt tolerant crops such as asparagus and beets, but also barley and sunflowers can produce a good yield on a saline soil. Which will ensure a good income for the farmer. In addition, in the fallow period of the year a salt tolerant cover crop can be sown to increase soil organic matter content and with that infiltration capacity to leach out salts from the surface. These deep rooting cover crops, such as salt tolerant varieties of alfa, can slowly mitigate the salinity problem in the soil. Deep rooted cover crops are best for this. The increased infiltration and better soil structure will enable the soil to flush the excess salt in the profile. In this way the soil becomes more healthy and can contain more biodiversity (SDG15); the farmer will maintain and in the long term increase the farm's yield (SDG 8, 12); healthy food will be grown (SDG 2) while storing more carbon in the soil (SDG13); and the water quality in the soil will be improved (SDG 6).

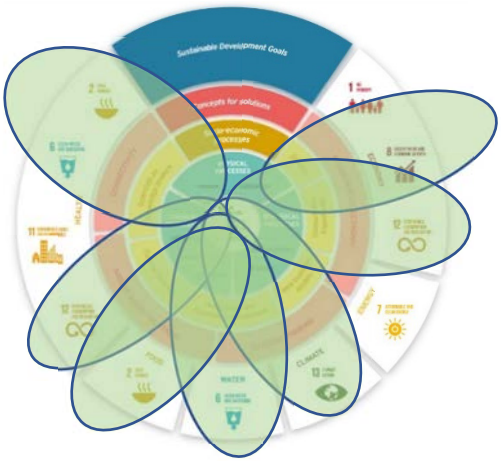
Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

3.3.4.9 Soil threat 9: Desertification

Desertification is usually defined as a type of land degradation in drylands in which biological productivity is lost due to natural or human induced processes whereby fertile areas become increasingly more arid. However, it can also be defined more broadly as any progressive and unsustainable reduction in the ecosystem services provided by the soil.", which includes also areas other than drylands. It is caused by a variety of factors, such as through climate change (particularly the current global warming) and through the overexploitation of soil through human activity, which causes soil erosion, loss of soil fertility and long-term loss of natural or desirable vegetation.

[64] https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri_fg36_soil_salinisation_starting_paper_2019_en.pdf

Lighthouse example for desertification: Dehesa system



The lighthouse example for the soil threat of desertification is the Dehesa system. The Dehesa system is a multifunctional, agrosylvopastoral system mainly used on the Iberian Peninsula. It combines sustained, extensive livestock farming with farming and forestry activities to try to conserve and ensure the sustainability of biodiversity and economic sustainability. The Dehesa system is specifically suitable for semi-arid regions; because of its permanent grass cover the soil is protected any form of degradation. Because of this desertification due to human actions cannot take place. The Dehesa system is a dryland system and therefore needs no irrigation and usually uses no, or limited, chemical input. In addition, it is considered a cultural heritage landscape and that provides an income for the local people by the production of high-quality meat and providing hunting locations. With this system there are biodiversity and soil health benefits (SDG 15); but also farmers have the opportunity to sustainably produce food in an animal friendly way (SDG 2, 8 and 12). Water resources are not exploited (SDG 6) and carbon is stored in the soil (SDG 13).

Health	Food	Water	Climate	Energy	Economy	Soil/land
2	2	6	13	7	1	15
6					8	
11					12	
12						

4 Stakeholder views on the role of communication and awareness and the limitations for implementing soil and land related SDGs

During the soil conference organised as part of this project (see Section 2.2.2), one of the panel discussions was dedicated to the issue of awareness raising for soils, which brought some interesting insights. We have highlighted the main messages for the different stakeholder groups in addition to some general comments.

It is clear that there is a need to raise awareness; all levels of society need to understand that soil and land degradation is an important issue. Everything we enjoy comes from the land; we all depend on it. To achieve the SDGs a transitional change is needed in our society. For this, the entire society must be aware that business- as-usual, or even improved business- as-usual is not enough. As President Ursula von der Leyen said, commenting on the European Green Deal6: "(...) We need to transform our way of living and working, of producing and consuming so that we live more healthily and make our businesses innovative. We can all be involved in the transition and we can all benefit from the opportunities. (...) By showing the rest of the world how to be sustainable and competitive, we can convince other countries to move with us.". It is important that the SDGs are not seen as a burden, but as an opportunity. Environmentally- friendly business does not need to be less profitable. People need to be aware of the multiple benefits that can be the result of implementing the SDGs successfully for their own lives, their families and the community as a whole.

Actual implemented examples will help to get this message across. These region-specific solutions enhance the understanding of local people, who know their area and are emotionally attached to it. Seeing sustainable solutions in their own region will raise the awareness of the potential and possibility of sustainable land and soil management. In addition, awareness should be raised of the fact that land and soils are an essential part of the solution to achieving the SDGs. Sustainable soil management should not only be aimed at agricultural soils but all soils.

A healthy soil system lies at the basis of a sustainable world. For the transformational change we need:

- Action: link soil and land to running actions on climate change, food security and biodiversity.
- Region-specific solutions: will enhance the understanding of local people, who know their area and are emotionally attached to it. Seeing sustainable solutions in their own region will raise the awareness of the potential and possibility of sustainable land and soil management.
- Technology: new technology such as precision agriculture and urban farming can provide new opportunities for sustainable business.
- Engage the private sector: the European example may become a standard in the world. Sustainability should become a business case.
- Indicators: a soil-footprint for customer products is a way to create awareness, as this is the link to people and what they do in their daily lives.
- Organic matter content can be an easy indicator of soil health.
- Indicators are essential, as this is the link to people and what they do in their daily lives.
- Young people: connect to the young people through their channels, step into their world; connect to the movement of young people's call for climate action and a sustainable world.

What can we do to increase awareness?

We do not need to make a whole new movement for this: we can build on the momentum on climate and biodiversity for soil and land. We should start from food or climate and show the link to land and soil. Soil can be linked to food security, or even the other way around: if I consume something, I should be aware of the impact, the soil or land footprint.

Policies for soils are complicated as land is private, unlike the climate, which is not owned by anyone. There is no single soil policy. Therefore, we need to consider how we can we optimise what we have. The upcoming new Climate Law may give good opportunities for this.

When we seize the momentum of the Climate Action the European Union as a whole has the opportunity to be the example that can serve as a standard in the world. All stakeholders need to be involved in the implementation of actions in practice - including policy-makers at all levels, scientists, CSOs, the private sector and direct land users such as farmers. Therefore, the awareness raising needs to be targeted for each specific stakeholder group to give all stakeholders an action perspective by showing good, real-life examples that are connected to them and which they could implement themselves:

- For practitioners and end-users: show and tell how land restoration is the best contribution to achieve the SDGs. It is possible to use nature-based solutions to mitigate climate change and maximise resource use efficiency.
- For science: the science community has to step out of the comfort zone and show what soil can bring to society. Scientists need to learn to communicate about soil: attract, interest, desire, action as scientific evidence alone will not move policy.
- For policymakers: political leadership is needed to promote soil and land-related SDGs if we are to make real progress. Assisting countries to achieve their LDN target by showing good examples of countries where successful policies has already been implemented.
- Education: at all levels of education, starting at young ages, soil and land should be brought to their attention to show the importance of this for society in terms of food security, water resources, climate change and human health. The climate change action has a head start and can also serve the soil awareness by showing how system Earth works and how a healthy soil forms an important basis for this.

Insights on limiting conditions in Europe for implementing land and soil related SDGs
The panel discussions at the conference highlighted several limitations:

Bio-physical-practical limitations:

1. There is a need for data to be made available to monitor and report on threats, e.g. salinisation, compaction and their measurement. The proposed practices may be inspiring but more data is needed. We cannot focus solely on producing databases.
2. However, we cannot wait for the data to be available but, rather, must act now.
3. Currently there are insufficient solutions linked to soil and land and more generally, nature-based solutions, to the challenges that are high on the political agenda, such as biodiversity, food and water supply, climate change, migration and peace.
4. How we can compensate for various negative impacts - is compensation always possible and can we restore the full value and functions of soil?

Political limitations:

1. Few Member States have comprehensive policies for soils. Policies and strategies produced on paper need to be strengthened and applied on the ground.
2. Compromising the implementation of the proposed approach is the fact that at European and national level there is a need to update sustainable development plans and strategies to incorporate the SDGs. There is widespread (political) support for the implementation of the SDGs.
3. There are problems with understanding LDN. It is an exciting concept, but we need to know how to measure it and how to counterbalance the various impacts that cause land degradation.

Socio-economic limitations:

1. Incentives may currently not be enough and should be put in place to apply sustainable methods, e.g. farmers need to see that environmentally friendly methods are profitable. It is not yet evident that a more sustainable approach makes economic sense.
2. It is necessary to work together with economists because we need to know the costs and the benefits.
3. Behavioural biases need to be accounted for: not only the economic issues are important; also, it is essential to take emotions, cultural heritage and social pressure into account.

4. Environmental measures must become the norm.
5. The fear of loss is very strong in humans and outweigh the attraction to a future benefit.
6. It is necessary to increase awareness of the importance of soil and land for achieving most of the SDGs.
7. Spreading important messages takes time as people may not understand it right away. Problems with soil should of course mean that we have to talk to farmers; but we should also be aware that soil and land issues also relate to other areas. Similarly, soil issues should be taught in schools but also outside schools.

At the conference it was stated that a new Commission will be in office soon and has announced ambitious goals for environmental policy. However, the Commission will not achieve the goals related to soil and land alone. We need to raise stakeholder awareness of the need to act. We should stress the emotional links, that soil is full of life and is essential for our existence. In this way soil could gain importance on the political agenda and become an important topic in the next years.

5 Conclusions and recommendations

Increasing land take, soil sealing and loss of ecosystem functions due to soil and land degradation have been recognised as major environmental and socioeconomic challenges both in the EU and worldwide. In 2015, the UN put forward the 2030 Agenda, with 17 interdependent SDGs, that entered into force in January 2016. Many of the SDGs reflect challenges related to land and soil, particularly SDG 15, concerning life on land. This SDG strives to achieve a land degradation-neutral world. SDG 15 is a key enabler for many other SDGs, including SDG 2 (zero hunger), 6 (clean water and sanitation), and 11 (sustainable cities and communities).

The status of implementation of SDG 15 was reviewed in-depth at the High-Level Political Forum of 2018. The review found that at a global level there is progress on the indicators related to actions (e.g. numbers of protected areas), but the indicators related to status (e.g. numbers and state of species) remain negative. The monitoring framework often fails to capture essential elements related to the quality of the soil and ecosystems[65].

The **main aim of this study was to analyse progress on the implementation of land and soil-related SDG targets in the EU,** taking due consideration of the 2030 Agenda commitments, and to provide a platform for exchanges on best practices between Member States on the implementation of land and soil-related SDGs.

In light of the COVID-19 crisis that started in 2020 in Europe, it has become even more evident that resilience is key to sustainability. Resilience on all three main levels of the SDGs: the biosphere, society and economy. A green recovery of the crisis focusses on resilience in society and economy, but it is important to keep in mind that **many of the SDGs rely on sustainably managed soil**. Therefore, action towards long-term sustainable use of land and soil is essential to reach all SDGs; without that, there is no basis for the rest. Transitional change in land management is needed to reach the land and soil related SDGs.

The broad areas of actions we have identified through this project, and which we elaborate in more detail below, include:

- **Incrementally updating the policy framework**: Designing coherent legislation addressing sectors and land-uses that makes transition towards sustainable land and soil management possible. The European Green Deal and its associated actions provide opportunities for defining policy targets and measures for specific pressures on land and soil resources.
- **Awareness-raising:** Promoting region-specific but interdisciplinary land management practices at Member State level in which the soil and landscape should play an important role, in order to assess the impact of new projects on the surrounding area, including off-site and on-site effects. EU-funded research projects and service contracts provide a wealth of information which could be effectively communicated to Member States and individual practitioners to inspire action. By the same token, the 'soil literacy'[66] of the broad public needs to improve to progress towards more 'soil-friendly' behaviours and choices which might eventually drive broader shifts in food consumption, agricultural markets, and production methods.
- **Methodology development:** The SDGs and their associated targets for soil and land should be elaborated at EU level in order to develop a clear framework for data collection, monitoring, analysis and target setting. This would ideally involve a technical debate on how to describe the role of soil in the SDGs. At the operational level, **methodologies need to be established** (such as the

[65] Sustainable Development Goal 15: Progress and Prospects, https://sustainabledevelopment.un.org/content/documents/19647Key_messages_SDG_15_EGM_Final.pdf.

[66] The Global Soil Biodiversity Initiative notes that "The world needs more citizens who are soil literate—who understand how soils and humanity depend on each other for their mutual long-term existence. The insufficiency of such understanding (at societal levels) is due, in part, to the world's "soil education gap"—the shortage of soil education efforts relative to the scale of the societal need for them." (https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2018/10/2/overcoming-challenges-of-the-soil-education-gap-part-2)

lighthouse methodology proposed in this report) to assess the impact of the specific land management measures on soil and land-related SDGs, to demonstrate the trade-offs and synergies between the different SDGs impacted by those measures.

The remainder of this section presents the main conclusions resulting from our review of the state- of play of the implementation of land and soil-related SDGs in Europe and formulates recommendations for EU and national policy makers, researchers, and practitioners with a view to advancing land and soil protection as a precondition for meeting the SDGs. Conclusions and recommendations are organised along the three research themes and the key questions formulated at the outset of this project.

5.1 Institutional coordination and implementation

What are the main EU policies enabling the implementation of LDN target and other soil and land related SDGs?

Out of the 28 policy instruments reviewed, 14 are assessed as contributing directly to meeting at least three of the seven SDGs covered by this analysis. Our assessment identifies the following regulatory, planning, and economic instruments as highly relevant for meeting the soil and land-related SDGs:

- The Sustainable Use of Pesticides Directive
- The Water Framework Directive
- The Nitrates Directive
- The Environmental Liability Directive
- The Industrial Emissions Directive
- The Landfill Directive
- The Waste Framework Directive
- The National Emissions Ceiling Directive
- The Plant Protection Products Regulations
- The Roadmap to Resource Efficient Europe
- The Soil Thematic Strategy
- The Farm to Fork Strategy
- The Biodiversity Strategy
- The Common Agricultural policy

The analysis shows that the existing policy framework already contributes to meeting the SDGs at the focus of this study. Soil threats potentially hampering progress towards meeting SDGs 3 and 15 are directly targeted by several policies. Progress towards meeting the remaining SDGs is (to date) likely to be a result of policies indirectly addressing relevant soil functions and threats (see table below).

Table 5.1 *Number of policies that are relevant for implementing the soil and land-related SDGs*

SDG	No. of highly relevant (and relevant) policies	Highly relevant policies identified
	8 (15)	ELD. IED, NECD, Roadmap to Resource Efficient Europe, Soil Thematic Strategy, Farm to Fork Strategy, Biodiversity Strategy, CAP
	13(13)	SUPD, WFD, Nitrates Directive, ELD, IED, Landfill Directive, Waste Framework Directive, NECD, PPPR, Soil Thematic Strategy, Farm to Fork Strategy Biodiversity Strategy,
	9(6)	SUPD, WFD, Nitrates Directive, IED, Landfill Directive, Waste Framework Directive, Roadmap to Resource Efficient Europe, Soil Thematic Strategy, Biodiversity Strategy
	8(11)	ELD, IED, Landfill Directive. Waste Framework Directive, PPPR, Roadmap to Resource Efficient Europe, Soil Thematic Strategy, Farm to Fork Strategy, Biodiversity Strategy
	7(15)	Roadmap to Resource Efficient Europe, Soil Thematic Strategy, Farm to Fork Strategy, Biodiversity Strategy, CAP
	9(16)	SUPD, WFD, Nitrates Directive, IED, Landfill Directive, PPPR, Roadmap to Resource Efficient Europe, Soil Thematic Strategy, Farm to Fork Strategy, Biodiversity Strategy
	18(8)	SUPD, WFD, ELD, IED, Landfill Directive, Waste Framework Directive, NECD, Roadmap to Resource Efficient Europe, Soil Thematic Strategy, Farm to Fork Strategy, Biodiversity Strategy, CAP

Many of the policies assessed as having the strongest direct links to land and soil, and to most of the relevant SDGs, are mainly of a strategic nature, meaning that they serve as a framework for other policies. With the adoption of the Farm to Fork and Biodiversity Strategies, there is now a set of broad ambitions which can drive progress towards meeting the SDGs. However, whilst these ambitions provide a high-level framework for soil and land protection, they clearly need to be translated in measurable, action-oriented policy targets, specifying incremental steps to be taken to ensure their realisation and to directly address the various pressures causing soil and land degradation processes (and thus endangering the achievement of the SDGs). In addition, many of the policies reviewed here focus on limiting or preventing soil threats rather than defining good soil quality and functions at EU-level or for different types of soils or regions.

Existing policies regulate various soil threats and functions; however, most land and soil outcomes are achieved as 'co-benefits' of policies on water, waste, agriculture, or climate action. Whilst this means soil protection through EU policies might not be effectively targeted, it also demonstrates that multiple environmental benefits could be realised, and subsequently a range of SDGs could be met by setting land and soil targets and through policies promoting sustainable land use and soil management.

Did the Member State publish a National Sustainable Development Plan and when?
Alongside the EU-level strategic documents, Member States develop their own approaches to implementation of the SDGs. This project's mapping exercise shows that most Member States have adopted national sustainable development plans or strategies. However, only 13 strategies were adopted or updated after the SDGS entered into force in 2016.

Does the National Sustainable Development Plan integrate soil and land considerations?
Soil and land considerations are relevant for several SDGs, not just SDG 15.3. As such, there are many examples of elements of national sustainable development plans that affect – at least indirectly – soil and land, from the promotion of organic farming under SDG 2 to sustainable management of forests under SDG 12. The Member State survey conducted as part of this study identified only a few countries where land and soil were explicitly addressed by the National Sustainable Development Plans (CZ, DE, RO, and SK). However, not all Member States completed the survey and supplementary

information was not always available; hence, the results presented here might not provide an accurate picture of the integration of land and soil considerations in the European Member States' National Sustainable Development Plans.

Which MS authorities are in charge of implementing and monitoring SDGs? How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities? Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?

The main authorities in charge of implementation of the national sustainable development plans typically include the office of the Prime Minister and/or one of the sectoral ministries (e.g. Ministry of the Environment), supported by various inter-sectoral working groups, commissions for sustainable development or other horizontal bodies. In almost all Member States, the Ministry of Foreign Affairs is the external policy lead for implementation of the SDGs. All Member States have engaged with various types of stakeholders in the preparation of their sustainable development strategies. These activities take the form of online consultation, advisory councils and creation of special platforms to coordinate inputs from various experts and civil society organisations.

How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?

All Member States have engaged with various types of stakeholders in the preparation of their sustainable development strategies. These activities take the form of online consultations, advisory councils and creation of special platforms to coordinate inputs from various experts and civil society organisations.

What are the main national policies and activities enabling the implementation of LDN targets and other soil and land related SDGs?

The policy mapping exercise shows that few Member States have dedicated land or soil policies. Sectoral policies that address land and soil typically encompass agricultural, forestry and spatial planning. Many of these policies set clear provisions for improving the condition of soil and land and have the potential to contribute significantly to the implementation of the land and soil-related SDGs. It is important to note that most policies, both at EU and at national level, have been shaped before the adoption of the SDGs and therefore, they may not fully reflect the targets as formulated by the UN in 2015. Hence, there is a need to revise, update or reformulate the existing policies. New policy instruments need to be devised that can help to adjust the socioeconomic development to the limitations of our planet in line with the SDGs.

Recommendations

The European Green Deal and its associated actions as well as other overarching strategic documents need to provide the framework driving the implementation and operationalisation of the soil and land SDGs.

- Whilst broad ambitions provide a high-level framework for soil and land protection, they clearly need to be translated into measurable, action-oriented policy targets, specifying incremental steps to be taken to ensure their realisation. A starting point for formulating targets is a robust understanding of the pressures impacting on the state of land and soil and thus the SDGs. On this basis, sector or land use-specific targets could be formulated. The update of key strategic policy documents, including the Soil Thematic Strategy and the 8th Environmental Action Programme, as well as actions planned under the Green Deal (e.g. the Zero Pollution Action Plan as well as the Soil Sealing and Brownfields Actions) offer opportunities to define SMART targets for specific sectors or types of land use.

Existing policies targeting the prevention of land and soil degradation remain fragmented and rely on sectoral interventions.

- While environmental mainstreaming that incorporates soil and land aspects is important and can be effective, its results are dependent on the extent to which clear objectives and targets relating to land and soil can be incorporated in other policies, and on the effectiveness of their implementation. Ongoing and upcoming policy reviews, including for example the Sewage Sludge Directive and the Sustainable Pesticides Directive, need to integrate the ambitions and targets formulated by these high-level strategic documents.

- At Member State level, the adoption of quantitative targets (such as LDN and zero net land take) at Member State level would be a good step to making land and soil-related SDGs more operational. It would be useful to share Italy's experience in setting up the LDN with the other Member States.
- National sustainable development plans or strategies need to be updated to integrate the SDGs and should include explicit targets and actions for sustainable land and soil management.

Member States have adopted national sustainable development plans or strategies but not all address the SDGs as adopted in 2015

- Member States that have not yet updated their national strategic documents following the adoption of the Sustainable Development Goals adopted in 2015, are encouraged to initiate a strategy review to ensure that their national frameworks guiding their activities serve the ambitions of the UN's Agenda 2030.

Member States have adopted coordinated and participatory approaches to implement the SDGs but focus on involvement of organised interests

- Information about the SDGs, their relevance to society as well as the individual, and the important role land and soil play in realising these ambitions, need to be widely communicated. To engage people, we should use the current momentum on climate and biodiversity to put soil and land on the agenda by showing how they link to food security and the mitigation of climate change impacts.
- The update of the STS (planned by 2021) offers an opportunity to build on its positive experiences with raising awareness for soil. Mirroring recent initiatives in other policy fields[67], "soil literacy"[68] may be a concept which could be developed and promoted at EU level as a way of delivering a more coordinated approach to soil awareness activities in Europe. Such an initiative could involve the setting up (and financing) of a new platform connecting relevant organisations and projects or may build on the work of existing groups such as the European Network for Soil Awareness[69] and the European Soil Bureau Network[70].
- The increased emphasis on communication and dissemination introduced with the Commission's Research Framework Programme Horizon 2020 needs to be maintained, expanded and refined to ensure widely supported outcomes that will improve uptake or research results in practice.

5.2 Land degradation/land degradation neutrality definitions and indicators

What is the definition of LD and LDN at national level?

There is no generally accepted definition, nor approach to land degradation in environmental science and policy. In the Member States, only Slovakia has adopted an official definition for land degradation (chapter 3.2.3) and none of the MS have defined an LDN definition, although some countries follow the UNCCD's definition.

What are the priorities and what are the soil and land related SDG indicators and sub-indicators retained at national level?

Despite the lack of common definitions, Member States nevertheless have priorities in respect of specific land and soil degradation processes. Of the countries that mention land degradation processes, they note the top three problems as soil erosion, contamination and sealing, closely followed by declining organic matter and soil compaction (chapter 3.2.3). Of the Member States, only Italy started the process to set up a national plan to reach LDN.

[67] See for example the EU4Ocean Coalition for Ocean Literacy which aims to bring together organisations, projects and people that contribute to ocean literacy in order to create awareness and trigger action for sustainable ocean management, build capacity and put ocean literacy on the policy agenda. Information available at: https://webgate.ec.europa.eu/maritimeforum/en/frontpage/1482

[68] The Global Soil Biodiversity Initiative notes that "The world needs more citizens who are soil literate—who understand how soils and humanity depend on each other for their mutual long-term existence. The insufficiency of such understanding (at societal levels) is due, in part, to the world's "soil education gap"—the shortage of soil education efforts relative to the scale of the societal need for them." (https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2018/10/2/overcoming-challenges-of-the-soil-education-gap-part-2)

[69] http://www.bodenbuendnis.org/en/

[70] https://ec.europa.eu/jrc/en/network-bureau/european-soil-bureau-network

What are the data sources for the indicators? Are they sufficient? What is the baseline or how do MS intend to set it?

For the purpose of answering these questions at MS level, the questionnaire responses in this study were insufficiently addressed by the responders. For the data sources, the UNCCD and partners[71] have found that in many countries, national data for one or more of the sub-indicators are available. Those national data "can be supplemented with regional and global data for all three sub-indicators and can be disaggregated at the national level for interpretation and validation by national authorities."

What is the approach on LDN at national/subnational level? Is it based on a balance between restored degraded land and newly degraded land?

As mentioned in the introduction of this chapter, at a global level there is progress on the SDG 15 indicators related to actions (e.g. numbers of protected areas), but the indicators related to status (e.g. numbers and state of species) are lagging behind.

The UNCCD is actively working on the development of indicators for the SDGs[72]. The UNCCD SDG indicator 15.3.1 is stated as the "proportion of degraded land over total land area" with three sub-indicators focusing on land cover, land productivity and carbon stocks.

At European level, Eurostat is developing indicators for all SDGs (Eurostat, 2019). Although soil degradation (SDG 15.3) covers many aspects such as soil sealing and contamination, erosion by wind and water, loss of soil biodiversity, compaction, decline in organic matter, desertification, acidification and salination, the Eurostat indicator set currently only includes soil sealing, settlement area per capita and soil erosion by water.

While these indicators are useful tools for tracking progress in achieving the LDN in the particular countries and environmental zones, there are still several challenges in the practical use of these indicators especially for areas with diverse land use, specific agricultural practices such as greenhouses and peatlands. No standard approach has yet been agreed. However, at EU level, the Commission is developing a methodology and guidance to monitor the achievement of LDN, following the recommendations of the ECA (2018), see also chapter 3.2.2.

Recommendations

The SDGs and their associated targets for land and soil should be elaborated at EU level in order to develop a clear framework for data collection, monitoring, analysis and target setting.

- The methodology in Europe for monitoring and assessing the land and soil SDGs should be more clearly defined and elaborated for all soil degradation processes. Although many countries have started to measure and monitor the land and soil SDGs, there is little coordination and no standard approach yet.
- An LDN indicator based on the three UNCCD sub-indicators (land cover, land productivity, and carbon stocks) provides a good starting point for measuring progress in relation to the land and soil-related SDGs but further guidelines and coordination, as currently being worked on by the Commission, is necessary for this indicator to become fully operational. The standard indicators as defined by the UNCCD are not sufficient for the European context as they do not take into account several important issues:
  - For most of the UNCCD sub-indicators there is more detailed information available in Europe than the generally used Tier 1 data.
  - The mosaic landscape in most European countries is not represented in the large pixels that are used in the UNCCD indicator set.
  - Important soil degradation processes are not taken into account in the UNCCD methodology, such as biodiversity decline (e.g. afforestation with single species); soil erosion (from terraced landscapes to large fields on sloping areas) or contamination.

Design and implement a comprehensive monitoring scheme for all ecosystems; soil is part of all terrestrial ecosystems and therefore needs well-defined targets that can be assessed with a good set of indicators to assess the impact of measures taken for protection and restoration.

[71] See https://unstats.un.org/sdgs/metadata/files/SDG-indicator-metadata.zip, file Metadata- 15-03-01.
[72] See e.g. https://unstats.un.org/sdgs/metadata/files/SDG-indicator-metadata.zip SDG.

5.3 Measures to prevent, reduce or reverse degradation

What type of measures have been defined by MS (e.g. sustainable soil and land management measures) or best practices to prevent, reduce or reverse degradation? And what are the conditions or limitations?

Although this project was not aimed at systematically collecting measures from all Member States, we identified several good practices (Annex 6 Most of them have not been specifically designed for achieving the SDGs. They aim to reduce a specific soil threat, to promote sustainable soil or land management or a societal goal. Therefore, they can be reasonably expected to positively contribute to meeting one or multiple soil and land related SDGs. However, since the SDGs are unlikely to have played a role in selecting and designing the measures, benefits or trade-offs were probably not factored into the decision-making process. The lighthouse example approach as we have highlighted in this report (chapter 3) may serve as a methodology to assess the overall benefit (or trade-off) of a specific measure. The approach advocates a holistic view of impacts of a measure on the system (both bio-physical as well as socio-economic). In the European Joint Programme on SOIL that started in February 2020 [73], similar approaches are being explored for agricultural soils to make them climate resilient and sustainable from both a bio-physical as well as socio-economic point of view. Within this programme and other projects the enabling conditions of implementation of sustainable land and soil management will be assessed. Here policy, financial, social and bio-physical constraints and opportunities will be assessed. Good governance and coherent policy regarding land and soils present a major opportunity for policy makers. "Measures that promote sustainable land use, inclusive and participatory land use planning, LDN and land tenure security potentially help (and particularly emerging economies) to meet multiple SDGs, targets and indicators whilst also being cost-effective"[74].

Are there examples of good practices which could be expanded?

There are many good examples, of which we have shown some in the body of this report to elaborate the use of the lighthouse example approach. The good practices in Annex 6 have the potential to be upscaled. It is important to share these examples and make them accessible to all land and soil stakeholders. WOCAT, the World Overview of Conservation Approaches and Technologies[75], is a good example of how such a database may work and can be expanded to include information on the impacts of land management techniques compiled in the future database on the SDGs. Additionally, it is important not to neglect non-agricultural soils. Industrial and (peri)-urban soils especially do not receive sufficient attention. Measures for urban soils are normally only aimed at two soil threats: contamination and soil sealing. However, beneficial soil functions in urban and industrial areas, such as excess rainfall drainage by infiltration and cooling effect by trees supported by a healthy soil, are largely ignored, while they have a large influence on the realisation of the SDGs in these areas.

Methodologies for assessment and monitoring and recommended concrete methodologies

Following the recommendations of the report of the European Court of Auditors on desertification (ECA 2018), the Commission is currently working on a common methodology to assess and monitor land degradation. However, currently there is no policy instrument which would require Member States to provide this information to the Commission. To ensure harmonised data collection and monitoring, an incentive to report to the Commission would be needed. In addition, the JRC EU soil observatory is currently being made which will facilitate the development of a common approach for assessing and monitoring methodologies. This reporting methodology should be well aligned between different policy areas (mainly DG ENV and DG AGRI) and be valid for all soils (agricultural, industrial, natural and urban soils).

Are the cost-benefits evaluated?

Soil threats and possible measures to mitigate these sol threats have been evaluated for their costs and benefits[76] but information on the costs and benefits of measures in general and for the SDGs in particular seems largely unavailable. However, it is clear that the cost of inaction on the long-term will

[73] www.ejpsoil.eu
[74] Grounding Sustainability: land, soils and the Sustainable Development Goals (August 2017 Authors: Nathalie van Haren, Karin van Boxtel (Both ENDS).
[75] https://www.wocat.net/en/
[76] https://esdac.jrc.ec.europa.eu/public_path/shared_folder/doc_pub/EUR27607.pdf

outweigh the cost of actions implemented now[77]. The lighthouse example approach we presented in the report currently only gives a qualitative assessment of the benefits and trade-offs of a specific measure for all land and soil related SDGs. But the framework could be used as a first step towards a methodology for a true cost-benefit analysis.

The research in this field can be enhanced when accepted approaches and indicators and monitoring of land and soil related SDGs are developed.

Recommendations

Availability of examples:

- Exchange region-specific solutions to enhance awareness of the importance of land and soil for local people, who know their area and are emotionally attached to it. Seeing sustainable solutions implemented in their own region will raise the awareness of the potential and possibility of sustainable land and soil management. For example:
  - Land and soil degradation and restoration measures as contributions for achieving sustainable development and with that, the SDGs
  - Nature-based solutions and agro-ecology principles contribute significantly to climate mitigation and adaptation, at the same time addressing biodiversity loss and land degradation
  - Measures to maximise resource efficiency: reusing and recycling soil and land resources
- Make new examples of region-specific solutions available via databases like WOCAT[78] and/or the new EU Soil observatory of JRC (in line with the activities of the Horizon Europe Mission 5 Soil Health and Food[79]).The development and exchange of good examples should be promoted on natural, urban and industrial land as well as for agricultural soils.

Shared methodologies:

- Develop tailored good practices for specific regions. This can be helpful to make the transition to a truly new system which can replace an 'old and unsustainable' system of soil and land management.
- Use a **concrete methodology** (for instance the lighthouse methodology proposed in this report) to assess the impact of the specific land management measures on soil and land-related SDGs, to demonstrate the trade-offs and synergies between the different SDGs impacted by those measures.
- Design a methodology for evaluating the costs and benefits for specific measures for the realisation of the SDGs.

[77] Nkonya, E., Mirzabaev, A., & Von Braun, J. (2016). Economics of land degradation and improvement–a global assessment for sustainable development (p. 686). Springer Nature.

[78] WOCAT is a global network on Sustainable Land Management (SLM) that promotes the documentation, sharing and use of knowledge to support adaptation, innovation and decision-making in SLM. Available via https://www.wocat.net/en/.

[79] https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme/mission-area-soil-health-and-food_en

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Annex 1 Overview of the project's research questions

The work carried out in this project was guided by a set of research questions which were listed in the Tender Specifications and subsequently slightly refined and reorganised during the inception phase:

Research questions	Section in the report
Institutional coordination and implementation • Did the Member State publish a National Sustainable Development Plan and when? • Does the National Sustainable Development Plan integrate soil and land considerations? • Which MS authorities are in charge of implementing and monitoring SDGs? • How to MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities? • Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation? • What are the main EU policies enabling the implementation of LDN target and other soil and land related SDGs? • What are the main national policies enabling the implementation of LDN target and other soil and land related SDGs? • What are the main activities identified at national level for implementing the land-soil related SDGs? • How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Section 3.1
Land degradation/land degradation neutrality definitions and indicators • What is the definition of LD and LDN at national level? • What are the priorities and what are the soil and land related SDG indicators and sub-indicators retained at national level? • What are the data sources for the indicators? Are they sufficient? • What is the baseline or how do MS intend to set it? • What is the approach on LDN at national/subnational level? Is it based on a balance between restored degraded land and newly degraded land?	Section 3.2
Measures to prevent, reduce or reverse degradation • What type of measures have been defined by MS (e.g. sustainable soil and land management measures) or best practices to prevent, reduce or reverse degradation? • Are there examples of good practices which could be expanded? • What are the conditions or limitations? • Are the cost-benefits evaluated?	Section 3.3

Annex 2 Questionnaire sent to the Soil Expert Group

1. What country do you represent? And what is your affiliation (institute name & position)?
2. How is the SDGs coordination ensured at national level? Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?
3. Is there a (an official) definition for Land degradation (LD) and for Land Degradation Neutrality (LDN) in your country? If yes can you share these definitions with us?
4. What are the main land degradation issues/threats in your country?
5. Are you monitoring soil and land degradation processes in your country? if yes continue with question 4, if no, please indicate how you think it should be implemented in your country
6. Are there specific indicators in your country for monitoring these soil and land degradation processes? If yes, what are these indicators? If no, what could it be?
7. What are/could be the data sources used for monitoring the land degradation processes in your country? Do you think these data are sufficient for your country to get a reliable picture of the process of land degradation?
8. When monitoring land degradation, it is important to set a baseline. What is/could be the baseline for the land degradation indicator(s) used in your country or how does your country intend to set it?
9. What is/could be the approach to define and monitor the progress of Land Degradation Neutrality (LDN) in your country? Is it based on a balance between restored degraded land and newly degraded land?
10. Can you identify the main national (sub-national) policies (potentially) enabling the implementation of the LDN target and other soil and land related SDGs?
11. Are there any activities at (sub)national/regional level for implementing the land-soil related SDGs, for example new strategy or policy developments, establishment of monitoring or reporting systems, stakeholder platforms or initiatives?

Annex 3 Soil and land related sustainable development goals and indicators[80]

Soil-related sustainable development goal target	Soil-based/soil-related SDG indicator	Relevant soil function/property	Suggested minimum soil indicator to monitor
2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists, and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment.	2.3.1 Volume of production per labor unit by classes of farming/pastoral/forestry enterprise size	Biomass productivity	Nutrient cycling: OC, P, C/N ratio; soil hydraulic properties: OC, EC, bulk density, soluble Na; soil morphology; pH
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding, and other disasters, and that progressively improve land and soil quality.	2.4.1 Proportion of agricultural area under productive and sustainable agriculture	Biomass productivity	Nutrient cycling: OC, P, C/N ratio; soil hydraulic properties: OC, EC, bulk density, exch. Na; soil morphology, pH
3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution, and contamination.	–	Concentration of hazardous elements	Concentration of hazardous elements, pH
6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.	–	Soil hydraulic properties	Bulk density, OC, EC, soil morphology
6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	6.5.1 Degree of integrated water resources management implementation (0–100)	Soil hydraulic properties	Bulk density, OC, EC, soil morphology
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning and management in all countries.	11.3.1 Ratio of land consumption rate to population growth rate	Biomass productivity, soil hydraulic properties	Nutrient cycling: OC, P, C/N ratio; soil hydraulic properties: OC, EC, bulk density, exchangeable Na; soil morphology
13.2 Integrate climate change measures into national policies, strategies, and planning.	–	Organic carbon content	OC
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.	–	Erodibility, N, P	Bulk density, OC, N, P, topsoil depth
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought, and floods, and strive to achieve a land degradation-neutral world.	15.3.1 Proportion of land that is degraded over total land area		Nutrient cycling: OC, P, C/N ratio; soil hydraulic properties: OC, EC, bulk density, exchangeable Na; soil morphology; topsoil depth, pH
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity, and, by 2020, protect and prevent the extinction of threatened species.	–		Selected soil biodiversity indicators

[80] Tóth, G. et al. 2018

Annex 4 Relevance of EU policies for implementing soil and land SDGs[81]

Key to reading the table

++	A policy is highly relevant for a specific SDG, meaning that that its objectives and measures may directly contribute to meeting the respective SDG.
+	A policy has an indirect an indirect and somewhat weaker link to a specific SDG.
+/-	A policy might both facilitate and hinder meeting a specific SDG

		Relevance for progress towards meeting SDGs						
Policy	**Description**							
Regulatory instruments								
Sewage Sludge Directive (SSD)	The SSD protects soil and water from heavy metals and pathogenic organisms by establishing limit standards and rules for the appropriate use of sewage sludge. It directly supports SDG 6 and 15. Bans and temporal restrictions on the use of sludge on land used to grow fruit and vegetable crops reduce potential consumer exposure to pathogens, contributing to SDG 3. SDG 13 benefits from increased carbon storage capacities of soils if they are enriched with organic matter from sludge. Contaminant concentrations from surface water run-off will be reduced, indirectly contributing to SDG 14. However, encouraging the use of sewage sludge might result in nutrient input into the marine environment (SDG 14). There is also concern about the presence of emerging pollutants in sewage sludge that may contaminate soil, and the legislation should be updated in the near future.	+	++	+/-		+	+/-	++
SUPD	The SUPD reduces harmful impacts from pesticide on human health and the environment through a mix of planning and information instruments as well as bans and restrictions on pesticides use. Exposure to pesticides can have a negative impact on the health of agricultural workers and continuous exposure to residual pesticide levels in food can also have negative consequences for human health. The Directive thus contributes directly to SDGs 3, 6, and 14 by reducing the amount of harmful chemicals entering the soil, the aquatic and marine environment and agricultural products. Integrated pest management and other practices promoted by the Directive support SDG 15. Pesticides reduce soil microorganisms, resulting in reduced soil biodiversity and soil organic matter content. Low organic matter content results in lower water retention and	+	++	++		+	++	++

[81] This analysis only includes those policies that were identified to address land and soil by more than once of the studies reviewed. This table therefore contains only a sub-set of the policies presented in Annex 5.

Policy	Description	Relevance for progress towards meeting SDGs						
		2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND
	reduced yields especially for during drought and reduces the soil's carbon storage capacity. Thus, the SUPD is also likely to contribute to SDGs 2 and 13 to some extent.							
WFD	The main aim of the WFD is to achieve a good status for all EU waters through a mix of planning instruments, economic instruments, quality standards, and monitoring. So-called 'Daughter Directives' include the Nitrates Directive and the Environmental Quality Standards Directive. The WFD does not explicitly address soil protection, however, its objectives will indirectly deliver several co-benefits for soil health and is likely to contribute towards meeting all SDGs to some extent: • Reducing soil contamination (SDG 3 and SDG 11), as less pollution means a lower risk of contamination for agricultural and urban areas. • Lower pollution levels along with erosion control also means lower harmful inputs into the marine environment (SDG 14), • Minimisation of landslides/floods reduces land and soil degradations (SDG 15) The WFD's impacts on soil health in general will ultimately also benefit food production (SDG 2) and mitigating climate change impacts (SDG 13).	+	++	++	+	+	++	+
Floods Directive	The purpose of the Directive is to establish a framework for the assessment and management of flood risks, covering all types of floods. The Directive does not explicitly reference soil protection in its objectives or measures; however, integrated flood management and the promotion of structural and non-structural measures can indirectly benefit the protection of soils. It is up to Member States to define measures, but measures aimed at both mitigating the adverse impacts of floods, as well as measures to reduce the flood risk might prevent/reduce soil erosion, contamination, and compaction threats and boost/preserve soil biodiversity. Fewer floods and landslides would also limit damages on land and soil used for primary production and human activities and infrastructures. Natural measures (e.g. Sustainable Urban Drainage) are likely to lead to fewer sealed surfaces and even 'de-sealing' of soils. The effective implementation of the Floods Directive could thus provide benefits for all soil functions and limit the increase of multiple soil threats, although impacts on some function and threats might be minimal. These impacts would thus contribute to meeting all SDGs to some extent; benefits can be expected to be greatest for SDG 2, 3, 11, 14 and 15. However, the benefits will depend on the types of measures adopted by the Member States.	+	+	+	+	+	++	++
Nitrates Directive	The Nitrates Directive aims to protect surface waters and groundwater against pollution by nitrates from agricultural sources by establishing limit values and promoting good farming practices. The Directive requires measures to be adopted to prevent run-off and leaching into groundwater or surface water. Member States also establish Codes of Good Agricultural Practice, which may include practices which will benefits soil, such as growing catch/cover crops and crop rotations which will increase the amount of soil organic matter and improve soil structure, which in turn reduces the potential for soil erosion/runoff and leaching of nitrates. Measures contained in the Codes, albeit voluntary outside designated Nitrate Vulnerable Zones, may halt land degradation (SDG 15) and mitigating climate change impacts (SDG 13). Reduced runoff and leaching should	+	++	++		+	++	+

Policy	Description	Relevance for progress towards meeting SDGs						
		2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND
	decrease input into the aquatic and marine environment, thus benefitting SDGs 6 and 14. Better soil health will ultimately ensure sustained food production and thus contribute to SDG 2.							
Birds and Habitat Directive (the Nature Directives)	The overall objective of the Habitats and Birds Directives is to maintain or restore protected species and habitat types. Member States must adopt conservation measures, which often combat pollution from pesticides and nutrients or restore and maintain landscape elements and features. The measures are likely to generate several benefits for soil. Erosion, contamination, organic matter decline and soil biodiversity will be prevented or decreased in the protected areas contributing to SDG 15. Protected wetlands and other habitats rich in soil organic matter (e.g. peatlands), may contribute significantly to SDG 13. The Directives will have indirect benefits on other SDGs, such as SDG 3 and 6, through a reduction of chemical fertilisers and pesticides.		+	+		+	+	++
SEA Directive	The Strategic Environmental Assessment Directive requires that plans and programmes expected to have significant effects must undergo an assessment. An environmental report must be prepared describing environmental effects (including on soil) and include reasonable alternatives. The report must contain information about the likely significant effects on soil (e.g. erosion, contamination, salinisation, loss of biodiversity, loss of soil organic matter). The SEA Directive applies to a broad range of sectoral plans with potential impacts on soil, including for example energy, transport, waste, and other strategic documents. Effective implementation of the SEA Directive can therefore be expected to contribute to meeting all SDGs by influencing sectoral developments and interventions at an early, strategic stage.	+	+	+	+	+	+	+
EIA Directive	The Directive requires the assessment of the environmental effects of a wide range of public and private projects likely to have significant effects on the environment. Soil is considered by the EIA Directive and identifying potential impacts on soil functions/assessing a projects effects on soil threats could result in projects that are less harmful to soil and land quality. Effective implementation of the EIA Directive can therefore be expected to contribute to meeting all SDGs.	+	+	+	+	+	+	+
ELD	The Directive establishes a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. The Directive covers damage to land, water, and biodiversity with (or under) land. It directly contributes to reducing soil contamination, and the loss of soil biodiversity. Reducing soil contamination ensures that soil can be safely used for human activities and biomass production. The Directive therefore contributes to SDGs 2, 3, 11, and 15. Decreased soil pollution can indirectly lower levels of contaminants entering the aquatic and marine environment (SDG 6 and 14). The ELD sets clear binding requirements mandating polluters to address emissions to land, however, there are many exceptions, and the Directive focuses on land rather than soil quality. Remediation techniques include removing and landfilling contaminated material which will often be contained in the soils - remediation of land therefore does not necessarily mean protecting the natural soils unless soil cleaning techniques are applied by the operator or mandated by the local authorities.	++	++	+	++		+	++

Policy	Description	Relevance for progress towards meeting SDGs						
		2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND
RED II	The Directive establishes a common EU framework and objectives for the use of energy from renewable energy sources to limit greenhouse gas emissions. The Directive sets the mandatory renewable energy targets for EU Member States and requires adoption of national renewable energy action plans on how to attain those targets. First generation biofuels are produced from food/feed commodities and with similar production methods (e.g. monocultures of maize, rapeseed, row crops, etc.), leading to possible soil erosion, soil compaction, decline of organic matter, threats to soil biodiversity, etc.). For this reason, the new Directive (RED II) establishes a set of sustainability criteria to protect lands with high biodiversity value and land with high-carbon stock, and to prevent 'indirect land-use change'. These sustainability criteria address loss of soil organic matter, soil erosion, soil compaction, threats for soil biodiversity and contribute to SDG 13 and 15. However, the promotion of biofuels might result in production intensification, potentially reducing crop diversification/cover crops and increasing soil erosion, organic matter loss, compaction from heavy machinery use, as well as salinisation from intensive irrigation in certain areas. Non-compliance and certification fraud and lack of enforcement, especially with biomass produces in third countries, may adversely contribute to climate change. Marginal benefits can be expected for all other SDGs.	+	+	+	+	+/-	+	+/-
Industrial Emissions Directive	The Directive aims to reduce and prevent emissions to air, water and land and reduce environmental impacts from industrial activities through a system of integrated permitting. The Directive covers both diffuse as well as point source pollutants from industry/combustion plant/waste installations and explicitly covers impacts on soils. Reduced soil contamination ensures that soil can be used safely for human activities and the production of biomass. The policy therefore contributes to SDGs 2, 3, 11, and 15. Reducing contamination to land and water will also indirectly contribute to fewer contaminants entering the aquatic and marine environment (SDGs 6 and 14).	++	++	++	++	+	++	++
Landfill Directive	The Directive aims to prevent or reduce the negative effects of landfilling of waste on the environment through permits and technical standards for facilities and waste. It covers any hazardous, non-hazardous and inert waste disposal site. The requirements of the Directive, particularly those related to the design and location of landfill sites, will directly reduce the risk of soil contamination and likely prevent negative impacts on soil biodiversity and contribute to SDGs 3 11, and 15. Reducing toxic contamination through leaching/run off will also contribute to SDGs 6 and 14 to some extent. It is likely soil sealing is used to contain leaching from landfills, however, overall commitments to reducing waste will hopefully reduce the area to by sealed in the future.		++	++	++		++	++
Waste Framework Directive	The Waste Framework Directive aims to reduce the negative impact of waste generation and management on the environment and to increase the efficiency of resource use. Member States must take measures to ensure that waste management is carried out without endangering human health or the environment, including water, air, soil, plants, or animals. Measures are likely to reduce both local and diffuse contamination through deposition from water courses, run-off etc. Reducing soil contamination will ensure land can be used safely for human activities, and contribute directly to SDGs 3 11, and 15 and to at least some extent SDGs 6 and 14.	+	++	++	++		+	++

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	The Directive promotes using biowaste for composting or anaerobic digestions might, which could potentially contribute to improving soil organic matter, especially on agricultural land (SDG 2).							
Fertiliser Regulation	The Regulation regulates fertiliser products on the European market by specifying minimum requirements, including consideration of negative effects on the health of humans, animals, plants, or the environment (including soils). The Regulation indirectly prevents and reduces acidification, diffuse contamination, and loss of soil organic matter. However, the Regulation only covers products available on the internal market, so does not cover products only on national markets (which concerns many organic fertilisers). Its potential contribution to meeting SDGs 3, 6, 13, 14, and 15 (by way of reducing soil contamination/eutrophication) might therefore be limited.	+	+	+	+	+	+	+
Organic production and labelling of organic products Regulation	The Regulation lays down the rules for organic production, related certification and use of labelling. By promoting organic production of food, food-related and feed products, and thus restricting external inputs, the Regulation directly contributes to sustainable agriculture, aquaculture and livestock production (SDG 2, 3 and 6). The Regulation encourages a high degree of genetic diversity in the choice of plant and animal varieties produced, thus supporting biodiversity (SDGs 14 and 15). Short production and distribution cycles reduces climate impacts from transport emissions (SDG 13).	+	+	+		+	+	+
ESR	The Effort Sharing Regulation defines the minimum contributes Member States need to make from 2021 to 2031 to fulfil the EU's target of reducing greenhouse gas emissions by 30% below 2005 levels from energy, industrial processes and product use, agriculture and waste. These sectors are not included in the EU Emissions Trading System. Certain Member States may use a limited number of ETS allowances to offset emissions in certain sectors in 2021-2030 for their compliance with the regulation. In addition, Member States exceeding their allocated annual emissions may use net removals resulting from improved land management linked to the implementation of the LULUCF Regulation. In total, this flexibility is capped at 280 Mt CO2 over the ten-year period. The ESR may indirectly address multiple soil threats depending on the policies and measures adopted by the Member States to meet, and ideally exceed, their annual emission reduction targets. Actions aimed at reducing agricultural emissions could include limiting livestock units on land parcels or changing cropping systems (e.g. by introducing crop rotations, cover crops, or green manure), which may alleviate compaction, soil pollution, and loss of soil biodiversity as well as decline of organic matter. Waste management measures to reduce emissions could also benefit a reduction of soil contamination and loss of soil biodiversity by reducing leaching of contaminants into the soil. Contributions to meeting SDGs might therefore be most direct for SDGs 13 and 15, as actions are likely to target an improvement of the soil's carbon sequestration capacity and will thus reduce land degradation processes. This will in turn drive process towards meeting SDGs 2, 3, 6, and 14.	+	+	+		++	+	++
NECD	The NECD sets emission reduction commitments for 2020 and 2030 for five major air pollutants. It does not establish any soil-specific targets; however, Member States must draw up National Air Pollution Control Programmes containing an assessment of the likely impact of national emissions on air quality and identify	++	++	+		+	+	++

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	mitigation measures. Potential measures set out in the Directive may benefit soil structure, such as establishing a national advisory code of good agricultural practices for residue management and the use of manure for fertiliser. Member States must also monitor negative impacts of air pollution on ecosystems. While soil is not explicitly mentioned, several soil quality indicators are listed among the optional monitoring indicators in an Annex. The Directive is highly relevant to soil protection as sulphur dioxide, nitrogen oxides, VOC and ammonia emissions directly impact the quality of soils and lead to contamination and acidification. By limiting emissions, the carbon storage capacity of soil may be improved, and healthy fertile soils maintained for food production (SDG 2 and 15). Reducing emissions to soil will also contribute to SDG 3, and maintaining and protecting the carbon storage function of soils will contribute to SDG 13. Additional benefits will include a reduction of pollution in marine and aquatic environments. However, it does not specific address historic emissions and any necessary mitigation measures.							
PPPR	The PPPR requires that plant protection products have no unacceptable effects on the environment, specifically mentioning the contamination of soil and establishes procedures and criteria for the approval of active substances, safeners and synergists. The Regulation aims to protect human and animal health and the environment and prevent soil pollution from pesticides. It thus directly contributes to SDGs 3, 11, and 15. Minimising soil pollution will also reduce harmful substances in freshwater and the marine environments, thus contributing to SDGs 6 and 14.		++	+	++		+	++
LULUCF Regulation	The LULUCF Regulation establishes Member State targets for this sector to contribute to meeting the greenhouse gas emission reduction commitment of the EU's 2030 target and its nationally determined contribution under the Paris Agreement. The Regulation defines rules for the accounting of emissions and removals from LULUCF covering all land uses on managed lands, corresponding to categories used for reporting under the United Nations Framework Convention on Climate Change (UNFCCC). The LULUCF Regulation defines six relevant carbon pools, including inter alia soil organic carbon. It allows Member States with net removals, for instance resulting from improved land management, beyond their commitment, to use a limited number of these net removals to comply with the Effort Sharing Regulation. In total, this flexibility is capped at 280 Mt CO2 over the ten-year period. The Regulation as such does not specify how targets should be achieved, but Member actions and policies are likely to promote farming and forest management practices to protect, maintain and increase soil organic matter. This policy therefore directly contributes to meeting SDG 13 and 15; increase soil organic matter will in turn benefit other soil functions and thus contribute to realising SDGs 2, 3, 6, and 14.	+	+	+		++		++
Planning instruments								
EU Forest Action Plan and Forest Strategy	The EU Forest Strategy provides the overall framework to ensure that EU forests are managed in a sustainable and balanced way, protect forests and biodiversity. The Action Plan is the main instrument implementing the Strategy. However, whilst measures can be funded under the RDP 2014 – 2020 forestry measures, impacts on land and soil depend on measures included by the Member States in their national					++		++

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	forest programmes. The activities under the key actions that enhance a sustainable forest management have a potential to contribute to increasing organic matter in soils, reducing the risk of soil erosion, landslides and floods, and promoting soil biodiversity. Effective implementation of the Action Plan could therefore contribute significantly to SDGs 13 and 15.							
Roadmap to Resource Efficient Europe	The Roadmap for Resource Efficient Europe provides strategic direction for the Member States by urging them to take action to achieve sustainable soil management by 2050. Actions target soil erosion, sealing and land take in general, contamination, and the decline of soil organic matter. The Roadmap promotes further research into ways of improving fertilisers, food production and bio-waste issues which could reduce dependence on mined phosphate. This will benefit soil protection, especially soil fertilisation. Finally, the Roadmap promotes further integration of resource-efficiency considerations into water policy and setting water efficiency targets. This could eventually minimise the impacts of droughts and floods by increasing water retention in soils and efficient irrigation, which would therefore lead to better soil protection and contribute to minimising the risk of desertification. The Roadmap is likely to contribute to all SDGs. However, it is non-binding and only recommends Member States adopt soil and land protection actions. There are no soil-focused targets or specific quantitative requirements concerning soil threats. It is therefore likely the contribution to SDGs will be limited.	++	+	++	++	++	++	++
EU Strategy on Adaptation to Climate Change	The Adaptation Strategy is the EU's overarching strategy to increase climate change adaptation through different mechanisms. The Strategy explicitly addresses erosion and flooding, while indirectly limiting compaction, loss of soil biodiversity, loss of soil organic matter and soil sealing. It also indirectly supports almost all soil functions. It sets out a wide number of voluntary instruments but no mandatory actions. Results will depend on the national adaptation strategies, which may have direct or indirect impacts on soil protection. Depending on the priorities and measures of the Member States' national adaptation strategies, there may be positive contributions to all SDGs, however, the lack of clear soil targets and management principles mean that the Strategy's impact on the SDGs is likely limited.	+	+	+	+	+	+	+
Soil Thematic Strategy	The Strategy aims to protect soil and to ensure its sustainable use, by preventing further soil degradation, preserving soil function, and restoring degraded soil. It highlights eight main threats to soil in the EU: erosion, organic matter decline, contamination, salinisation, compaction, soil biodiversity loss, sealing, landslides, and flooding. The Strategy sets out four key pillars to address these threats: 1) Framework legislation, 2) Integration of soil protection in other policies, 3) Research, and 4) Raising public awareness. The actions outlined by the Strategy are voluntary. A Soil Directive, one of the ambitions of the Directive, was withdrawn after several years of debate The Soil Thematic Strategy, whilst highly relevant to all SDGs, is unlikely to have a tangible impact on preventing/reducing soil threats or improving soil functions in Europe.	++	++	++	++	++	++	++
Farm to Fork Strategy	The strategy is part of the 'Green Pact for Europe' aims to ensure sustainable food production, food security and fighting against food loss and waste. The strategy sets the objective of allocating at least 25% of EU agricultural land to organic farming by 2030 and to significantly increase the share of organic aquaculture,	++	++	+	+	++	+	++

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	achievable through incentives complementary to the CAP, fiscal incentives and mandatory minimum criteria for sustainable food supplies from public authorities. Regarding chemical pesticides, the Commission intends to take additional measures to reduce the overall use and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030. On excessive nutrients (nitrogen and phosphorus), the Commission will work to reduce nutrient losses by at least 50% while ensuring that soil fertility does not deteriorate. It foresees the use of EU funding to finance the transition to sustainable agriculture. To address deforestation and forest degradation on a global scale, the Commission should propose a new legislative proposal by 2021 and other measures to avoid or minimise the placing on the market in the EU of products associated with deforestation or forest degradation. All these actions will contribute significantly to SDGs 2, 3, 13, and 15. They will also provide important co-benefits for SDGs 6, 11, and 14.							
Biodiversity Strategy	The current EU Biodiversity Strategy defines the EU's 2050 long-term vision for biodiversity and sets specific targets for 2020. The Strategy does not explicitly address land and soil but Target 2, "By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems", is indirectly relevant for soil protection. Sub-targets and associated actions are expected to have indirect positive impacts on soil health overall, and thus all SDGs. The new Biodiversity Strategy for 2030 highlights nature protection, including the greening of urban space, and foresees the adoption of a new EU chemicals strategy and a 'zero pollution' action plan for air, water, and soil. In its European nature restoration plan for 2030, it the following soil-relevant targets are formulated: (1) zero pollution by nitrogen and phosphorus flows from fertilisers, with a target of reducing nutrient losses by at least 50% and fertiliser use by at least 20%, (2) reduce the risks associated with chemical pesticides and the use of these substances by 50%, and the use of high-risk pesticides by 50%, (3) to recognise at least 10% of agricultural land as high-diversity landscape features, (4) at least 25% of the agricultural land cultivated in organic farming, (5) commitment to significant progress in the remediation of contaminated soils, and (6) no chemical pesticides in sensitive areas such as urban green spaces in the Union. According to the Strategy, at least EUR 20 billion per year (from public and private funding at EU and national levels) should be spent on nature spending and a significant proportion of the 25% of the EU climate action budget will be devoted to biodiversity and nature-based solutions. If all these targets of the Biodiversity Strategy can be realised, it will greatly contribute to all SDGs.	++	++	++	++	++	++	++
Economic instruments								
CAP Direct payments and market measures (Pillar I) and Pillar II (Rural Development)	The CAP aims to integrate ambitious standards on climate change, environmental services and animal welfare into common farming practices. The current system deploys several instruments to this end. Direct payments are tied to cross-compliance and greening, both of which include practices that are good for the environment (and soil in particular) (Pillar I). Under Pillar 2, voluntary practices that contribute to the same objectives are rewarded with additional financial support. Direct payments are payed to farmers based on land area, with some exceptions. Cross compliance is the mechanism that links direct payments to compliance by farmers	++	+	+	+	++	+	++

Policy	Description	Relevance for progress towards meeting SDGs
	with Statutory Management Requirements (SMR) concerning the environment, food safety, animal and plant health and animal welfare, as well as the requirement of maintaining land in Good Agricultural and Environmental Condition (GAEC). Cross-compliance includes two elements: statutory management requirements and the good agricultural and environmental condition (GAEC). More specifically: GAEC 4 concerns minimum soil cover; GAEC 5 concerns minimum land management (important to prevent landslides/floods and thus SDGs 2 and 15); GAEC 6 concerns maintenance of soil organic matter (directly relevant for maintaining carbon storage capacities and biomass production and thus for SDGs 2 and SDG 13); in addition GAEC 1 concerns establishment of buffer strips along water courses which might reduce nutrient/chemical inputs to surface/groundwater and eventually the marine environment, thus also reducing soil contamination (relevant for SDGs 6 and 14); GAEC 7 concerns retention of landscape features (indirectly contributing to preventing loss of biodiversity and potentially which are relevant for SDGs 2 and 15). Another important element that links direct payments to environmental protection is the so-called greening measures. In order for to receive the last 30% of their land-based payments, farmers must comply with conditions relating to a) crop diversity b) permanent pasture c) Ecological Focus areas. The EU's rural development policy (Pillar II) helps the rural areas of the EU to meet the wide range of challenges and opportunities that face them in the 21st century – economic, environmental and social. Rural development measures finance more demanding activities relating to farming, the environment and the reduction of greenhouse emissions ('agri-environment-climate measures'). From a soil protection and management perspective two of the six defined priorities, upon which Member states should build their RDPs, are most relevant: restoring, preserving and enhancing ecosystems related to agriculture and forestry (focus area 4(c) - preventing soil erosion and improving soil management); and promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in the agriculture, food and forestry sectors (focus area 5(e) - fostering carbon conservation and sequestration in agriculture and forestry). In June 2018, the European Commission published a legislative proposal for the CAP post-2020. The backbone of the new structure will be the CAP Strategic Plans (SP hereafter) drawn up by the Member States, which will be subjected to approval by the Commission. The two-pillar structure remains intact in the new CAP, although significant changes are proposed by the Commission. The new proposal scraps the greening measures introduced in 2013 to improve the environmental performance of farming and provide additional support for farmers who go beyond cross-compliance... The current system identifies six priorities and 18 focus areas for rural development, from which Member States prepare their rural development plans, which are subject to approval from the Commission. The new proposal does not change this structure substantially, other than incorporating the Rural Development Regulation into the CAP under Article 65. Currently, the AECMs are an important tool to deliver on environmental objectives and are the second most important measure in terms of financial allocation. The AECMs (now called AECH; incorporating organic, Natura 2000, water framework directive payments, animal welfare, forestry and non-productive investments) are allocated between 30-43% of the Pillar 2 budget. As in	

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	the current system, these practices must go beyond what the farmers are already doing to fulfil enhanced conditionality. In the new system, enhanced conditionality replaces the cross-compliance and greening requirements but building on the current system of Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Conditions (GAECs). New conditions with the potential to improve soil health have been added. Some of the new conditions incorporate greening requirements: permanent grassland is incorporated as GAEC 1, ecological focus areas are reflected in GAEC 9, and crop rotation is introduced to replace crop diversification as GAEC 8. Other new additions include the protection of wetlands and peatlands (GAEC 2). Eco-schemes are an important part of the new system. In their SPs, Member States will be required to set up voluntary eco-schemes for farmers, aiming to improve the climate and environmental ambition of the CAP. Such schemes will be available to farmers based on a list of practices (established by the Member States) that are beneficial for the environment and climate. Effective implementation of the CAP should lead to a decrease of all soil threats and an improvement of soil functions but will rely to a large extent on the Member States' SPs and their specification of the various GAECs. Similar to the existing CAP, the new CAP is expected to significantly contribute to meeting SDGs 2, 13, and 15, with smaller co-benefits for SDGs 3, 6, and 14.							
LIFE Programme	The LIFE Programme is the EU's funding instrument for environment and climate action. It aims to co-finance projects which contribute to the implementation, updating and development of EU environmental and climate policy and legislation. The current programme has two sub-programmes jointly covering six priority areas: 1) subprogramme for Environment, including as priorities areas environment and resource efficiency, nature and biodiversity, and governance and information; and 2) sub-programme for Climate action, including as priorities areas adaptation, mitigation, and governance and information. The thematic priorities for resource efficiency include soils, particularly activities which contribute to mitigation and compensation of soil sealing and better land use. The proposed new LIFE programme for 2021-2027 would contain two main fields of action covering four sub-programmes, each with its own financial envelope. For environment, this would include 1) the Nature and Biodiversity sub-programme; and 2) the Circular Economy and Quality of Life sub-programme. For Climate Action, this would include 3) the Climate Change Mitigation and Adaptation sub-programme; and 4) the Clean Energy Transition sub-programme. Land and soil are not mentioned as a priority in the current proposal. However, the proposal clearly states the programme's intention of contributing to the EU's commitments on the SDGs. Given the overall budget envelope, projects funded under the upcoming programme, particularly those aiming to integrate conservation priorities in other policies and programmes ('strategic nature projects') and those addressing implementation challenges of the Member States environmental and climate action plans ('strategic integrated projects') could make a contribution to meeting multiple SDGs at Member State level.	+	+	+	+	+	+	+
Information instruments								

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		2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND
Soil Sealing Guidelines	The Soil Sealing Guidelines are essentially a compilation of best practices collected from Member States. They provide illustrative examples of measures for limiting soil sealing, mitigating the effects of soil sealing, and compensating soil sealing. In addition, relevant EU policies and funding opportunities are presented. The guideline directly aims to prevent further soil sealing, which would subsequently also water retention capacities and ultimately reduce the risks of floods and landslides. Ultimately, soil sealing leads to a loss of soil functions and thus, minimising this threat or even-'de-sealing soils', might benefit all SDGs. However, since the guidelines contain no mandatory policy measures, it is unlikely to contribute substantially to realising the SDGs.	+	+	+	+	+	+	+

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Annex 5 Member State fact sheets

Austria

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Strategy for Sustainable Development of the Federal Government and Federal Provinces (ÖStrat) adopted in 2010, building on the National Strategy for Sustainable Development of 2002. https://www.bmnt.gv.at/english/environment/Sustainabledeve/-STRAT---Strategy-for-Sustainable-Development-of-the-Federal-Government-and-Federal-Provinces.html	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Head of state level: Federal Chancellery Domestic Lead: Ministry of Sustainability and Tourism External Lead: Ministry of Foreign Affairs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Sustainable Development focal points in each ministry Coordinating mechanism: Sustainable Development Steering group	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Sub-national coordination or participation mechanism: Expert conference of national and regional sustainable development coordinators Stakeholder consultation of the Strategy carried out in 2017 Actor Network for Sustainable Austria (SDG Watch Austria), independent Sustainable Development Council, Stakeholder participation strategy group	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	A single national strategy does not exist, as spatial planning, soil protection and housing subsidies are under the responsibility of the provinces. The Rural Development Plan includes measures to improve soil fertility	2, 3
What are the main activities identified at national level for implementing the land-soil related SDGs?	No information	

References

Number	Source	Source reported by AT
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	
7	[additional sources]	

Belgium

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy approved in 2017, vision for sustainable development was adopted in 2013	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Domestic Lead: no ministerial lead External Lead: Ministry of Foreign Affairs and a committee (Coormulti) at the Ministry	1
How to MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	IMCSD (Inter-ministerial Conference for Sustainable Development) gathering ministers from all governments (federal, regional, and local)	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Sub-national coordination or participation mechanism: IMSCD Consultation on SDS was carried out Federal Council for Sustainable Development is the main mechanism coordinating input from nine advisory councils to the strategy	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	The National Voluntary Review lists policies relevant for the success of SDGs, the following which may be relevant for land and soil (noting that some are regional policies): • Organic agriculture: A first strategic plan for the development, processing and consumption of biological agriculture produce runs until 2020. • Forestry: The Forestry Code of Wallonia requires forestry management plans • Plan Nature of the Brussels-Capital Region Other policies were identified as being relevant to land degradation/desertification, but not specifically linked to SDGs: • National Biodiversity Strategy • Natura 2000 network & Life programme: for example a project to restore peat and wetlands and another to mitigate land degradation in a specific area. • The Rural Development Programme (RDP) for Wallonia 2014-2020: including measure on afforestation and soil management (including erosion) Soil Policies concerning mitigation of the effects of drought: Flanders Policy and legislative measures to combat land degradation/desertification: Flanders (focused on erosion control). These measures are linked to the CAP	3, 6

Question	Information	Source
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified as mitigating land degradation/desertification (not linked to SDGs): • Sharing information and knowledge on best practices and approaches to drought management: guidance documents, research centres, Coordinating Committee for integrated water policy (Flanders), Geo portal Waterinfo.be, Climate portal Flanders • Subsidies (Flanders): including projects mitigating soil erosion, an erosion coordinator who guides and supports the municipality in implementing the municipal erosion control plan, subsidies on agroforestry • Expertise and consulting unit (Wallonia) Activities identified to achieve SDGs (likely impacting soil and land degradation): • voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security (VGGT)	3, 6

References

Number	Source	Source reported by BE
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Flanders only
6	National Voluntary Review	Yes
7	[additional sources]	

Bulgaria

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	No overarching strategy for SDGs, the National Programme for Development Bulgaria2020 provides development guidelines, in addition a set of sectoral strategies including the National Action Programme for Sustainable Land Management and Fight against Desertification 2014-2020	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Finance supervises the National Programme for Development; Ministry of Foreign Affairs as an external lead	1
How to MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Coordination Committee chaired by the Minister of Finance, accountable to the Council of Development	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information provided	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information provided	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Standard online consultations for all interested parties	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	No information provided	
What are the main activities identified at national level for implementing the land-soil related SDGs?	No information provided	

References

Number	Source	Source reported by BG
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	
7	[additional information]	

Cyprus

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Sustainable Development Strategy since 2007, revised in 2010	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Foreign Affairs	1
How to MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Cyprus' institutional mechanism for the implementation of Agenda 2030 is comprised mainly of Ministries and other governmental services, such as the Statistical Service, and falls under the coordination of the Ministry of Foreign Affairs. Following an extensive, introductory meeting organized by the Ministry of Foreign Affairs in 2016, an inter-ministerial group was established, comprised of contact points mostly from the strategic planning units of each Ministry. As a first step, each one of the 17 Goals was assigned to the most relevant Ministry, which, in turn, assumed the responsibility of defining and liaising with all stakeholders.	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Civil society organisations were involved in consultations through an online survey before the first VNR	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as contributing to the success of the SDGs and are likely linked to soil and land degradation mitigation: • National Action Plan for a Green Economy includes measures on sectors such as agriculture, water resources, biodiversity, forests, etc. • Rural Development Plan 2014-2020 includes targets to: increase of organic farming; improve sustainable productivity of the agriculture sector, reduce pollution from production, increase agricultural fields rotation; increase agricultural land use reclamation concerning the smart use of irrigation water reserves; conserve natural landscapes, habitats, genetic resources and preservation of crop diversity • Water and Soil Pollution Control Law provides for control of discharges to water and soil, where illegal direct and indirect discharges are considered criminal offences. • National Biodiversity Strategy which includes actions and measures for all ecosystems (forest, freshwater, grassland etc.), as well as the implementation of above targets which foresees conservation, restoration and sustainable use of the mountain and freshwater ecosystems and their services. • National Forest Policy, National Forest Law, the Strategic Planning for the Department of Forests for 2017-2019 • Rural Development Plan (RDP) there are measures for afforestation of agricultural land, protection of forests from fires and natural disasters, reforestation of burnt areas, afforestation of non-agricultural land and investment for maintaining and improvement of the economic, ecological and social role of forests. • National Action Plan (NAP) and Programme of Measures for Combating Desertification	6

Question	Information	Source
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified as contributing to the success of SDGs, likely linked to soil and land degradation mitigation: • guidelines against soil sealing practices • Financial resources for the protection, restoration and promotion of sustainable use of terrestrial ecosystems, combat desertification, halt and reverse land degradation, halt biodiversity loss, include national funds, LIFE and Structural funds, RDP (LEADER).	6

References

Number	Source	Source reported by CY
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional sources]	

Czechia

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	'Implementing the Agenda 2030 in the Czech Republic', 2018, 'Czech Republic 2030', 2017	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Government Council for Sustainable Development chaired by the deputy Prime Minister The Minister of Environment ensures the implementation of the 'Czech Republic 2030' document. The Ministry of Environment (the Sustainable Development Unit) fulfils a number of functions in the implementation process.	1
How to MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	The Ministry of Environment (SD unit) cooperates with other ministries and actors on selected issues and, at the same time, through its own analytical capacity, acts as a unit responsible for maintaining contacts with all stakeholders. It coordinates the activity of the Government Council on Sustainable Development (GCSD) and participates in activities of a number of other advisory and working bodies that enable cross-sectoral cooperation, coordination and feedback. Representatives from the Parliament, all ministries, NGOs, municipalities, industry, agriculture, trade unions, research, academic society and other stakeholders are members of the 9 committees of the Council and many working groups. The Ministry also co-ordinates respective ministries through so-called focal points – persons responsible for intra-departmental coordination and communication with the Ministry of Environment on issues relating to the implementation of the strategy 'Czech Republic 2030'.In the Czech Republic, the Ministry of the Environment and the Ministry of Agriculture share the responsibility for soil protection. They cooperate on the level of the inter-ministerial coordination network (i. e. focal points) as well as in the GCSD committees, including the committee for sustainable development indicators.	4
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	The Strategic Framework 'The Czech Republic 2030' contains Strategic Objective 15, which reads as follows: The land is protected from degradation and the potential of the landscape is utilized as much as possible for carbon sequestration and storage. This objective includes three sub-targets: • 15.1. Organic matter content in soil and soil structure correspond to the natural state of the soil type; • 15.2. Levels of water and wind erosion of soil is being reduced; • 15.3. The species composition of the planted forest stands corresponds to the habitat conditions and prevents further degradation of forest soils.	3
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Government Council for Sustainable Development (GCSD) is the main mechanism for involving stakeholders Other stakeholder participation mechanisms include the Multi-stakeholder Council for Development Cooperation which participated in 2017 VNR	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	The national policy on soil protection is manifested through: • act No. 334/1992 Coll. on the protection of the agricultural land fund, • act No. 289/1995 Coll. on forests, and their respective decrees, • act No. 183/2006 Coll. (building act).	3, 4

Question	Information	Source
	Programmes for soil protection are also developed in some individual regions, and a decree on soil erosion is currently being prepared (to be linked to act No. 334/1992) The National Biodiversity strategy of the Czech Republic 2016–2025, has the priority 3 'Environmentally Friendly Use of Natural Resources', which includes inter alia the objective 3.4 'Soil and Mineral Resources' with its sub-target 3.4.1. 'Reduce the Risk of Water and Wind Erosion and Increase the Organic Matter Contained in the Soil'. The Strategy on Adaptation to Climate Change in the Czech Republic includes general adaptation measures for relevant sectors and in agriculture sector namely measures such as: • 3.2.3.3. 'Standards of Good Agricultural and Environmental Conditions'; • 3.2.3.6. 'Reducing soil erosion' • 3.2.3.7. 'Measures against agricultural drought'. These agriculture measures are further elaborated in the National Action Plan on Adaptation to Climate Change, adopted in January 2017. Decree No. 153/2016 Coll., on determining details in relation to the protection of soil quality also contains several relevant references, including indicators to determine soil degradation.	
What are the main activities identified at national level for implementing the land-soil related SDGs?	The Government Council for Sustainable Development implements and analyses SDGs associated with soil. Data from the evidence of land takes (managed by the Ministry of the Environment) is subject of the annual review.	4

References

Number	Source	Source reported by CZ
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	Yes
6	National Voluntary Review	
7	[additional information]	

Germany

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Sustainable Development Strategy aligned with SDGs since 2017, including operational measures	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Federal Chancellery; Ministry of Environment and the Ministry of Development and Cooperation	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	The three most important bodies are the State Secretaries' Committee on Sustainable Development, the Parliamentary Advisory Council on Sustainable Development and the Sustainable Development Council. Sustainability policy comes under the Federal Chancellery (Bundeskanzleramt). The State Secretaries' Committee for Sustainable Development ensures SDG coordination. An interministerial group coordinated the reporting on Strategic objective 1 of the UNCCD national report 2018 'To improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to land degradation neutrality.' Involved ministries: Federal Ministry for Economic Cooperation and Development (BMZ), Federal Minister for Environment, Nature Conservation and Nuclear Safety (BMU) and German Environment Agency (UBA), Federal Ministry of Food and Agriculture (BMEL) with Federal Research Institute for Rural Areas, Forestry and Fisheries (Thünen-Institute) and Federal Research Center for Cultivated Plants (Julius Kühn-Institute), Federal Statistical Office (Destatis). BMEL and BMU are currently working together on the development of an indicator to monitor changes in soil quality ('Bodenindikator'). Though this is part of the national sustainability strategy, a soil indicator may support SDG 15, target 15.3.	4
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	Germany's National Sustainable Development Strategy ('Nachhaltigkeitsstrategie') includes indicators with relevance for land and soil include nitrogen surplus, deforestation prevention, ecosystem preservation, sustainable land use, organic farming area, and species diversity. Most importantly the strategy includes an indicator on land take ('Built-up area and transport infrastructure expansion') with the objective to reduce expansion of built up area and infrastructure to less than 30 ha a day by 2030. There are no indicators and targets in the German Sustainable Development Strategy addressing directly land consumption. The strategy concentrates on issues biodiversity, ecosystems and forests, nevertheless Germany takes up SDG target 15.3, aiming at reaching land degradation neutrality until 2030 by taken land sealing and land take as a possible indicator for the implementation of land degradation neutrality. Beside this there is an awareness that a new indicator is needed to identify changes of soil quality	4, 5, 7
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Federal-Länder meeting provides a coordination mechanism between the federal and the regional level Stakeholder consultations on the SDS in 2004, 2008, 2012, 2016 (and beyond) Independent Sustainable Development Council providing a platform for stakeholders Broad consultations via events and online, sustainability forum	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Documents of special relevance for LDN are the German Sustainable Development Strategy, the National Strategy on Biological Diversity and German Climate Protection Plan 2050. Germany's National Sustainable Development Strategy ('Nachhaltigkeitsstrategie') includes the goal of land take reduction (see answers to questions 1, 2 and 5). There are also several strategies and initiatives on food and agriculture in Germany. The National Sustainable	4, 6

Question	Information	Source
	Development Strategy ('Nachhaltigkeitsstrategie') is the key framework for achieving the SDGs in Germany, setting out national sustainability goals and indicators, and includes indicators for soil and land. The German National Strategy on Biological Diversity sets out around 330 targets and 430 concrete measures to be taken in sixteen fields of action. One of these targets is that by 2020, forests with natural forest development will account for 5% of the wooded area. the Forest Strategy 2020 and the National Strategy for Agrobiodiversity also contribute to protecting biodiversity. The sustainable utilisation of soils as a resource is an important national objective. In accordance with the Federal Government's 2015 Environmental Report, soil-related issues are to be given further increasing consideration, e.g. by reflecting the soil-related provisions of the 2030 Agenda in the National Sustainable Development Strategy.	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • Retaining and enhancing soil fertility, partly by financing measures (currently in the amount of around 93 million euros) to rehabilitate 200,000 hectares across five countries through One Word, No Hunger initiative • Implementation of the Strategy For The Future Of Organic Farming; continuation and development of the Federal Organic Farming Scheme and other forms of sustainable agriculture (BÖLN), agri-environmental measures, climate action, animal welfare programmes and the Protein Crop Strategy. • With its Research for Sustainable Development (FONA3) framework programme, the Federal Government improves knowledge and decision-making tools for maintaining biodiversity and ecosystem services. The programme's focal topics are 'Ecological and socioeconomic dynamics', 'Long-term data and data management', 'Natural capital' and 'Land degradation' • Germany committed to the implementation of the New York Declaration on Forests (2014) which calls for an end to the loss of natural forests by 2030 and for the restoration of more than 350 million hectares of forests and degraded landscapes worldwide. With its internationally renowned Bonn Challenge action platform, Germany supports the target to restore 150 million hectares of degraded and deforested land by 2020. With its signing of the Amsterdam Declaration in December 2015, Germany has also declared its aim to eliminate deforestation from agricultural commodity chains. With a view to combating illegal logging, Germany established a Centre of Competence on the Origin of Timber as a central contact facility for government agencies, the timber trade, consumers and conservation associations and it initiated the Global Timber Tracking Network (GTTN) in order to promote tools to support or refute claims of timber provenance worldwide.	6

References

Number	Source	Source reported by DE
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	German Sustainable Development Strategy – SUMMARY (submitted as part of the 2019 questionnaire)	Yes

Denmark

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Initial SDS adopted in 2009, new strategy to be developed (the plans announced in 2011), SDG National Action Plan adopted in 2017; the Acion Plan contains concrete, national targets that are to high extent measureable and quantifiable	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Foreign Affairs; Ministry of Finance responsible for coordination of the national implementation of the SDGs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Each line ministry has an international department which links national and international policy including the SDGs, all ministries are responsible for integrating the SDGs in policy (all the SDGs distributed across the ministries); regular coordination between the ministries. A Working Group is set up on and ad-hoc basis, e.g. for the first progress report in 2018.	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	VNR consultation and stakeholder conference was organised ahead of the formulation of the National Action Plan Ministry of Finance to organise regular stakeholder meetings, e.g. at the occasion of the annual progress report.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Most Danish agri-environmental regulation aims to limit and reduce nutrient losses from agriculture to the aquatic environment. Some of the regulation also contributes to protecting the quality of agricultural land and soils. The regulation includes: • the Act on agricultural use of fertilizer and nutrient-reducing measures, • the Act on environmental approval of commercial livestock • the Act on commercial livestock and use of fertilizer. • The following requirements contribute both to reducing nutrients losses but also to maintaining soil quality. Until 2017, Denmark had mainly general nitrates regulation where the same rules applied to all farmers. A political agreement from 2015 (The Food and Agriculture Package) introduced a policy shift, supplementing the general regulation with more cost-effective targeted nitrates regulation. The measures of the targeted nitrates regulation include catch crops, energy crops, early establishment of winter crops etc. all of which reduces the risk of soil erosion. The Danish Nature Conservation Act also protects land and soils in designated areas. According to the Act, the natural conditions in designated Natura 2000 areas must not be changed and certain harmful activities are prohibited. The Act does not prohibit the use of fertilizers and pesticides in general, but the application must not be intensified. If, through a subsidy support scheme, a total stop on use of fertilizers and pesticides is introduced in an area, the farmer may as a general rule not subsequently revert to fertilizing and spraying again in this area. The regional Soil Plan supports implementation of SDG 3, 6, 11, 12, 13, 15 and 17.	4a, 4b

Question	Information	Source
What are the main activities identified at national level for implementing the land-soil related SDGs?	Although Denmark is not specifically monitoring degradation of agricultural soil there is an extensive sampling program called Kvadratnettet, where soil organic carbon contents are measured, and the modelled erosion data is being prepared by Aarhus University. The targeted nitrates regulation is supplemented by subsidy support schemes for projects reducing the load of nitrogen to Danish coastal waters. The following projects have a nitrogen-reducing purpose, but contribute also to the protection of soils on farmland; establishment and reestablishment of wetlands, afforestation, and set-aside of carbon-rich soils in river valleys. At regional level the CRD action plan for SGD implementation was approved in 2019.	4a, 4b

References

Number	Source	Source reported by DK
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4a	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019 – answer of Capital Region of Denmark	Yes
4b	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019 – answer of Ministry of Environment	Yes
5	SURFACE project	Yes (no relevant information)
6	National Voluntary Review	
7	[additional information]	

Estonia

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy 'Estonia 2021' from 2005, reviewed in 2016, a new document expected by the end of 2019.	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Government Office Strategy Unit; Ministry of Finance	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	At the central government level, the implementation and monitoring of sustainable development issues is coordinated by the Government Office Strategy Unit, which also coordinates the strategy Estonia 2021 and drafts and monitors the Government Action Plan. This helps to maintain the coherence between main horizontal strategies. Estonia also plans to utilize the functioning of national coordination mechanism for sustainable development issues in coordinating the implementation of Agenda 2030. The Estonian Sustainable Development Commission (ESDC) was formed in 1996. It consists of nongovernmental roof-organizations which cover different fields of sustainable development (for example education, environmental protection, culture, children, health, local government, academy, companies, agriculture, etc). The Commission meets 4-5 times per year to hold thematic discussions on different sustainable development topics, discuss drafts of sustainable development related strategic action plans before they are adopted by the government and publish focus reports with policy recommendations. Coordination and monitoring also involves the inter-ministerial working group on sustainable development, which is comprised of representatives from all the ministries and the Statistics Estonia. The SD working group works on an ad hoc basis. For example, the working group has participated in compiling the set of sustainable development indicators, drafting Estonian positions for SDG negotiations, and compiling the Estonian review on Agenda 2030 implementation for the 2016 HLPF.	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Estonian Sustainable Development Commission, Coalition for Sustainable Development supports the ESDC, which is the main forum; conferences, informal exchange	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	• Estonian Rural Development Programme – soil degradation is one of the important issues to address (supporting proper crop rotation, taking soil-samples, supporting farmers to keep peat and eroded-soils as grassland, farmers training etc). • National Soil Monitoring Programme (including forest soil monitoring) – a centralised approach of soil monitoring, collecting, storing and analysing through one institution (Agricultural Research Centre – ARC) • Forestry Development Plan (until 2020) aggregates measures to preserve the diversity of flora and fauna in forests and to use forests in a versatile and effective manner, including the aim to increase forest growth and carbon sequestration through timely reforestation. Sustainable forest management is set as a main principle, it also handles prevention of damaging forest soils. For example, it underlines the need to further develop infrastructure in the forests and states that to protect water and soil, restrictions to forest management are set in the Forest Act.	4, 6

Question	Information	Source
	• New Strategic Plan for Agriculture and Fishery for 2030 and Strategic Plan for implementing EU new CAP are setting the policy measures and addressing both soil degradation as part of the environmental policy and as the asset to produce the agricultural production. • Regulation worked out but not yet approved to avoid sealing of the fertile agricultural soil.	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs and/or impacting soil and land degradation: • Elaborating the National Soil Monitoring Programme • Forming an inter-ministerial and –institutional Estonian soil policy working group to involve all the main soil-related stakeholders • Increasing the awareness of agricultural producers, promoting competitive and resource-efficient agriculture as well as innovation and knowledge transfers, improving the position of food producers in the supply chain. In addition, environment and climate change support is paid to agricultural companies (done via the measures included in the Rural Development Plan) • Collecting and providing farmers with the Big-Data information and other web-based solutions to support decision-making make in agriculture • Sharing knowledge through Agricultural Research Centre	4, 6

References

Number	Source	Source reported by EE
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Greece

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Growth Strategy in line with the SDGs, 2018	1
Which MS authorities are in charge of implementing and monitoring SDGs?	General Secretariat of the Government; Ministry of Environment and Energy and Climate Change; Ministry of Foreign Affairs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Due to the importance accorded to the planning and coordination of the SDGs at the highest political level, the Greek government decided in December 2016 to assign the task of monitoring and coordinating the national implementation of the SDGs to the General Secretariat of the Government (GSG) and in particular its Office of Coordination, Institutional, International and European Affairs (OCIIEA). The Inter-ministerial Coordination Network for the SDGs, which is led by the GSG/OCIIEA, has been primarily established for the purpose of better coordinating line ministries and enhancing their shared commitment and responsibility in implementing the SDGs. The Ministry of Environment and Energy contributes significantly to the work of the Inter-ministerial Network, since it is thematically/technically responsible for the implementation of 7 out of the overall 17 SDGs (i.e. SDGs 6, 7, 11, 12, 13, partly 14 and 15).	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Inter-ministerial Coordination Network for SDGs, consultation through GSG/OCIIEA; Economic and Social Council of Greece provides the main platform for stakeholders, ongoing dialogue	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies related to either SDGs and/or land degradation: • Rural Development Programme of Greece 2014-2020 • Eight National Priorities have been established including strengthening the protection and sustainable management of natural capital as a base for social prosperity and transition to a low-carbon economy. • Law 4351/2015 adopted in 2015 on the development of Management Plans for all the grazing land of the country. This legislation contributes substantially to the rational management, exploitation and distribution of grasslands, as well as to the support of livestock farming	3, 6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • Some of the practices implemented are: (a) reforestation of degraded natural areas, (b) minimizing ground water pollution, € restoring degraded terracing land, (d) applying measures on protection of high ecological importance areas (NATURA 2000), € improving soil physical properties by applying sustainable LMPs, (f) assessing land capability on grazing capacity for sustainable land management, (g) applying organic farming in selected crop productions,	3, 6

Question	Information	Source
	(h) applying measures on soil erosion reduction, (i) assessing land degradation and desertification risk and selection of appropriate measures for mitigation. • Some of the restoration and rehabilitation practices are the following projects: (a) Integrated land management of pastures, (b) daily national maps of forest fire risk sensitivity, € protection of land of high productivity, € rules of good agricultural management, (f) various plans for forested areas after a forest fire, (g) regional plans on ground water pollution from agricultural activity, etc. • Promoting actions in monitoring land degradation in olive groves by providing extra subsidies in the farmers applying 'integrated land management' • Providing economical support to farmers for applying measures on environment protection (Agricultural Set Aside Project) • Mobilizing farmers in applying new technologies on protection of the environment and increasing income (European Research projects such as iSQAPER, LEDDRA, DESIRE, DESERTLINKS, etc). • Promoting of environmentally friendly land management practices by receiving extra product price (organic farming) • Setting agricultural land aside action for a certain period using economical drivers • Planning synergies on DLDD have been undertaken by: (a) informing land user and policy makers on the effects of land degradation and desertification and the importance on combating DLDD by organizing conferences, writing leaflets, organizing web pages, etc., (b) by applying existing knowledge on combating DLDD in pilot areas (community level) and analyzing the effectiveness of existing policies and formulating new policies and planning actions, if necessary, (European research projects, MED projects, etc.) • Sharing experience in other countries by experts in topics such as olive plantations expansion in areas vulnerable to desertification, management of pastures in overgrazing lands, water management and harvesting in irrigated cropland, protecting land from land degradation processes such as soil erosion and 124alinization, facing drought under adverse climatic conditions, etc. • Participation of Greek Institutes and Universities in European Environmental Research Projects, • Executing national projects on environmental protection, collaboration of institutes and universities with local communities in technology transfer on land resources management, etc. Such actions have been undertaken by the execution of the European Mediterranean projects such as Archimed, Life, etc. • National Geographic Information Database of the country's grasslands is planned to be established. • Updating of the national action plan against desertification in order to reflect new challenges and the revised strategic and operational objectives of the International Convention to Combat Desertification (UNCCD), as well as strengthening partnerships and joint planning with other relevant international conventions, including the Convention on Biological Diversity (CBD) and the UN Framework Convention on Climate Change (UNFCCC) is also treated as priority.	

References

Number	Source	Source reported by EL
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Spain

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Sustainable Development Strategy since 2007, action plan (2018-2020) to prepare long-term sustainable development strategy 2030	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Prime Minister's Office and High Commissioner for the Agenda 2030	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	High Level Group, including focal points at various ministries (Foreign Affairs and Cooperation, Ecologic Transition, Public Works, Economy), academics and research organisations	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information provided	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information provided	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Sustainable Development Council, including experts, multi-stakeholder councils	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Act 43/2003 establishes the following principles that are directly relevant to SDG 15: balance the multifunctionality of uplands and respect environmental, economic and social values; conduct forestry planning in the framework of territorial planning; encourage productive activities in woodlands areas and in associated economic sectors; create employment and develop the rural environment; preserve, improve and restore the biodiversity of ecosystems and forest species; ensure the participation in forestry policies of the economic and social sectors affected; apply the precautionary principle in all interventions; adapt upland areas to climate change; define and treat forests as green infrastructures, in acknowledgment of this natural capital and its value in alleviating the impact of climate change. Spanish forestry policy is addressed in the following documents, which constitute the basic framework for the management actions taken by the Autonomous Communities: the Spanish Forest Strategy (1999), the Spanish Forest Plan (2002-2032), the Programme for National Action against Desertification (2008), the National Plan for Priority Action to Restore Water and Forest Resources (2001) and the National Plan to Ensure the Legality of Commercialized Wood (2015) In addition, each Autonomous Community has specific planning instruments for its territorial area.	6
What are the main activities identified at national level for implementing the land-soil related SDGs?	No information provided	

References

Number	Source	Source reported by ES
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Finland

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	'The Finland we want by 2050 – Society's Commitment to Sustainable Development' 2013, updated 2016.	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Prime Minister's Office; Finnish National Commission on Sustainable Development (FNCSD); Ministry of Foreign Affairs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Finnish National Commission on Sustainable Development (FNCSD), Inter-ministerial Network Secretariat, with 11 line ministries	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	FNCSD provides a framework for broad stakeholder participation; Development Policy Committee – multi-stakeholder and parliamentary body	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policy identified as relevant to SDGs (and likely impacting soil and land degradation: • National Sustainable Development Objectives - assessment of Finland's performance in the implementation of the Agenda 2030 Goals and targets, including a target on annual change in forest area and protection of terrestrial sites important to biodiversity	6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified likely impacting soil and land degradation: • Afforestation in all land categories sums up altogether 1.040 km2, most typically old pasture (grassland) and abandoned cropland are being returned to tree-covered/forest areas • Drained peatlands (used for instance for forestry) are being restored back to peatlands both in public as well as privately owned lands. The amount of restoration is a couple of thousands of hectares annually and usually allocated areas with significant nature/biodiversity values	3

References

Number	Source	Source reported by FI
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

France

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy 2015-2020, adopted in 2015, SDG roadmap to be prepared by 2019	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Inter-ministerial Delegate under the Prime Minister and the Ministry of Environment	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	All ministries are responsible, each has a focal point responsible for the selected SDGs; Inter-ministerial Committee for Development Cooperation	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	One of the strategic focuses outlined in the National Voluntary Review: • Manage the extension of artificial land cover and the degradation of soils and the natural environment	6
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	National Council for Sustainable Development coordinating stakeholders' participation, participatory process of roadmap elaboration	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as relevant to SDGs (and likely impacting soil and land degradation): • The Ecophyto 2 plan renewing the commitment to halve the use of pesticides by 2025, by encouraging agro-ecological practices and by issuing low-pesticide certificates to encourage distributors to act. • Ambition Bio 2017 programme which aims at increasing organic land from 4.14% of the French utilisable agricultural area in 2014 to 8% by 2017	6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified as relevant to SDGs (and potentially mitigating land degradation/desertification): • Issuing low-pesticide certificates to distributors and encouraging agro-ecological practices through the Ecophyto 2 plan • Creating Coherent Territorial Planning Schemes in France (SCOT) non-obligatory territorial planning instruments for a group of towns aiming at ensuring the sustainable development of balanced land use types and restricting space consumption. Following the current territorial reform, it is expected that SCOT would be developed at regional level and therefore that land take targets would be defined for each administrative region. As they are not mandatory but only strongly recommended in areas with key development challenges, such as urban and coastal areas, only 20% of the territory has developed and implemented a SCOT so far. The administrative complexity caused by the necessity to ensure compliance with multiple sectoral plans also impedes their implementation in practice.	6

References

Number	Source	Source reported by FR
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes (in French)
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Croatia

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy since 2009, work underway on National Development Strategy 'Croatia 2030', mapping the links to SDG	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Foreign and European Affairs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	The National Council for Sustainable Development (CSD) is chaired by the Prime Minister, and its members are heads of relevant ministries and agencies of the Government of the Republic of Croatia, the Office of the President and the Croatian Bureau of Statistics. It is also planned that representatives of other sustainable development stakeholders will participate in the work of the Council in an advisory role, namely representatives of regional self-government units, the economic sector, interested scientific and professional public and civil society representatives.	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	The CSD provides a framework for stakeholder participation, online consultations on the National Development Strategy	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as relevant to SDGs which are likely to impact soil and land degradation: • The Constitution of the Republic of Croatia explicitly states that the sea, sea coast and islands, water, air space, mineral and other natural resources, as well as land, forests, flora and fauna and other parts of nature, and things of economic and ecological importance, determined by law as being of interest to Croatia, enjoy a special protection by the state • Forests Act adopted in 2018 defines the general and economic functions of forests and prescribing sustainable forest management in a way that reflects their biodiversity, productivity, capacity for regeneration, vitality and potential to fulfil the corresponding ecological, economic and social functions at the local, national and global level, at present and in the future • The Environmental Protection Act and the Nature Protection Strategy of the Republic of Croatia for 2017-2025 ensure comprehensive preservation of the quality of the environment and the preservation of the biodiversity in nature as one of the most important resources • The Agriculture Act adopted in 2019 defining the measures of agricultural policy and rural development, direct support measures and market regulation	6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • increasing funding for biological restoration of state forests from EUR 61.98 million in 2017 to EUR 68.32 million in 2018, while in 2019, plans for forest growing and restoration amount to EUR 70.93 million in total. For the purposes of forest growing and restoration (preparing habitats for filling and afforestation, planting and sowing, conversion, restoration and post-fire rehabilitation plans), EUR 9.95 million were used in 2017, EUR 9.74 million in 2018, and the planned amount for 2019 is EUR 10.42 million • Invest additional efforts to reduce exposure of the population to environmental pollution (water, air and soil) and to reinforce the environmental factors by doing a health impact assessment with the industrial facility construction and other potential environmental polluters	6

References

Number	Source	Source reported by HR
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Hungary

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Framework Strategy on Sustainable Development adopted in 2013, for the period 2012-24	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Prime Minister Office; Ministry of Foreign Affairs, Ministry of Technology and Innovation, Ministry of Agriculture	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	The Directorate for Environmental Sustainability created in 2015 is responsible for long-term sustainability issues, which arch over governing cycles. The Directorate maintains contacts with national and international bodies, educational institutions and organisations and also prepares background information and supports the President's Office in issues related to sustainable development. The Hungarian National Assembly ensures the realization of the sustainable development framework by adopting the Fundamental Law, the National Framework Strategy for Sustainable Development, and other SD relevant laws.	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	National Council for Sustainable Development, includes various stakeholders such as academics and civil society organisations, civil society roundtable, Business Council for Sustainable Development	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as relevant for SDGs and/or land degradation: • Act on Arable Land (129th of 2007): describing the framework for soil conservation including soil nutrient management, conserving soil organic matter, and erosion control on plots susceptible to erosion. These measures are incorporated into the Hungarian implementation of the EU Common Agricultural Policy • Modification of the Forest Act in 2017: maintaining and updating the solid basis of sustainable forest management that protects, restores and promotes sustainable use of terrestrial ecosystems, sustainably manages forests, combat desertification, and halts and reverses land degradation and halts biodiversity loss. The act reinforces the role of forests in nature conservation, considering climate change and related, predictable consequences, it also reduces the administrative burden, simplifies procedures, and gives more responsibilities to private forestry • Fundamental Law of Hungary came into force on 1 January 2012 stating that 'All natural resources, especially agricultural land, forests and drinking water supplies, biodiversity – in particular native plant and animal species – and cultural assets shall form part of the nation's common heritage, and the State and every person shall be obliged to protect, sustain and preserve them for future generations.' • The National Framework Strategy on Sustainable Development of Hungary: serving as the main framework for the realization of sustainable consumption and production policies with several sectoral strategies and policy documents (majority of them contain commitments on sustainable land management and against land degradation: - the revised National Climate Change Strategy (2017–2025, with an outlook to 2050); - Renewable Energy Utilization Action Plan (2010–2020); - National Environmental Technology Innovation Strategy (NETIS, 2011–2020);	3, 6

Question	Information	Source
	- National Forestry Strategy (2016–2030); - National Landscape Strategy - National Rural Development Strategy - National Strategy for the Conservation of Biodiversity (2015–2020); - National Strategy on the Preservation of Food Genetic Resources (2013–2020); - National Waste Management Plan (2014– 2020) - National Water Strategy (Jenő Kvassay Plan) • National Environmental Remediation Program was established in 1996 for the identification, assessment, and remediation of contaminated land and groundwater	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified as relevant for SDGs and/or land degradation: • EU funding and the Hungarian subsidies offered to encourage biodiversity-friendly practices on vulnerable locations. Since 2008, farmers have met cross compliance requirements in the agricultural area if they apply for direct payments. Cross compliance rules, such as crop rotation, protection against erosion, providing minimal soil cover, and irrigation, contribute to sustainable agricultural production and the efficient use of natural resources. • Subsidies supporting afforestation and forest rehabilitation or environmental-friendly aquaculture practices. Hungary develops agroforestry countrywide - its experience is distributed internationally and resulted in several cooperation projects within Europe • Integrating national and regional territorial spatial plans and the plan for the priority. The system is based on harmonised basic maps in the real estate register, and the values that need protection can be defined more accurately within the territorial and settlement management plans. As a result, the protection of forests, croplands with exceptional productivity, landscape and traditional uses of land, inland and ground waters is further ensured • Decreasing use of the chemical fertilizers through Food Supply Chain Program. The small farmers and small-scale producers participating in the program use far fewer chemicals and artificial fertilizers and more manpower than large 'industrialized' farms through. Local products and less packaging result in lower environmental loads. • Year of the Local Products initiative introduced in 2015 – activities included encouraging the consumption of local products, training local producers to implement short supply chains as well as to raising awareness by publishing brochures and through an online campaign • The Homestead Development Program introduced in 2016 with the aim to save the values of this specific small-scale kind of farm management and to improve living standards and farming conditions • In line with the objective of reducing the degradation of natural habitats, 112 individual projects had been completed by 2015 ensuring the implementation of direct nature conservation interventions, such as the restoration of degraded habitats, improving site management infrastructure, and reducing the negative impacts of linear infrastructure. These measures targeted over 100,000 hectares of protected areas and/or Natura 2000 sites, corresponding to approximately 5% of the national Natura 2000 network. As a continuation, a new package of interventions was initiated in 2015, including 92 individual projects. It will include an additional 100,000 hectares of land, and as a result, the conservation status of at least 10% of species and habitats of community interest will improve.	3, 6

References

Number	Source	Source reported by HU
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Ireland

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	'Our Sustainable Future - A Framework for Sustainable Development for Ireland', 2012 (to be revised 2019); SDG National Implementation Plan 2018-2020	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Minister for Communications, Climate Action and Environment; Ministry of Foreign Affairs; Ministry of Trade	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	A Senior Officials' Group [SOG] on the SDGs, made up of Assistant Secretaries from all Government Departments, has been established to provide strategic coordination and to report, as required, to Cabinet. This Group is chaired by the Department of the Taoiseach [Prime Minister], with support from the National Sustainable Development Unit. It is assisted by an SDG Interdepartmental Working Group [IDWG], again comprised of representatives from all Government Departments. The IDWG is responsible for developing national policy in relation to SDG implementation, preparing Ireland's VNRs and other SDG reports, and developing national arrangements of stakeholder engagement.	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	SDG Stakeholder Forum provides a framework for consultation with a broad range of stakeholders, consultations on the SDS in 2012	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as relevant to SDGs (and likely impacting soil and land degradation): • National Biodiversity Action Plan 2017-2021 with seven strategic objectives, including conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands • Rural Development Plan 2014-2020 with a central priority of restoring, preserving and enhancing ecosystems related to agriculture and forestry • The Forestry Programme 2014-2020 - higher support for broadleaf planting and also measures to promote the creation of new native woodlands and the appropriate restoration management of existing native woodlands, to promote associated biodiversity and other ecosystem services • The 2016 National Peatlands Strategy and the National Raised Bog SAC Management Plan outline the way forward for conservation and restoration of important peatland sites which will also combat desertification and halt and reverse land degradation and halt biodiversity loss • Food Wise 2025 - sustainable food production building on national advantages, with specific objectives articulated in the strategy. • DHPLG River Basin Management Plan (2018-2021) and Water Services Policy Statement 2018 with the aim of protecting and restoring water related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes by 2020 • DBEI Chemicals Act 2008 facilitating the enforcement of the following EU Regulations concerning chemicals: REACH Regulation; CLP Regulation; Rotterdam Regulation concerning the export and import of dangerous chemicals under the Rotterdam Convention; and Detergents Regulation. The aim of the Act is to achieve the environmentally sound management of chemicals and all wastes throughout their life cycle and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	6

Question	Information	Source
	• DCCAE Waste Management Policy, Legislation and National Implementation Plan on Persistent Organic Pollutants Comprehensive policy (2012 'A Resource Opportunity') with the goal to ensure that the disposal and recovery of waste does not present a risk to water, air, soil, plants, human health and animals. Legislation also sets a general duty on everyone not to hold, transport, recover or dispose of waste in a manner that causes or is likely to cause environmental pollution. Implementing legislation covers national priorities in addition to EU and international obligations	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • Developing and implementing agri-environment schemes such as the Green Low-carbon Agri-Environment Scheme [GLAS] and Locally Led Agri-Environment Schemes [LLAES] - to ensure that a measurable net gain for biodiversity is attained. • Mobilizing significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.	6

References

Number	Source	Source reported by IE
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Italy

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy 2017	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Presidency of the Council of Ministers; Ministry of Foreign Affairs; Ministry of Environment	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	The Presidency of the Council of Ministers will take the lead in coordinating and managing the Strategy, with the support of the Ministry for the Environment, Land and Sea and the Ministry of Foreign Affairs and International Cooperation, respectively for the domestic and external dimension. Government offices with dedicated functions: Ministry of Foreign Affairs (MOFA) who has the role of a Focal Point, acting as interface with the UNCCD and dealing with international activities, Ministry of the Environment and Territorial Protection (IMELS), the main body with jurisdiction relating to combating desertification in the national Territory, Ministry of Agricultural and Forestry Policies; • Government offices with sectoral functions, including partial: Ministries of Health, of Infrastructure, Productive Activities, Agricultural and Forestry Policies, Cultural Properties, Foreign Affairs, Infrastructure and Transport; Civil Protection Department; • Technical and scientific bodies: ISPRA- Institute for the Environmental Protection and Research, ENEA – Agency for New Technologies, Energy and the Environment, CNR – National Research Council, INEA – National Institute for Agricultural Economics, etc. At the local/sub-national level: • Regional bodies with legislative, management and monitoring powers: Regions and Autonomous Provinces • Regional bodies with management and monitoring powers: Provinces, Municipalities, Mountain Communities • Authorities with sectoral competence: Protected Areas Organizations, River Basin Authorities – as combined State-Regional bodies responsible for planning and programming, through the hydrograhic basin plans, etc. • Environmental monitoring and other specialized structures: Regional environmental protection agencies; National Forestry Corps, agriculture development agencies, etc. In September 1997, Italy Government established a National Committee to Combat Desertification – NCCD as NCB, based on the Ministry of Environment. As already mentioned, the NCCD prepared the National Action Programme (NAP) to combat drought and desertification, adopted with CIPE resolution, December 21, 1999, n. 229.	4, 7
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	The achievement of SDGs related to land take (SDG target 11.3: halt soil consumption) and land degradation (SDG target 15.3: strive to achieve LDN) are adopted in the National Strategy for Sustainable Development. These targets have been defined at technical level. Review and update of specific target process is ongoing in order to start the process to mainstream these targets into national and local planning and legislative framework.	3
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Forum on Sustainable Development, coordinated by the Ministry of Environment, Italian Alliance for Sustainable Development engaged in strategy development, Regional Working Table & Italian Network of Environmental Agencies	1

Question	Information	Source
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	At national level, many soil protection measures are included in policy instruments that not directly connected to soil protection: • Legislative Decree n. 152/2006 • Legislative Decree n. 49/2010 • Law 164/2014 (which promotes the implementation of 'integrated interventions' that indirectly consent the conservation and improvement of the soil), and policies for contaminated sites • National Strategy for Biodiversity (SNBD) considers among the main threats the soil loss processes as well as the land use changes resulting in loss, modification and fragmentation of habitats • National Strategy for Adaptation to Climate Change (SNAC) considers land degradation and desertification as one of the climate change impacts areas: climate change exacerbate the negative effects of several pressure anthropogenic and environmental factors • National Strategy for Sustainable Development Goals; • A future Plan of Action will be developed by the end of 2017 and will include numerical and quantitative targets at 2030, as well as monitoring and review mechanisms and analytical models capable of measuring the impacts of policies on the NSDS objectives • Proposed legislative initiative on 'Limit soil consumption and re-use of built-up areas' that sets limits to soil consumption, focusing thereby on transformation of the existing urban areas and not on the new urbanization, through a regulatory instrument that combines constraints and incentives. The proposed text specifically recognizes the soil as a 'common good' and 'resource' which ensures non-renewable-ecosystem functions and services. Furthermore, the concept of reuse and regeneration of existing built-up areas are defined as fundamental principles in land and urban planning • National Plan on the Sustainable Use of Pesticides; • National Action Plan to Combat Drought and Desertification (PAN); • Protocol of Soil Conservation of the Apine Convention; • Strategic Plan for research and innovation in the agricultural-food and Forestry sector, National Plan on biodiversity of agricultural interest • Framework program for the forestry sector	3, 4, 6, 7
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs and/or impact soil and land degradation: • National Committee to Combat Desertification established in 1997 • Identification of causes of decline in productivity in dryland forests: selecting appropriate measures of rehabilitation and rehabilitation measures in 200 sq km. (by 2030, national level) • Identification of causes of decline in productivity in shrubs, grasslands and sparsely vegetation in drylands: selecting appropriate measures of rehabilitation and rehabilitation measures in 50 sq km. (by 2030, national level) • Identification of causes of decline in productivity in cropland in drylands: selecting appropriate measures of rehabilitation and rehabilitation measures in 1.000 sq km. (by 2030, national level) • No net land take (by 2050, sub-national level) Some regions (Emilia Romagna, Veneto and Lombardia) issued specific laws aiming to achieve the 2050 goal of "no net land take". In some case (Lombardia) new building should necessarily occur in areas already urbanized, degraded or abandoned, in other case (Veneto and Emilia Romagna) the public decision-makers established the largest limit areas (expressed in hectares or as percentage) still available until 2050 on the basis of the data send by local municipality	3,7

References

Number	Source	Source reported by IT
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	Italy Summary Report	Yes

Lithuania

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy 'Lithuania 2030' adopted in 2012, update planned for 2020	1
Which MS authorities are in charge of implementing and monitoring SDGs?	National Commission for Sustainable Development (NCSD) chaired by the Prime Minister, Ministry of Environment	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	NCSD includes other ministries and NGOs; National Progress Council (to be merged with the NCSD). The NCSD is headed by the Prime Minister of the Republic of Lithuania and includes the ministers and representatives of non-government organisations, business associations and research institutions. The main functions of the NCSD are to analyse and assess biennial reviews on the implementation of the National Strategy for Sustainable Development and make proposals to the Government of the Republic of Lithuania concerning the updating of the NSSD and sustainable development priorities with account of the environmental, social, economic and cultural indicators of the state. Under the Government resolution approving the NSSD, the Ministry of Environment is obliged to coordinate the implementation of the NSSD. With a view to ensuring the appropriate implementation of the NSSD, the Ministry of Environment has established a working group of experts which in cooperation with other national authorities help the Ministry of Environment to prepare NSSD implementation reviews for presentation to the NCSD. Lithuania finds the proper implementation of the 2030 Agenda very important. Therefore, a great deal of attention is devoted to its legal framework and institutional implementation mechanism. This process involves all national authorities, their work being coordinated by the Ministry of Environment in cooperation with the Office of the Government of the Republic of Lithuania.	1, 6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	NCSD acts as the main framework, Non-government Development Cooperation Organisation provides an additional platform.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as relevant to SDGs (and likely to impact soil and land degradation): • Lithuanian Rural Development Programme 2014–2020 launched in 2015, consists of various measures designed to promote the competitiveness of agriculture, protect the environment and conserve biodiversity, and improve the quality of life in rural areas • Law on Forests regulating reforestation and forest protection and use and creating legal preconditions for the management of forests of all forms of ownership on the basis of the uniform principles of sustainable forest management • National Forestry Sector Development Programme 2012–2020 laying down the strategic forestry sector objective, other forestry development objectives and tasks, their assessment criteria, the funding for implementation and the implementing institutions • National Environmental Strategy providing three environmental protection policy objectives for forests: a) conservation and increase of forests and forest resources,	6

Question	Information	Source
	b) conservation and formation of sustainable forest ecosystems c) assurance of rational exploitation of forest resources	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • Support given to about 3 000 entities for organic farming and the farming of fruit, berries and vegetables in accordance with the national agriculture and food quality system (support is provided to an area of more than 200 000 ha). With a focus on environmental protection and sustainable development, support is to be provided to 70 000 entities and their activities related to the promotion of environmentally friendly farming practices in areas containing natural handicaps • Collecting, analysing and sharing information related to desertification as well as sharing experience and technological knowledge	6

References

Number	Source	Source reported by LT
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Luxembourg

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy 2018	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Minister for Sustainable Development and Infrastructure; Minister for Development and Cooperation	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Inter-departmental Commission for Sustainable Development – coordination across all relevant ministries	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	High Council for Sustainable Development, including sectoral experts; roundtables with NGOs and private sector	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	No information provided	
What are the main activities identified at national level for implementing the land-soil related SDGs?	No information provided	

References

Number	Source	Source reported by LU
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes (in French)
7	[additional information]	

Latvia

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Sustainable Development Strategy 'Latvia 2030' since 2010, a process for a new national development plan underway	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Cross-Sectoral Coordination Centre; Ministry of Foreign Affairs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	National Development Council (NDC), chaired by the Prime Minister, including Minister of Finance, Education and Science, Economics, Environmental Protection and Regional Development	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	NDC includes various stakeholders, regional and national forums; Civil Society Report at HLPF	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified likely to impact soil and land degradation: • Law on Pollution adopted in July 2001 with several regulations concerning soil quality • Cabinet of Ministers Regulations No.483 (November 2001) - 'Inventory and registration of contaminated and potentially contaminated areas' • Cabinet of Ministers Regulations No 804 (October 2005) – 'Quality Standards for Soil and Ground'	3
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified likely impacting soil and land degradation and/or relate to the SDGs: • Agri-environmental subsidies are given to farmers who use environmentally friendly farming methods that reduce erosion and preserve plant nutrients in the soil • Economic incentives for the increase in agricultural production on agricultural land, which grew from 88,6% in 2010 to 92% in 2016. Agricultural land transactions in terms of number and area have decreased, but the price of land has increased one and half times. • Rehabilitating historically contaminated sites through European Union Structural Investment funds and Latvian-Swiss Cooperation Program 'Remediation of historically polluted sites in Sarkandaugava'	3, 6

References

Number	Source	Source reported by LU
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Malta

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy since 2007, new strategy 2020-2050 under preparation	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Sustainable Development, the Environment and Climate Change	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Focal Point Network falling under the organisation of the Ministry for the Environment, Sustainable Development & Climate Change (MESDC) involves the participation of a senior representative from each Government Ministry. The Network meets periodically and has at its objective the sharing of information on progress or developments related to sustainable development in Malta.	6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	The Ministry is currently drafting a Sustainable Development Strategy with a vision up to 2050 and it will be incorporating soil protection and land use policies which will be linked with the SDG framework and other national strategies.	4
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	The Sustainable Development Network provides information and training programmes, a platform for exchange with civil society, new strategy to be drafted in consultation.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	The main national policy enabling the implementation of the LDN targets, along with the soil and land SDGs is the 'National Action Plan on Desertification and Land Degradation in the Maltese Islands'. The Environment Protection Act (Cap. 549) marks some of Malta's key sustainable development initiatives and provides a legislative framework. Through the Act, government can integrate sustainable development in its operations as well as raise awareness on sustainable development issues across all strata and sectors of government and society in general, hence integrating sustainability into all areas of government policy and decision-making. Ministry for the Environment, Sustainable Development and Climate Change (MESDC) is currently drafting a Sustainable Development Strategy with a vision up to 2050 and it will be incorporating soil protection and land use policies which will be linked with the SDG framework and other national strategies. National Agricultural Policy for the Maltese Islands 2018-2028: This vision agreed upon between Government entities, representatives of the private sector and the farming community contemplates i.e. fostering sustainability of farming activities by adapting to the local geo-climatic conditions and ensuring that farmland is managed by genuine farmers for agricultural purposes and related activities	4, 6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • Public consultation in November 2017 on amendments to the legal framework for the protection of trees in Malta initiated by the Government. The amendments propose broadening the protection currently in place (focused on the type and age of the tree concerned) to a protection focused on the value of specific trees in urban public spaces • Afforestation and development of a family park at Il-Qortin ta' Isopu, in the village of Nadur. To date, the project has involved significant earth-moving and re-contouring works covering an area of around 20,000m2, included the afforestation of the majority of the area, and the	6

Question	Information	Source
	formation of new levels in order to avoid overspill of material onto the surrounding protected area, which is mainly garrigue. Works also included the construction of a reservoir and the planting of approximately 3,900 trees and shrubs. Moreover, the levelling of soil, the installation of an irrigation system, and the formation of paths, have been completed earlier this year.	

References

Number	Source	Source reported by MT
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

The Netherlands

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	No overarching sustainable development strategy, Green Growth Policy Paper 2013, 'Confidence in the Future' 2017-2021	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Foreign Affairs, including the Minister of Political Affairs and the Minister of Trade and Development Cooperation	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	The coordination of SDGs is at the Ministry of Foreign Affairs The following two institutes are involved in monitoring the SDGs: • Statistics Netherlands (CBS) • Environmental Assessment Agency (PBL) Land planning and soil protection are competences of municipalities and provinces. Both organizations have signed the 17 SDGs and underline the implementation of the goals. In general the indicators for soil are connected to the soil threats.	4
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Association of Netherlands Municipalities stimulating local governments, taking part in the inter-ministerial working group.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Phosphate Reduction Scheme in 2018 - package of restrictive measures including a reduction in the number of livestock aiming to further reducing phosphate, nitrogen and ammonia emissions	6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • State funding provided to research and innovation in other forms of sustainable agriculture such as permaculture and environmentally friendly farming, as well as to initiatives promoting short logistic chains and marketing of local products. Activities identified for implementing the land-soil related SDGs: • May 2019 a congress is organized about the soil related SDGs: 500 participant from all kind of Dutch soil networks. There is a "growing" awareness about the importance of land and soil for implementing the SDGs. An increasing need for multifunctional land use. • For 3 years a special working group within the Common Forum on Contaminated Land in Europe discusses this subject and works on exchanging information. The Netherlands leads the working group.	4, 6

References

Number	Source	Source reported by NL
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Poland

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Strategy for responsible development until 2020 (with perspective to 2030), 2017	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Entrepreneurship and Technology	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Coordination Committee for Development Policy (CCDP), with representatives of all ministries. The Council of Ministers, led by the Prime Minister, defines the country's development objectives and the manner in which they are to be achieved under respective development policies. The Council of Ministers adopts Poland's development strategy and its updates, and determines the manner in which its objectives are to be achieved, including the necessary financial outlays. Recognising such a complex programme as the Sustainable Development Goals requires a comprehensive approach, strong cooperation and involvement of representatives of various circles in the process, the Task Force for the Coherence of the Strategy for Responsible Development by 2020 (with a perspective to 2030) with the 2030 Agenda and its Sustainable Development Goals was appointed. It is a key body of cooperation between the administration and social and economic partners with regard to building an appropriate mechanism of coordination and implementation of SDGs in Poland.	1, 6
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	CCDP may involve representatives of local authorities, academia and civil society organisations, depending on needs	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified that are relevant to SDGs and/or land degradation: • Strategy for Responsible Development, adopted by the Council of Ministers on 14 February 2017 formulating the Polish perspective for actions for sustainable and responsible development, including protection of soils from degradation. • Rural Development Programme 2014-2020: measures include the development of forest areas and improvement in forest viability, Agri-environment-climate measures, Organic farming. • The Government Policy for the Development of Public-Private Partnerships adopted in 2017. Its main purpose is to increase the scale and efficiency of infrastructure investment implemented through the PPP formula. Public-Private Partnerships in Poland are considered as a one innovative way of providing and financing high-quality public infrastructure, e.g. waterworks or sewage works. The investments are expected to help with mitigating the amount of wasting water resources and, in the sequel, to mediate the risk of desertification.	3, 6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified likely impacting soil and land degradation: • Promoting innovative solutions and educating farmers and on i.e. fertilising responsibly and reducing usage of artificial fertilisers through the (WATERPROTECT Project) and better water management, especially in times of the drought (OPERA Project)	3

Question	Information	Source
	• Afforestation of marginal agricultural land that contributes to the expansion of existing forest complexes, as well as to the increase in water retention, reduction of erosive processes and improvement of microclimate. • State subsidies to insurance premiums for agricultural producers who concluded agricultural crop and livestock insurance contracts against the risk of damage caused by a hurricane, flood, heavy rain, drought and other negative factors related to natural hazards	

References

Number	Source	Source reported by PL
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Portugal

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Sustainable Development Strategy since 2007 (expired in 2015)	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Ministry of Foreign Affairs, Ministry of Infrastructure and Planning	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	A network of focal points at different governmental departments	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	National Council for the Environment and Sustainable Development (CNADS): academics, business, NGOs	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	The public policy of soil, land use and urban planning' (LAW n. 31/2014 of May 30) specifically deals with the containment of urban sprawl (SDG 11) Other policies linked to SDGs which may impact soil and land degradation: • 2014-2020 Rural Development Programme for mainland Portugal: promotes a more efficient use of resources (water, soil and energy) • Azores 2014-2020 Rural Development Programme (PRORURAL+): includes measures on soil erosion • Forest Reform • National Reform Programme • National Programme for Spatial Planning Policy • National Forestry Strategy • Forestry Law The National Action Programme to Combat Desertification is also highlighted as important for desertification. Measurers include: crop diversification (greening), soil conservation and efficient use of water provided for in the RDP2020,the promotion of forestry, giving priority to areas susceptible to desertification, maintenance of agricultural activities in less-favoured areas in order to reduce the risk of land abandonment, and the production and certification of biologically diverse seed mixtures, ensuring more sustainable and extensive livestock production, allowing adaptation, increasing production and the quality of fodder and higher rates of CO2 sequestration, improving overall soil quality	5, 6

Question	Information	Source
What are the main activities identified at national level for implementing the land-soil related SDGs?	Themes identified in the National Voluntary Review: • Value the territory and promote the biodiversity • Promote classified areas as strategic assets for national development • Strengthen nature conservation policies, improving the overall state of habitats and species • Promote the sustainable management of national forests by improving its resilience and environmental value • Combat desertification and promote crop diversification, the conservation of the soil and the efficient use of water resources	6

References

Number	Source	Source reported by PT
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Romania

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Revised National Sustainable Development Strategy, 2018	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Department for Sustainable Development (DSD) under the Prime Minister Office	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Inter-ministerial Committee for the Coordination of the Integration of Environmental Protection into Sectoral Policies and Strategies at the National Level, led by the Minister of Environment. In Romania, the Ministry of Environment is responsible for contaminated lands, the Ministry of Water and Forests is responsible for flooding, the Ministry of Regional Development and Public Administration for landslides and the Ministry of Agriculture and Rural Development for degradation of land.	1, 4
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	The National Strategy for Sustainable Development (SNDD) of Romania reaches some objectives for implementing of the LDN target and land-related SDGs	4
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Federation of Romanian Non-governmental Organisations for Development (FOND), consultation and awareness-raising events organised by the DSD, planned a participation body and an independent societal coalition.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as enabling the implementation of the LDN target and other soil and land-related SDGs: • National Strategy for Sustainable Development from 2008 - some objectives for implementing of the LDN target and land-related SDGs are reached by Romania • Government Ordinance no. 81 of 25 August 1998 regarding on some measures for afforestation of degraded land with its definition Art. 2. - Degraded lands within the meaning of the present Ordinance are considered to be lands that, through erosion, pollution or the destructive action of anthropogenic factors, have lost their plant production capacity, namely: a) areas with very strong and excessive surface erosion; b) deep-erosion lands - pits, ravines, torrents; c) lands affected by active landslides, crashes, spills and muddy leaks; d) sandy soil exposed to wind or water erosion; e) land with agglomerations of gravel, boulder, grove, rock and deposits of torrents; f) lands with permanent excess moisture; g) salty or acidic lands; h) lands polluted with chemicals, petroleum or noxious substances; i) land occupied by mining waste, industrial or household waste, loan pits, etc.; j) lands with damaged or destroyed biocenoses.	4, 6

Question	Information	Source
	• Forthcoming Law concerning the management of the potential and contaminated sites reach the aspects of the contaminated lands. This law takes over and improves the content of government decisions (Decision no. 1403/2007 on the rehabilitation of areas where land, subsoil and terrestrial ecosystems have been affected) which will be repealed. Policies identified as relevant to achieving the SDGs which likely impact soil and land degradation: • Program of Environmental Protection through Biodiversity Conservation (part of Romania Governing Program 2018-2020) • Forest Code Law No. 46/2008: includes measures to maintain the integrity of the national forestry land by forbidding the reduction of the total area of forests • Environmental Improvement Program: implemented through afforestation of degraded land, managed by the Environment Fund Administration and financed by the Environment Fund	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to achieve SDGs (likely impacting soil and land degradation): • The Green House Program - launched in 2011 to improve air quality, water and soil by reducing pollution caused by burning of wood and fossil fuels (used to produce heat and hot water) and encourage the use of clean renewable energy source • Efforts are being made in the forestry sector to combat desertification, ecological reconstruction of degraded land and soil and mitigate the effects of drought, by creating anti-erosive forest plantations and forest protection belts. • The penalties for the offenses committed in the forestry field have been tightened by the amendments to the Law No. 46/2008 - Forestry Code and Law No. 171/2010 regarding the establishment and sanctioning of forest contraventions; Activities identified to reduce desertification and land degradation: • Research studies on new strategy on desertification and the identification of degraded land in Romania	3, 6

References

Number	Source	Source reported by RO
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Sweden

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	National Action Plan 2018-2020, adopted in 2018	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Minister for Public Administration and the Ministry of Finance and Minister for International Development Cooperation at the Ministry of Foreign Affairs.	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Inter-departmental consultation group for the 2030 Agenda made of state secretaries from five ministries; inter-ministerial working group, including all ministries.	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	National Committee for the 2030 Agenda – multi-stakeholder, broad dialogue with authorities, social partners, private sector and academics.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	The National forestry programme is identified as relevant for implementing the SDGs and is likely to impact soil and land degradation.	6
What are the main activities identified at national level for implementing the land-soil related SDGs?	The National Forest Inventory covers not only forest land but also grazing areas (agricultural land which is not cropland) and wetlands. There is also a wide range of more intense monitoring on specific sites on e.g. soil compaction, leaching of nutrients on field scale, soil solution chemistry on forest plots etc.	4, 6

References

Number	Source	Source reported by SE
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	Yes
5	SURFACE project	
6	National Voluntary Review	Yes
7	[additional information]	

Slovenia

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Slovenia's Development Strategy 2030, adopted in 2017	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Government Office for Development and European Cohesion Policy; Ministry of Foreign Affairs	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Permanent Inter-Ministerial Working Group on Development Planning, with two representatives from each ministry.	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	Development Strategy of Slovenia 2030 adopted in December 2017. One goal is sustainable soil management and conservation of soil ecosystem services, prevention further degradation and rehabilitation of degraded soils.	3
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	Civil society and private sector participated in the process of drafting of the national development strategy.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	The following policies related to soil and land degradation include: • Development Strategy of Slovenia 2030 adopted in December 2017. One goal is sustainable soil management and conservation of soil ecosystem services, prevention further degradation and rehabilitation of degraded soils. • The National Environmental Protection Programme with a program of measures up to 2030 is under preparation. Within the chapter Conservation, preservation and improvement of natural capital soil issues are addressed. With foreseen soil protection and management measures, the following objectives stipulated in the draft document should be achieved: 1. increased ability to implement soil ecosystem services: o controlling the degradation processes associated with the reduction of organic matter in the soil, preventing soil erosion, preventing soil contamination, and rehabilitating and revitalizing degraded areas, o sustainable soil and land management and reduced net annual land take; 2. strengthening information and data on soil, 3. increased awareness of the importance of soil.	2, 3, 6
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to mitigate soil and land degradation: • Collecting detailed data on built-up land by the Ministry of the Environment and Spatial Planning, Directorate for Spatial Planning, Construction and Housing and the Ministry of Infrastructure	3

References

Number	Source	Source reported by SI
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	Yes
7	[additional information]	

Slovakia

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	Vision and National Development Strategy of Slovakia until 2030, 2019	1
Which MS authorities are in charge of implementing and monitoring SDGs?	Deputy Prime Minister; Ministry of Foreign and European Affairs.	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	Government Council of the Slovak Republic for the 2030 Agenda for Sustainable Development, including all ministries; Working Group.	1
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 'Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	The Government Council and the Working Group include a broad range of stakeholders; the Slovak Non-Governmental Development Organisations Platform.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as being relevant to soil and land degradation: • Law 220/2004 on protection and use of agricultural soils (complemented by law 219/2008) providing rules regarding topsoil removal, reuse of topsoil and recultivation process for taken soils. These rules are often applied and contribute to avoiding agricultural land reduction and protecting soil from several threats, including erosion and soil organic matter losses. • Regulation 508/2004 executing the law on protection and use of agricultural soils (recultivations):provides rules regarding topsoil removal, reuse of topsoil and recultivation process for taken soils • Act on Spatial Planning and Building Code (Code No. 50/1976 Zb), which makes a clear reference to sustainable spatial planning and the protection of natural resources • Regulation on land protection through urban planning and zoning, and through forest land functions restriction • Decree setting the amount of payment and specifications of payment for agricultural land consumption: not directly tackling soil organic matter losses, however, the fee is related to soil fertility: the more fertile the soil is, the higher the fee is.	7
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified to promote soil and land: • Mandatory soil evaluation for every development plan • Preventing soil degradation by steering new developments off the land of higher fertility and establishing fees for using agricultural land	7

References

Number	Source	Source reported by SK
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	Yes
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	Yes
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	Yes
6	National Voluntary Review	
7	Soil inventory	Yes

United Kingdom

Question	Information	Source
Did the Member State publish a National Sustainable Development Plan and when?	No overarching strategy, Sustainable Development Vision 2011, Action Plan 2017	1
Which MS authorities are in charge of implementing and monitoring SDGs?	No state secretary or ministerial lead, Cabinet Office acts as an external lead.	1
How do MS authorities in charge of implementing and monitoring SDGs coordinate with other, relevant MS authorities?	MHCLG (ministry of homes, communities and local government) deals with development whereas DEFRA (Department of environment, food and rural affairs) deals with food/soil and water security in England. DEFRA reviews business plans of all government departments to check environmental mainstreaming.	1, 7
Are the authorities in charge of soil protection and land planning involved in the development of indicators, SDG monitoring and implementation?	No information	
Does the National Sustainable Development Plan integrate soil and land considerations?	No information	
How does the MS engage stakeholders in the implementation of SDGs as defined in the 2030 Agenda (e.g. public consultation of stakeholders and citizens, projects, engagement of private sector)?	No stakeholder coordination.	1
What are the main national policies enabling the implementation of LDN target and other soil and land-related SDGs?	Policies identified as contributing to soil and land degradation mitigation: England • Department of Environment, Food and Rural Affairs' 25-year Environment Plan (2018). Two of the goals are improving soil health and restoring and protecting the peatland • National Planning Policy Framework by Ministry of Housing, Communities & Local Government - first published in 2012, revised in 2019 including Green Belt land policy • Safeguarding Soils in England 2009: - Defra's strategy for England Wales • National indicators for Wales: Mapping to Well-being and UN Sustainable Development Goals – this is an interactive tool that includes indicators such as concentration of carbon and organic matter in soil and area of healthy ecosystem in Wales • Policy Position in support of Woodlands for Wales, the Welsh Assembly Government's strategy for woodlands and trees • Code of good agricultural practice – Welsh's Government advice for farmers to protect water, soil and air from pollution Policies identified as supporting the implementation of the SDGs which may directly or indirectly impact soil and land degradation: • Agenda 2030: Delivering the Global Goals (2017) • Single Departmental Plan • Scotland's National Performance Framework (NPF) • The Well-being of Future Generations (Wales) Act 2015 • draft Programme for Government in Northern Ireland	6, 7

Question	Information	Source
	• Rural Development Programme (ENG) • Countryside Stewardship (and existing agreements under Environment Stewardship): financially incentivises farmers and land managers in England to protect the natural environment by: conserving and restoring habitats; managing flood risk and reducing water pollution; creating and managing woodland preserving historical features; and encouraging educational access • National Planning Policy Framework for England: development should provide net gains for biodiversity and to strengthen protection for irreplaceable habitats like ancient woodland. • Scottish Planning Policy • Forestry and Land Management (Scotland) Act 2018 • Scotland's Forestry Strategy 2019-2029 • Scotland's Strategic Plan for Biodiversity 2011-2020 • Environment (Wales) Act 2016 • Woodlands for Wales strategy: bring more Welsh woodland into management, expand its cover and increase its resilience so they can deliver more benefits • Sustainable Management Scheme programme, Wales: funding a range of projects which include a peatland element, chief among which is the Snowdonia National Park led Realising the Natural Capital of Welsh Peatlands project. This project has a very broad remit with on-the ground restoration; and, developing applications for PES support through the Peatland Code mechanism. • National Planning Policy, Wales: continued protection for Best and Most Versatile Agricultural Land	
What are the main activities identified at national level for implementing the land-soil related SDGs?	Activities identified: • Funding research on cost of soil degradation 'The total costs of soil degradation in England and Wales - SP1606' done by University of Cranfield in 2011 • Publishing briefing 'UK Soil Degradation' funded by the National Environment Research Council in POSTnote in July 2006 providing analysis on soil degradation	7

References

Number	Source	Source reported by UK
1	European Parliament Study: Europe's approach to implementing the Sustainable Development Goals: good practices and the way forward, 2019	Yes
2	Questionnaire to the Soil Expert Group Context and problem definition in view of technical preparatory work on EU Soil policy development, 2018	
3	United Nations Convention to Combat Desertification Performance Review and Assessment of Implementation System Seventh reporting process (2018)	
4	Questionnaire on the implementation of soil and land related SDGs in the EU, March 2019	
5	SURFACE project	
6	National Voluntary Review	Yes
7	Weblinks supplied as part of response to 2019 questionnaire	Yes

Annex 6 Examples of good practices/initiatives to achieve soil and land-related SDGs

List of Initiatives starting from Soil Sustainable Management

- Good practice name: UNCCD Science-Policy Interface (SPI)
- Good practice name: UNCCD and WOCAT cooperation Country: Global
- Good practice name: UNCCD Drought Initiative Country: Global
- Good practice name: 4 per 1000 Country: France-global
- Good practice name: Climate smart farming Country: Finland
- Good practice name: Soil monitoring Country: Italy
- Good practice name: Global Long-Term Agricultural Experiment Country: global
- Good practice name: Voluntary Guidelines for Sustainable Soil Management (VGSSM) Country: Global
- Good practice name: SoilCare Country: EU
- Good practice name: RECARE Country: EU
- Good practice name: EJP SOIL Country: EU
- Good practice name: LANDSUPPORT Country: EU
- Good practice name: CIRCASA Country: EU
- Good practice name: LANDMARK Country: EU
- Good practice name: Life AMDRY 4 Country: Mediterranean area
- Good practice name: land stewardship and soil stewardship scenarios OVAM Country: Belgium
- Good practice name: Guidelines on best practice to limit, mitigate or compensate soil sealing Country: EU
- Good practice name: SOS4Soil Country: Italy
- Good practice name: O.666 Circular ideas (OVAM) Country: Belgium

Initiatives starting from LDN / combating LD

- Good practice name: LDN action UNCCD /LDN target setting Country: Global
- Good practice name: LDN Fund Country: Global
- Good practice name: World Atlas of Desertification Country: Global
- Good practice name: Land Degradation Neutrality: Italy Country: Italy
- Good practice name: JustDigIt Country: Africa
- Good practice name: MFA subsidies / Great green wall Country: Africa
- Good practice name: European Environment - State and Outlook (SOER) Country: EU
- Good practice name: Initiative on Sustainability, Stability and Security (3S) Country: Africa

Initiatives starting from SDGs

- Good practice name: Land and soil related SDG project Country: EU
- Good practice name: UNCCD Peace Forest Initiative Country: Global
- Good practice name: Nicole network discussion on SDGs Country: Europe
- Good practice name: IPBES-Food Country: EU

Initiatives starting from Soil Sustainable Management

Good practice name: UNCCD Science-Policy Interface (SPI)

Good practice name:	UNCCD Science-Policy Interface (SPI)	Country:	Global
Type of initiative:	☒ Policy ☒ Practice ☐ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

An EC contract with the UNCCD provided partial funding for this work.

What is the main purpose/objective of the initiative?

To develop scientifically grounded policy proposals for consideration of the signatory Parties of the UNCCD.

Short description if the initiative/project/network

The UNCCD Science-Policy Interface (SPI) conducted a comprehensive scientific assessment and produced the technical report 'Realising the Carbon Benefits of Sustainable Land Management Practices: Guidelines for Estimation of Soil Organic Carbon in the Context of Land Degradation' provides decision guidance for the estimation of soil organic carbon (SOC) in support of appropriate deployment of sustainable land management (SLM) technologies, in order to maintain or increase carbon in the soil and contribute to the achievement of land degradation neutrality (LDN).

What are the main outputs and outcomes (take-home messages)?

See UNCCD global policy decision 16/COP.14. See pages 46-49:
https://www.unccd.int/sites/default/files/sessions/documents/2019-12/ICCD_COP%2814%29_23_Add.1-1918355E.pdf

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☐ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
☒ Desertification	☐ 6. Clean water and sanitation
☒ Flooding	☐ 7. Affordable and clean energy
☒ Soil salinisation	☐ 8. Decent work and economic growth
☒ Droughts	☐ 9. Industry, innovation and infrastructure
☒ Landslides	☐ 10. Reduce inequalities
☒ Eutrophication	☐ 11. Sustainable cities and communities
☒ Soil biodiversity	☐ 12. Responsible consumption and production
☒ Forest fires	☐ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://knowledge.unccd.int/publication/ldn-scientific-conceptual-framework-land-degradation-neutrality-report-science-policy

Good practice name: UNCCD and WOCAT cooperation
Country: Global

Good practice name:	UNCCD and WOCAT cooperation	Country:	Global
Type of initiative:	☐ Policy ☐ Practice ☒ Network ☒ Research ☒ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

UNCCD and WOCAT cooperation

What is the main purpose/objective of the initiative?

In the area of SLM, WOCAT focuses mainly on preventing and reducing land degradation through Soil and Water Conservation technologies and the implementation approaches. The aim of WOCAT is to increase the awareness and motivation of planners and decision makers, as well as land users and agricultural advisors. WOCAT hopes to reduce investment failures by providing knowledge support on advantages and disadvantages of available alternatives, based on a wide range of experience in the field.

Short description if the initiative/project/network

For UNCCD stakeholders the World Overview of Conservation Approaches and Technologies (WOCAT) is the primary recommended database for best practices on 'sustainable land management (SLM) technologies, including adaptation'. WOCAT was established in 1992 as a global network of Sustainable Land Management (SLM) specialists and has more than 2000 registered users, over 60 participating institutions, and around 30 national and regional initiatives. It connects SLM specialists with experts that provide tools and methods for identifying fields of action and enables users to share knowledge of land-resource management. An agreement between UNCCD and WOCAT was signed on 15 April 2014. UNCCD identified WOCAT as a primary recommended database for best practices on SLM technologies. The official recognition of UNCCD gives WOCAT a mandate to support the 194 signatory countries in recording their SLM best practices and using the SLM knowledge of stakeholders worldwide – from land users to decision-makers – to improve local land management.
The cooperation between UNCCD and WOCAT focusses on the dissemination of practices, techniques and experiences with implementing SLM. UNCCD stakeholders are encouraged to share their SLM experiences through the WOCAT database (in a structured way) and to use the WOCAT database and associated knowledge and decision support tools in their planning processes.

What are the main outputs and outcomes (take-home messages)?

Together with the WOCAT Consortium partners the UNCCD intends to continue offering support and SLM knowledge through the WOCAT 2020+ strategy. The proposed WOCAT 2020+ initiative, developed by WOCAT Consortium Partners and long-term partners from 19 countries, will build on the WOCAT tools, database and networks to stimulate the uptake of SLM around the world through a strengthened global partnership. The WOCAT global network will commit to achieving key targets of the 2030 Agenda: promoting land-based solutions to reach zero hunger (SDG 2), clean water and sanitation (SDG 6), supporting life on land (SDG 15) - particularly land degradation neutrality - promoting climate action (SDG 13), and reducing poverty (SDG 1). Achieving these targets will not be possible without focusing on interlinked targets such as governance (SDG 16) and sustainable production and consumption (SDG 12). As a global platform, it will unite partners for transformative actions towards a future with greener land and bluer water.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☐ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
☒ Desertification	☐ 6. Clean water and sanitation
☒ Flooding	☐ 7. Affordable and clean energy
☒ Soil salinisation	☐ 8. Decent work and economic growth
☒ Droughts	☐ 9. Industry, innovation and infrastructure
☒ Landslides	☐ 10. Reduce inequalities
☒ Eutrophication	☐ 11. Sustainable cities and communities
☒ Soil biodiversity	☐ 12. Responsible consumption and production
☒ Forest fires	☐ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

On Best practices in sustainable land management, see: https://knowledge.unccd.int/knowledge-products-and-pillars/best-practices-sustainable-land-management On the UNCCD and WOCAT, see: https://knowledge.unccd.int/knowledge-products-and-pillars/best-practices-sustainable-land-management/about-unccd-wocat The WOCAT database also contains detailed descriptions of best practices from various countries in Europe.

Good practice name: UNCCD Drought Initiative
Country: Global

Good practice name:	UNCCD Drought Initiative	Country:	Global
Type of initiative:	☒ Policy ☐ Practice ☐ Network ☐ Research ☒ Tool / Instrument ☒ Methodology ☒ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

UNCCD Drought Initiative

What is the main purpose/objective of the initiative?

To help countries build drought resilience, the Parties at COP 13 requested the UNCCD secretariat to implement a drought initiative (2018-2019). It will support concrete action on drought preparedness systems to boost the resilience of people, communities and ecosystems. Most countries already have some elements in place on how to respond to a drought. But, in general, approaches are not comprehensive and mostly reactive. The elements tend not to function well together.
72 countries are participating

Short description if the initiative/project/network

The UNCCD Drought Initiative was adopted at COP 13 where the Parties requested the secretariat and appropriate UNCCD institutions and bodies, including the Science-Policy Interface, within their respective mandates to: (a) Implement the drought initiative for the biennium 2018−2019 (later extended to 2020-2021) which proposes action on: (i) drought preparedness systems; (ii) regional efforts to reduce drought vulnerability and risk; and (iii) a toolbox to boost the resilience of people and ecosystems to drought;

What are the main outputs and outcomes (take-home messages)?

- We need to move away from 'reactive' to 'proactive' approaches to drought management. That means we need to treat the 'symptoms' not the 'causes'.
- Drought should be treated as a 'risk' and not 'crisis'.
- We need to move away from 'uncoordinated and piece meal approach' to a more coordinated approach and integrated approach to drought management. So, intersectoral coordination should be strengthened to tackle drought in a more sustainable way.
- Early warning systems, vulnerability assessment and risk mitigation measures are the three key pillars for a proactive to drought management.

Soil threats addressed:	SDGs addressed:
☐ Soil erosion	☐ 1. No poverty
☐ Soil sealing	☐ 2. Zero hunger
☐ Soil contamination	☐ 3. Good health and well-being
☐ Decline in soil organic matter (SOM)	☐ 4. Quality education
☐ Soil compaction	☐ 5. Gender equality
☐ Desertification	☐ 6. Clean water and sanitation
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☐ Soil salinisation	☐ 8. Decent work and economic growth
☒ Droughts	☐ 9. Industry, innovation and infrastructure
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☐ Eutrophication	☐ 11. Sustainable cities and communities
☐ Soil biodiversity	☐ 12. Responsible consumption and production
☐ Forest fires	☐ 13. Climate action
☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.unccd.int/actions/drought-initiative

Good practice name: 4 per 1000
Country: France-global

Good practice name:	4 per 1000	Country:	France-global
Type of initiative:	☒ Policy ☐ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

Own initiative

What is the main purpose/objective of the initiative?

The international initiative '4 per 1000', launched by France on 1 December 2015 at the COP 21, consists of federating all voluntary stakeholders of the public and private sectors (national governments, local and regional governments, companies, trade organisations, NGOs, research facilities, etc.) under the framework of the Lima-Paris Action Plan (LPAP). The aim of the initiative is to demonstrate that agriculture, and in particular agricultural soils can play a crucial role where food security and climate change are concerned.

Short description if the initiative/project/network

Supported by solid scientific documentation, this initiative invites all partners to state or implement some practical actions on soil carbon storage and the type of practices to achieve this (e.g. agroecology, agroforestry, conservation agriculture, landscape management, etc.). The ambition of the initiative is to encourage stakeholders to transition towards a productive, highly resilient agriculture, based on the appropriate management of lands and soils, creating jobs and incomes hence ensuring sustainable development. The Executive Secretariat of the '4 per 1000' initiative is hosted by the CGIAR System Organization, an international organization based in Montpellier.

What are the main outputs and outcomes (take-home messages)?

Primarily composed of carbon, the organic matter in soils plays a role in four important ecosystem services: resistance to soil erosion, soil water retention, soil fertility for plants and soil biodiversity. Even small changes in the soil carbon pool have large-scale effects both on agricultural productivity and on greenhouse gas balance. Maintaining organic carbon-rich soils, restoring and improving degraded agricultural lands and, more generally, increasing soil carbon, play an important role in addressing the three-fold challenge of food security, adaptation of food systems and people to climate change, and mitigation of anthropogenic emissions.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☐ Soil sealing	☒ 2. Zero hunger
☐ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.4p1000.org/

Good practice name: Climate smart farming
Country: Finland

Good practice name:	Climate smart farming	Country:	Finland
Type of initiative:	☐ Policy ☐ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

Own initiative

What is the main purpose/objective of the initiative?

To give practical solution to combate climate change

Short description if the initiative/project/network

Communication network and action for soil productivity and climate friendly use with farmers organization (Central Union of Agricultural Producers and Forest Owners in Finland MTK) and advisory organization ProAgria. The booklet 'Climatesmart farm' was published September 2019 and the communication to disseminate the messages and content of the book written by many experts from Research Institutes and Universities)

What are the main outputs and outcomes (take-home messages)?

Communication plan and common main messages for climate smart farming.
The climate smart farm use healthy and productive soils, plants and animals and strive for resource efficiency also in energy options and nutrient use.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☐ Soil sealing	☒ 2. Zero hunger
☐ Soil contamination	☒ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☒ Soil acidification	☒ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.mtk.fi/fi/web/en

Good practice name: Soil monitoring
Country: Italy

Good practice name:	Soil monitoring	Country:	Italy
Type of initiative:	☒ Policy ☒ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

EU's Common Agricultural Policy (CAP 2014-2020) and the Rural Development Programme (RDP)

What is the main purpose/objective of the initiative?

a soil regional monitoring network to assess soil quality and the impact of agricultural management

Short description if the initiative/project/network

Monitoring of representative soil and land use sites with soil sampling and analysis of chemical physical and biological parameters. The soil management is also detected.

What are the main outputs and outcomes (take-home messages)?

Assessment of soil quality in relationship with land management and evaluation of the RDP effectiveness

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☐ Soil sealing	☐ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
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☐ Droughts	☐ 9. Industry, innovation and infrastructure
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☐ Eutrophication	☐ 11. Sustainable cities and communities
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☐ Forest fires	☐ 13. Climate action
☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://ambiente.regione.emilia-romagna.it/it/geologia/suoli/proprieta-e-qualita-dei-suoli/monitoraggio-delle-caratteristiche-chimico-fisiche-e-biologiche-dei-suoli-agricoli

Good practice name: Global Long-Term Agricultural Experiment
Country: Global

Good practice name:	Global Long-Term Agricultural Experiment	Country:	global
Type of initiative:	☐ Policy ☐ Practice ☒ Network ☒ Research ☐ Tool / Instrument ☒ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

International Project supported by Charity Trust Fund and Research Institute.

What is the main purpose/objective of the initiative?

The identification, data Harmonisation and accessibility of Long-term experiments worldwide. The GLTEN aim to establish and support collaborative network within the agricultural science community carrying out research through LTEs.

Short description if the initiative/project/network

The Global Long-Term Agricultural Experiment Network was launched in May 2018. The GLTEN is a network of long-term agricultural experiments and associated researchers spanning six continents and representing a range of climates, environments, crop systems and farming practices.

What are the main outputs and outcomes (take-home messages)?

In progress

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☒ 1. No poverty
☐ Soil sealing	☒ 2. Zero hunger
☒ Soil contamination	☒ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
☐ Desertification	☐ 6. Clean water and sanitation
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☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☒ 17. Partnerships for the goals

References/Links/More info:

www.glten.org/
https://www.rothamsted.ac.uk/glten-global-long-term-agricultural-experiment-network
https://www.rothamsted.ac.uk/news/wltm-176-year-old-seeking-significant-other-long-term%E2%80%A6experiment
https://www.rothamsted.ac.uk/events/future-long-term-experiments-agricultural-science#DOWNLOADS-2

Good practice name: Voluntary Guidelines for Sustainable Soil Management (VGSSM)
Country: Global

Good practice name:	Voluntary Guidelines for Sustainable Soil Management (VGSSM)	Country:	Global
Type of initiative:	☐ Policy ☒ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

GSP initiative

What is the main purpose/objective of the initiative?

to advocate SSM to practitioners

Short description if the initiative/project/network

The Voluntary Guidelines for Soil Sustainable Management contain many good practices for different kinds of land (focus on agricultural) for Soil Sustainable Management

What are the main outputs and outcomes (take-home messages)?

Practical guidelines

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☒ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☒ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

http://www.fao.org/3/a-bl813e.pdf

Good practice name: SoilCare
Country: EU

Good practice name:	SoilCare	Country:	EU
Type of initiative:	☐ Policy ☐ Practice ☐ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

European research project

What is the main purpose/objective of the initiative?

To test and promote soil-improving cropping systems (SICS) which ensure productivity while reducing environmental impacts

Short description if the initiative/project/network

A review of soil- improving cropping systems is made in a report

What are the main outputs and outcomes (take-home messages)?

This project is ongoing and will provide insights into the environmental and economic benefits of various SICS tested across 16 European study sites.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☒ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
☒ Desertification	☐ 6. Clean water and sanitation
☒ Flooding	☐ 7. Affordable and clean energy
☒ Soil salinisation	☐ 8. Decent work and economic growth
☒ Droughts	☐ 9. Industry, innovation and infrastructure
☒ Landslides	☐ 10. Reduce inequalities
☒ Eutrophication	☐ 11. Sustainable cities and communities
☒ Soil biodiversity	☐ 12. Responsible consumption and production
☒ Forest fires	☐ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.soilcare-project.eu/en/

Good practice name: RECARE
Country: EU

Good practice name:	RECARE	Country:	EU
Type of initiative:	☐ Policy ☐ Practice ☐ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

European research project

What is the main purpose/objective of the initiative?

Short description if the initiative/project/network

research project to ensure implementation of the available suite of practical management responses that address the soil threats.

What are the main outputs and outcomes (take-home messages)?

Finding and sharing solutions to protect our soils

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☐ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
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☒ Forest fires	☐ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☐ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.recare-project.eu/downloads-by-category/project-deliverables-2/441-recare-final-publishable-report-final-aug2019/file

Good practice name: EJP SOIL
Country: EU

Good practice name:	EJP SOIL	Country:	EU
Type of initiative:	☒ Policy ☒ Practice ☒ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

programme of EU

What is the main purpose/objective of the initiative?

climate smart sustainable agricultural soil management

Short description if the initiative/project/network

programme in which project will be developed

What are the main outputs and outcomes (take-home messages)?

just started

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☐ 2. Zero hunger
☒ Soil contamination	☒ 3. Good health and well-being
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☐ Forest fires	☒ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☒ 17. Partnerships for the goals

References/Links/More info:

https://projects.au.dk/ejpsoil/

Good practice name: LANDSUPPORT
Country: EU

Good practice name:	LANDSUPPORT	Country:	EU
Type of initiative:	☐ Policy ☐ Practice ☐ Network ☒ Research ☒ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

European research project

What is the main purpose/objective of the initiative?

-support sustainable agriculture and forestry;
-evaluate trade-off between land uses;
-contribute to the development and implementation of land use policies in Europe.

Short description if the initiative/project/network

Several European directives and policies are aimed at reconciling agriculture and environment, preserving natural resources and adapting to climate change at the same time. However, full implementation of these directives and policies is still challenging – as recognized, for example, in COM(2015) 120 or COM(2013) 683 of the European Commission. Similar challenges are faced by the factual application of global strategic policy documents aiming at sustainable landscape management, such as for example the 7th EAP, the FAO Agenda, or the 17 SDG in the 2030 UN Agenda.

What are the main outputs and outcomes (take-home messages)?

DSS GIS systems for land use decision making

Soil threats addressed:	SDGs addressed:
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☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☒ Forest fires	☐ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.landsupport.eu/
https://www.youtube.com/watch?v=zqfSS2puu4E
https://www.youtube.com/watch?v=wCKC5lBLbbI

Good practice name: CIRCASA
Country: EU

Good practice name:	CIRCASA	Country:	EU
Type of initiative:	☐ Policy ☐ Practice ☐ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

European research project

What is the main purpose/objective of the initiative?

CIRCASA (Coordination of International Research Cooperation on Soil Carbon Sequestration in Agriculture) aims to develop international synergies concerning research and knowledge exchange in the field of carbon sequestration in agricultural soils at European Union and global levels, with the active engagement of all relevant stakeholders.

Short description if the initiative/project/network

The CIRCASA project is at its 3rd year (*in 2020*). At this stage, we are preparing a 2020-2022 implementation plan for the International Research Consortium (IRC) on soil carbon. Current work on a Strategic Research Agenda co-designed with stakeholders, grounded on scientific evidence and stakeholders' knowledge demands will support the alignment of research for this IRC.

What are the main outputs and outcomes (take-home messages)?

Strategic Research Agenda at EU and global levels

Soil threats addressed:	SDGs addressed:
☐ Soil erosion	☐ 1. No poverty
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☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.circasa-project.eu/

Good practice name: LANDMARK
Country: EU

Good practice name:	LANDMARK	Country:	EU
Type of initiative:	☒ Policy ☐ Practice ☐ Network ☒ Research ☒ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☐ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

European Research Project

What is the main purpose/objective of the initiative?

Comprehensively quantify the current and potential supply of soil functions across the EU, as determined by soil properties (soil diagnostic criteria), land use (arable, grassland, forestry) and soil management practices.

Short description if the initiative/project/network

LANDMARK is a European Research Project on the sustainable management of land and soil in Europe. The questions that LANDMARK aims to address are: "How can we make the most of our land? How can we ensure that our soils deliver on the many expectations we have of our land?". These expectations (or 'demands') include:

- Primary productivity (agriculture and forestry)
- Water purification and regulation
- Carbon sequestration, cycling and regulation
- Provision of functional and intrinsic biodiversity
- Provision and cycling of nutrients.

What are the main outputs and outcomes (take-home messages)?

- For farmers & advisors – a Soil Navigator that provides advice on the sustainable management of soils on 'my farm'. This agricultural Decision Support Tool (DST) will be developed for soil management that optimises soil functions, both from an agronomic perspective (optimising yields) and an ecosystem function perspective (enhanced environmental performance), and that sustains soil functions by mitigating threats to soil quality;
- For legislators – a framework for monitoring of soil quality and soil functions that is applicable across Europe. The monitoring scheme designed will be applicable at regional scale, for a range of soil types, land uses and pedo-climatic zones;
- For policy makers – an assessment of policies that can ensure that we 'make the most of our land', from both an agronomic and environmental point of view. The policy framework developed for 'Functional Land Management' at European scale will optimise the sustainable use of Europe's soil resource across all major land uses: grassland, arable and forestry.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☒ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☒ Droughts	☐ 9. Industry, innovation and infrastructure
☐ Landslides	☐ 10. Reduce inequalities
☒ Eutrophication	☐ 11. Sustainable cities and communities
☒ Soil biodiversity	☐ 12. Responsible consumption and production
☐ Forest fires	☐ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

http://landmark2020.eu/

Good practice name: Life AMDRY 4
Country: Mediterranean area

Good practice name:	Life AMDRY 4	Country:	Mediterranean area
Type of initiative:	☐ Policy ☒ Practice ☐ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

LIFE project

What is the main purpose/objective of the initiative?

To promote resilience in Mediterranean agricultural areas

Short description if the initiative/project/network

Project AMDRY4(Life) Adaptation to Climate Change of Agricultures in the Mediterranean Area. It focuses on the promotion of resilience in Mediterranean agricultural areas, along with its sustainable management. It also promotes ecosystem-based adaptation

What are the main outputs and outcomes (take-home messages)?

Agriculture and biodiversity can survive together, they are not enemies but complementary in the adaptation to climate change

Soil threats addressed:	SDGs addressed:
☐ Soil erosion	☐ 1. No poverty
☐ Soil sealing	☒ 2. Zero hunger
☐ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☐ Eutrophication	☐ 11. Sustainable cities and communities
☒ Soil biodiversity	☐ 12. Responsible consumption and production
☐ Forest fires	☐ 13. Climate action
☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

http://lifeamdryc4.eu/en/

Good practice name: land stewardship and soil stewardship scenarios OVAM
Country: Belgium

Good practice name:	land stewardship and soil stewardship scenarios OVAM	Country:	Belgium
Type of initiative:	☒ Policy ☐ Practice ☐ Network ☐ Research ☒ Tool / Instrument ☒ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☒ Industrial ☒ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

own initiative:

OVAM, the Flemish Waste Management Agency, has initiated a program to explore novel policy approaches to dealing with soil care and new challenges on soil contamination such as diffuse pollution and emerging contaminants. One of the key elements in this program for more soil care is a strategy based on soil and land stewardship.

With the **Soil Remediation and Protection Decree**, there is already an important instrument in the realization of the Flemish soil policy: it provides for a thorough **curative approach** to soil contamination with, in addition, an important prevention component (e.g. stricter regulation of the remediation obligation and liability for new soil contamination; sustainable management of soil materials) through the regulation on excavated soil; a general framework for soil protection). Other **(new) challenges**, such as the policy on emerging substances and diffuse contamination, the strengthening of the ambitions of sustainable circular land use (such as brownfields and landfill sites), the further prevention of pollution, the integration of care for soil ecosystem services and soil biodiversity, ... **require new solution pathways** that are currently in an exploratory phase.

What is the main purpose/objective of the initiative?

OVAM considers stewardship as a potential lever for **activating** everyone in order to take responsibility for **soil care** (including the listed challenges[82]) and put it into practice. To achieve this, it is necessary that 1) we strengthen the insight of the importance of a healthy soil and the sense of urgency for soil care through **soil awareness**, 2) that we offer the necessary **regulatory frameworks and knowledge** to be able to apply this soil care in such a way that this leads to 3) more soil care (and therefore more soil care workers or soil stewards) **in practice**, and this within different contexts, for different target groups and in different spatial scales: from micro to meso to macro scales.

Short description if the initiative/project/network

Within each of the 3 above mentioned layers, we work on various actions:
- creating support and awareness, and expanding knowledge through workshops on international forums
- developing future scenarios within an international stakeholder group
-exploring the legal possibilities for stewardship and soil care in regulations
- building of stewardship communities
- encouraging good practices tailormade for each target group: eg via guidelines for the management of contaminated soil within un-sealing processes,…

What are the main outputs and outcomes (take-home messages)?

1. Align policy on soil
2. Centralize and exchange knowledge in order to provide tools for soil care
3. Build communities
4. Integrate policy-knowledge-practice
5. Build inspiring future scenarios

Policy tools, regulations, guidelines, community of good practices, scenarios, …

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☒ 2. Zero hunger
☒ Soil contamination	☒ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☒ 4. Quality education
☒ Soil compaction	☐ 5. Gender equality
☒ Desertification	☒ 6. Clean water and sanitation
☒ Flooding	☐ 7. Affordable and clean energy
☒ Soil salinisation	☒ 8. Decent work and economic growth
☒ Droughts	☒ 9. Industry, innovation and infrastructure
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☒ Eutrophication	☒ 11. Sustainable cities and communities
☒ Soil biodiversity	☒ 12. Responsible consumption and production

[82] Such as the policy on emerging substances and diffuse pollution, the strengthening of the ambitions of sustainable circular land use (such as brownfields and landfill sites), the further prevention of pollution, the integration of care for soil ecosystem services and soil biodiversity, ...

☒ Forest fires	☒ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☒ 17. Partnerships for the goals

References/Links/More info:

Not ready yet

Good practice name: Guidelines on best practice to limit, mitigate or compensate soil sealing
Country: EU

Good practice name:	Guidelines on best practice to limit, mitigate or compensate soil sealing	Country:	EU
Type of initiative:	☐ Policy ☒ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☒ Industrial ☒ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

EC initiative

What is the main purpose/objective of the initiative?

Main goals are to provide information on the magnitude of soil sealing in the European Union (EU), its impacts and examples of best practice.

Short description if the initiative/project/network

This Commission Staff Working Document describes approaches based on limiting, mitigating and compensating for the effects of soil sealing which have been implemented in the Member States. Limiting soil sealing means preventing the conversion of green areas and the subsequent sealing of (part of) their surface. The re-use of already built-up areas, e.g. brownfield sites, can also be included in this concept. Targets have been used as a tool for monitoring as well as spurring progress. Where soil sealing occurs, appropriate mitigation measures have been taken in order to maintain some of the soil functions and to reduce any significant direct or indirect negative effects on the environment and human well-being. Where on-site mitigation measures are regarded as insufficient, compensation measures have been considered, bearing in mind, however, that sealing cannot be exactly compensated for. The objective has rather been to sustain or restore the overall capacity of soils in a certain area to fulfil (most of) their functions. Existing best practices designed to limit, mitigate and compensate soil sealing show that sound spatial planning follows an integrated approach, requiring the full commitment of all relevant public authorities (and not only planning and environmental departments), in particular those governance entities (e.g. municipalities, counties and regions) which are normally responsible for the management of land. A second common element is that specific regional approaches are developed, taking into account unused resources at local level, for example a particularly large number of empty buildings or brownfield sites. Finally, existing funding policies for infrastructure development have been carefully reviewed, leading to a reduction of those subsidies that act as drivers for unsustainable land take and soil sealing; the scope for lowering the share of urbanisation fees in municipal budgets is also sometimes considered.

What are the main outputs and outcomes (take-home messages)?

Practical guidelines

Soil threats addressed:	SDGs addressed:
☐ Soil erosion	☐ 1. No poverty
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☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://ec.europa.eu/environment/soil/pdf/soil_sealing_guidelines_en.pdf

Good practice name: SOS4Soil
Country: Italy

Good practice name:	SOS4Soil	Country:	Italy
Type of initiative:	☐ Policy ☒ Practice ☐ Network ☐ Research ☒ Tool / Instrument ☐ Methodology ☒ Pilot ☐ Other (please specify)	Type of land:	☐ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☒ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

SOS4Soil LIFEENV/IT/000225

What is the main purpose/objective of the initiative?

SOS4LIFE aims to contribute to the enforcement at the municipal scale of European orientations about soil protection and urban regeneration, with particular preference to the Guidelines on best practices to reduce, mitigate and compensate soil sealing [(SWD(2012)101]

Short description if the initiative/project/network

Evaluation of ecosystems services provided by urban soils; regulation framework and operational tools at municipal level to achieve the 'no net landtake' target;

What are the main outputs and outcomes (take-home messages)?

desealing interventions to promote urban regeneration; operational tools at municipal level; Urban and Soil Decision Support System adopted by municipal and regions for monitoring land use change, urban regeneration processes and ecosystem services

Soil threats addressed:	SDGs addressed:
☐ Soil erosion	☐ 1. No poverty
☒ Soil sealing	☐ 2. Zero hunger
☐ Soil contamination	☐ 3. Good health and well-being
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☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☐ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

www.sos4life.it
https://ambiente.regione.emilia-romagna.it/en/geologia/temi/suoli?set_language=en

Good practice name: O.666 Circular ideas (OVAM)
Country: Belgium

Good practice name:	O.666 Circular ideas (OVAM)	Country:	Belgium
Type of initiative:	☐ Policy ☒ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☐ Agricultural ☐ Forest ☐ Nature ☒ Industrial ☒ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

What is the main purpose/objective of the initiative?

Short description if the initiative/project/network

Due to the 'Protocol Trusty', the OVAM (public waste agency of Flanders) was able to acquire a property located at the harbor of Ostend (Belgium), for one symbolic euro. For years, the firm 'The North Sea Bunkers' was a deposit for fuels. The legacy of this activity was a severe contamination of petroleum in soil and groundwater. The previous owner was bankrupt and therefore not able to pay for the soil remediation. Moreover, the estimated remediation costs were far above the sales value of the site.

The site has a unique location on shore. It lies on the border of two areas with on the one hand the redevelopment to residential area and on the other hand the existing port area. The port area has a fall back in terms of economic growth, such as many other port areas. Due to its specific position, the site has a strong potential for the launch of new dynamics on the Eastern Shore.

Considering the remediation of the groundwater on the site is a long-term project, making the space unavailable for further development, OVAM allowed temporary use for local stakeholders who were willing to invest into activities with circular ideas. Now they are a well organises group and called themselves 'O.666'. They considered themselves to be a testing ground for circular economy, social and corporate social responsibility. It is focused on a close connection and dialogue with the neighborhood and the city of Oostende, giving meaning back to the site. They stand for public partnerships, participation and education in the form of open workshops, forums, presentations and events

What are the main outputs and outcomes (take-home messages)?

It is necessary to do a tailor-made approach with goal setting to redevelop specific contaminated spaces toward meaningful places. Focussing on local societal challenges and collaborating with the local authority and committed stakeholders is key for success

Soil threats addressed:	SDGs addressed:
☐ Soil erosion	☐ 1. No poverty
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☐ Forest fires	☐ 13. Climate action
☐ Soil acidification	☐ 14. Life below water
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	☐ 17. Partnerships for the goals

References/Links/More info:

Initiatives starting from LDN / combating LD

Good practice name: LDN action UNCCD /LDN target setting
Country: Global

Good practice name:	LDN action UNCCD /LDN target setting	Country:	Global
Type of initiative:	☒ Policy ☒ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

LDN initiative UNCCD

What is the main purpose/objective of the initiative?

The new UNCCD 2018-2030 Strategic Framework is the most comprehensive global commitment to achieve Land Degradation Neutrality (LDN) in order to restore the productivity of vast expanses of degraded land, improve the livelihoods of more than 1.3 billion people, and reduce the impacts of drought on vulnerable populations to build a future that avoids, minimizes, and reverses desertification/land degradation and mitigates the effects of drought in affected areas at all levels. To achieve a land degradation-neutral world consistent with the 2030 Agenda for Sustainable Development

Short description if the initiative/project/network

Different action programmes have been set to provide policy-relevant information and further guidance, awareness -raising and advocacy on LDN, for UNCCD country parties, key decision- and policy-makers, national and international development partners.
one of the actions is the Land Degradation Neutrality Target Setting, aimed at operationalisation of LDN and transform it into an implementable approach that enables countries to make progress towards achieving SDG target 15.3 and the objectives of the UNCCD.
A policy brief has been made containing on four main building blocks: (1) leveraging LDN, (2) assessing LDN, (3) setting LDN targets and measures, and (4) achieving LDN.
As of today, 123 countries have committed to set LDN targets

What are the main outputs and outcomes (take-home messages)?

consult the knowledge hub on https://knowledge.unccd.int/

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☒ 1. No poverty
☒ Soil sealing	☒ 2. Zero hunger
☒ Soil contamination	☐ 3. Good health and well-being
☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
☒ Soil compaction	☒ 5. Gender equality
☒ Desertification	☒ 6. Clean water and sanitation
☒ Flooding	☐ 7. Affordable and clean energy
☒ Soil salinisation	☐ 8. Decent work and economic growth
☒ Droughts	☐ 9. Industry, innovation and infrastructure
☒ Landslides	☒ 10. Reduce inequalities
☒ Eutrophication	☐ 11. Sustainable cities and communities
☒ Soil biodiversity	☐ 12. Responsible consumption and production
☒ Forest fires	☒ 13. Climate action
☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

http://catalogue.unccd.int/1217_UNCCD_GM__Report_18_V2_2019.pdf

Good practice name: LDN Fund
Country: Global

Good practice name:	LDN Fund	Country:	Global
Type of initiative:	☐ Policy ☒ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

LDN initiative UNCCD

What is the main purpose/objective of the initiative?

To establish an innovative finance instrument (managed and operated independently by a private sector fund manager) that combines private and public resources to invest in financially viable projects that contribute to achieving LDN.

Short description if the initiative/project/network

The Land Degradation Neutrality Fund is an innovative fund that combines public and private resources to finance a range of financially viable investments – from sustainable agriculture projects that benefit small landowners or rural cooperatives to large agroforestry projects for rehabilitating vast tracts of land – in application of the LDN response hierarchy of avoiding, reducing, and reversing land degradation. The LDN Fund was conceived in recognition of rapidly growing interest from individual investors, savers, and pensioners who wish their money to have a positive impact on many environmental challenges beyond a financial return. The LDN Fund aims to play a catalytic role by supporting productive and conservation activities that contribute to both achieving LDN and creating decent jobs and livelihoods for the most vulnerable people and countries. The LDN Fund initiative is part of a broader framework of Land Degradation Neutrality under the UNCCD, noting that the Fund is independently managed and the Global Mechanism of the UNCCD spearheaded the development of the Fund.

What are the main outputs and outcomes (take-home messages)?

The main take-home message is: the LDN Fund initiative is an exemplary case that is creating an impact by leveraging innovatively substantial private-sector capital, thereby contributing to the achieving LDN at a global level.

Soil threats addressed:	SDGs addressed:
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☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.unccd.int/actions/impact-investment-fund-land-degradation-neutrality
https://www.mirova.com/en/invest/natural-capital

Good practice name: World Atlas of Desertification
Country: Global

Good practice name:	World Atlas of Desertification	Country:	Global
Type of initiative:	☐ Policy ☐ Practice ☐ Network ☒ Research ☒ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☒ Industrial ☒ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

UNCCD / JRC initiative

What is the main purpose/objective of the initiative?

To analyse the causes and impacts of desertification, and their impact of land degradation

Short description if the initiative/project/network

Overview and analysis of the different aspects that relate to desertification and then land degradation, such as aridity, pollution, biodiversity, fire regimes, nutrients, mining, biodiversity, etc.

What are the main outputs and outcomes (take-home messages)?

Land degradation happens locally but has repercussions at global scale. Human activities drive change, with land degradation one unfortunate result.

Soil threats addressed:	SDGs addressed:
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	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://wad.jrc.ec.europa.eu/

Good practice name: Land Degradation Neutrality: Italy
Country: Italy

Good practice name:	Land Degradation Neutrality: Italy	Country:	Italy
Type of initiative:	☒ Policy ☐ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

LDN initiative UNCCD

What is the main purpose/objective of the initiative?

implementing LDN in Italy

Short description if the initiative/project/network

The Italian National Institute for Environmental Protection and Research (ISPRA) participated in the project 'Towards achieving land degradation neutrality: turning the concept into practice. Pilot country: Italy'. The project was carried out by a working group of experts from the main national research institutions under the supervision of the Ministry of Environment and the UNCCD Focal Point in the Ministry of Foreign Affairs.

A project that addressed land cover, land productivity and soil organic carbon, in order to be consistent with the LDN indicator proposed by UNCCD and adopted by UN Statistical Commission and an extensive analysis of available data was carried out, using data, including CORINE Land Cover Project of the European Environmental Agency and the national contribution to the Global Soil Organic Carbon Map (GSOC map). The Environmental Quality Index was also used, encompassing soil quality, climate, vegetation and land use, showing that 10% of soils turned out to be very vulnerable, while 49.2% have average vulnerability and 26% have low vulnerability. Sicily is the most vulnerable region.

What are the main outputs and outcomes (take-home messages)?

- It is necessary to utilise/develop national/local data - global databases are not sufficient;
- Better understanding of the driving forces behind degradation processes is needed for the identification of policies and actions;
- Involvement of stakeholders is necessary at all levels to validate the assessment;
- Other SDG indicators should be integrated in order to build an effective policy framework;
- A long-term strategy should be considered, since land and soil degradation are slow processes, as are restoration activities;
- All land components should be taken into consideration alongside all related factors. Built infrastructure and cultural heritage, for example, should be included and their individual values maintained.
- Global databases must be integrated with national/local data for validation and to increase spatial and temporal resolution in order to develop national LDN strategies;
- A benchmark system should be built for each indicator;
- Integration with other indicators (e.g. climate change impact and adaptation, biodiversity loss) is necessary;
- Indicators for restoration activities should be developed.

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☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

http://www.isprambiente.gov.it/en/archive/news-and-other-events/ispra-news/2016/11/monitoring-and-assessment-of-land-for-to-climate-change-mitigation-and-adaptation

Good practice name: JustDigIt
Country: Africa

Good practice name:	JustDigIt	Country:	Africa
Type of initiative:	☐ Policy ☒ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

NGO - UN funding and donations

What is the main purpose/objective of the initiative?

Landscape restauration

Short description if the initiative/project/network

Justdiggit applies rain harvesting techniques to restore African landscape in collaboration with local partners and organizes training and community building for local farmers

What are the main outputs and outcomes (take-home messages)?

We can slow down climate change, make our soil more productive and our society more inclusive at the same time

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	☒ 17. Partnerships for the goals

References/Links/More info:

justdiggit.org

Good practice name: MFA subsidies / Great green wall
Country: Africa

Good practice name:	Great green wall	Country:	Africa
Type of initiative:	☐ Policy ☒ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☒ Industrial ☒ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

What is the main purpose/objective of the initiative?

Short description if the initiative/project/network

Great Green Wall:

The Great Green Wall is an African-led movement with an epic ambition to grow an 8,000km natural wonder of the world across the entire width of Africa.

A decade in and roughly 15% underway, the initiative is already bringing life back to Africa's degraded landscapes at an unprecedented scale, providing food security, jobs and a reason to stay for the millions who live along its path.

The Wall promises to be a compelling solution to the many urgent threats not only facing the African Continent, but the global community as a whole – notably climate change, drought, famine, conflict and migration.

What are the main outputs and outcomes (take-home messages)?

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☒ 1. No poverty
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☐ Forest fires	☒ 13. Climate action
☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☒ 17. Partnerships for the goals

References/Links/More info:

https://www.greatgreenwall.org/about-great-green-wall

Good practice name: European Environment - State and Outlook (SOER)
Country: EU

Good practice name:	European Environment - State and Outlook (SOER)	Country:	EU
Type of initiative:	☐ Policy ☐ Practice ☐ Network ☒ Research ☒ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

What is the main purpose/objective of the initiative?

The European Environment Agency's (EEA) 'State of the Environment' reports assess Europe's environmental challenges

Short description if the initiative/project/network

The European environment — state and outlook 2020 (SOER 2020) comes at a crucial time of urgent sustainability challenges that require urgent systemic solutions. The overarching challenge of this century is how we achieve development across the world that balances societal, economic and environmental considerations. Sustainability needs to become the guiding principle for ambitious and coherent policies and actions across society.

What are the main outputs and outcomes (take-home messages)?

Europe will not achieve its 2030 goals without urgent action during the next 10 years to address the alarming rate of biodiversity loss, increasing impacts of climate change and the overconsumption of natural resources. The European Environment Agency's (EEA) latest 'State of the Environment' report states that Europe faces environmental challenges of unprecedented scale and urgency.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☐ 1. No poverty
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☒ Decline in soil organic matter (SOM)	☐ 4. Quality education
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☒ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
	☐ 16. Peace, justice and strong institutions
	☐ 17. Partnerships for the goals

References/Links/More info:

https://www.eea.europa.eu/soer-2020

Good practice name: Initiative on Sustainability, Stability and Security (3S)
Country: Africa

Good practice name:	Initiative on Sustainability, Stability and Security (3S)	Country:	Africa
Type of initiative:	☒ Policy ☒ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

Development partnership (African governments and UNCCD)

What is the main purpose/objective of the initiative?

The Initiative on Sustainability, Stability and Security (3S) aims to improve stability in Africa by promoting sustainable land management and offering economic opportunity in rural areas, thereby reducing incentives for migration within and from the continent.

Short description if the initiative/project/network

Within 5 years of Program implementation, the Program aims to restore 10 million hectares of degraded cropland, primarily in the Sahel zone of sub-Saharan Africa, through investment, policy reforms and technical and financial innovation. This physical output will have the economic impact of sustaining and creating employment opportunities in the form of 2 million land-based jobs - both existing ones at peril of getting lost due to climate change and new ones being created as a result of stopping and reversing land degradation. The final outcome will be reduced migration from rural areas as populations chose to remain on their cropland instead of moving away for economic reasons. Achieving the restoration of 10 million hectares of land will benefit nearly 10% of the total cropland currently affected by land degradation, desertification and drought in all of Africa. The land area to be restored also corresponds to nearly 5% of all cropland on the African continent. While this will be a modest impact for Africa in the aggregate, the relative impact in the specific countries participating in the Program will be considerably higher. Safeguarding or newly creating 2 million rural jobs over the Program duration will be equivalent to nearly one quarter of the job gap in Africa arising in one single year. These 2 million jobs also represent 5% of the about 40 million international migrants living within and outside of Africa. These are modest impact numbers in a continental perspective, yet the relative impact of the Program in participating African countries will be substantially larger.
Under the leadership of Morocco and Senegal much preparatory work has been undertaken by African governments including the development of coordination frameworks, national roadmaps and proof-of-concept projects. The United Nations Convention to Combat Desertification (UNCCD) is entrusted with the Secretariat of the Initiative and is coordinating its launch planned for late 2020 on the basis of a development partnership involving African nations, ODA donors and multilateral lenders. This development partnership to implement the 3S Initiative is named 'Resilient Africa Program (RAP): Program on Climate Resilience, Employment and Migration' ('the Program'). The Initiative links the issue of youth unemployment to the availability of and access to natural resources as the majority of jobs in Africa are based on the utilization of land. The 3S Initiative has so far been African-led with 14 countries from the continent joining to date, including Benin, Burkina Faso, Central African Republic, Chad, Gambia, Ghana, Mali, Morocco, Niger, Nigeria, Rwanda, Senegal, Zambia and Zimbabwe. Selected official development assistance (ODA) donors, including the EU through the DG DEV and EU DEL in Morocco, are providing seed funding and the International Organization for Migration (IOM) provides technical advice.

What are the main outputs and outcomes (take-home messages)?

If goals are achieved, the initiative will have the economic impact of creating employment opportunities in the form of 2 million jobs. The final outcome will be reduced migration from rural areas as populations chose to remain on their croplands instead of moving away or risking to become prays of radicalized groups. The total program cost is estimated at USD 5.0 billion. This indicative figure rests on an expected average cost of restoring degraded land of USD 500 per hectare. The expected 2 million rural jobs to be sustained or created imply cost of USD 2,500 per employment, which is also comparable with similar initiatives. The financing plan includes USD 4 billion of private resources and USD 1 billion of public resources. Public resources will be composed of USD 900 million in funding from ODA donors, other donors such as NGOs and foundations, multilateral finance. USD 100 million will be made available from budgetary contributions by participating African countries; some of these will be in-kind, for instance through the provision of land access rights which will be assessed at their market value. Private resources will come from domestic and foreign investors in agriculture, agro-industry and forestry. These will provide equity capital, loans and guarantees. The Program will also promote innovation in providing incentives to harness the potential of remittances and diaspora investments.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☒ 1. No poverty
☐ Soil sealing	☐ 2. Zero hunger
☐ Soil contamination	☐ 3. Good health and well-being
☐ Decline in soil organic matter (SOM)	☐ 4. Quality education
☐ Soil compaction	☐ 5. Gender equality
☒ Desertification	☐ 6. Clean water and sanitation
☐ Flooding	☐ 7. Affordable and clean energy
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☐ Landslides	☐ 10. Reduce inequalities
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☐ Soil acidification	☐ 14. Life below water
☐ Other (please specify)	☒ 15. Life on land
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	☐ 17. Partnerships for the goals

References/Links/More info:

https://3s-initiative.org/

Initiatives starting from SDGs

Good practice name: UNCCD Peace Forest Initiative
Country: Global

Good practice name:	UNCCD Peace Forest Initiative	Country:	Global
Type of initiative:	☒ Policy ☒ Practice ☒ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☒ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☒ Forest ☒ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

Own initiative

What is the main purpose/objective of the initiative?

The Peace Forest Initiative is to facilitate the implementation of the Land Degradation Neutrality in fragile and post-conflict situation. Ultimate goal of the Initiative is to enhance trust and peace through cooperation on land and forest management while contributing to multiple SDGs.

Short description if the initiative/project/network

The Peace Forest Initiative is designed to provide a practical platform to forge a partnership in the implementation of LDN focusing on the post-conflict situations. Rehabilitation of degraded land and forest is one of urgent challenges faced by conflict-affected community. Joint effort and joint management of natural resources would help build confidence and lasting peace, while strengthening positive relationship and benefiting local communities.

What are the main outputs and outcomes (take-home messages)?

Sustainable management of land and forest. Concrete actions on ground with mobilization of multi partners engagement can contribute to resilience building and permanent peace.

Soil threats addressed:	SDGs addressed:
☒ Soil erosion	☒ 1. No poverty
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☐ Other (please specify)	☒ 15. Life on land
	☒ 16. Peace, justice and strong institutions
	☒ 17. Partnerships for the goals

References/Links/More info:

https://www.unccd.int/news-events/unccd-ready-welcome-countries-new-peace-forest-initiative

Good practice name: Nicole network discussion on SDGs
Country: Europe

Good practice name:	Nicole network discussion on SDGs	Country:	Europe
Type of initiative:	☐ Policy ☒ Practice ☒ Network ☒ Research ☐ Tool / Instrument ☐ Methodology ☒ Pilot ☐ Other (please specify)	Type of land:	☐ Agricultural ☐ Forest ☐ Nature ☒ Industrial ☒ Urban ☒ Derelict/unused

Context. What is the background of the project/initiative?

Nicole network comprising over 100 organisations.

What is the main purpose/objective of the initiative?

Promote sustainable land management across Europe.

Short description if the initiative/project/network

Nicole members discussing how best to implement the SDGs in land management.

What are the main outputs and outcomes (take-home messages)?

Much interest however frameworks need to be further developed to capture the SDGs into sustainable land management.

Soil threats addressed:	SDGs addressed:
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References/Links/More info:

Good practice name: IPBES-Food
Country: EU

Good practice name:	IPBES-Food	Country:	EU
Type of initiative:	☒ Policy ☐ Practice ☐ Network ☐ Research ☐ Tool / Instrument ☐ Methodology ☐ Pilot ☐ Other (please specify)	Type of land:	☒ Agricultural ☐ Forest ☐ Nature ☐ Industrial ☐ Urban ☐ Derelict/unused

Context. What is the background of the project/initiative?

IPBES food together with farmers, food entrepreneurs, civil society activists, scientists and policymakers.

What is the main purpose/objective of the initiative?

To develop a common food policy for the European Union

Short description if the initiative/project/network

Flagship initiative of the International Panel of Experts on Sustainable Food Systems (IPES-Food) that proposes a common policy based on Cross-sectoral (ensuring adequate synergies and avoiding inconsistencies between different policy areas);

- Informed by best practices found in cities and Member States;
- Long-term, with indicators allowing to monitor progress towards time-bound objectives;
- Supporting local and regional initiatives;
- Improving legitimacy and accountability in food systems, including calling for EU food policy council.

What are the main outputs and outcomes (take-home messages)?

Policy inconsistencies that hinder the development of more sustainable food policy, and misplaced incentives should be incorporated in the development of policy.

Key challenges for land in the EU include reduction of utilised agricultural area, increased concentration of land and inflation of land prices, unsustainable agricultural practices leading to various threats to soil health and pressure on water resources from nitrogen run-off and eutrophication.

Soil threats addressed:	SDGs addressed:
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	☐ 17. Partnerships for the goals

References/Links/More info:

http://www.ipes-food.org/pages/CommonFoodPolicy

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To explore the potential of nature to improve the quality of life

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 6,500 employees (5,500 fte) and 12,500 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.