



‘Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States’

Final Report

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Executive Summary

Soils are key to the delivery of a wide array of ecosystem services, including water and nutrient cycle regulation, food and fiber production, providing a physical basis for construction and habitat for various species. However, soils in the EU are exposed to numerous threats which limit their ability to deliver ecosystem services. These threats include erosion, floods and landslides, loss of soil organic matter, salinisation, contamination, compaction, sealing, and loss of soil biodiversity. In its recent report on the state of the European Environment, the European Environment Agency established that loss of soil functions and land degradation remain major concerns, and that these are expected to show continued deteriorating trends in the future (EEA, 2015b).

Against this background, this project aimed to take stock of existing soil protection policies and measures at the EU and Member State level, and to identify key gaps in protection with respect to soil threats and functions identified in the Thematic Strategy for Soil Protection. The project has:

1. Developed an inventory of existing and upcoming policy instruments at EU level and in the EU 28 Member States compiling this information in a collaborative Wiki web platform,
2. Carried out a cross-policy analysis, examining the coverage of soil threats and functions in EU policies and the strengths, weaknesses, opportunities and threats represented by existing policy. On this basis a list of outstanding questions and potential gaps in EU level policy have been identified.
3. Analysed how the Member State instruments across the EU-28 complement and address the gaps identified in the EU legislation
4. Fostered discussion regarding current and future policy initiatives with experts at Member State and EU level on the policy inventory and assessment results by participating in the discussions of the Expert Group on Soil Protection and co-organising the Soil Stakeholders' conference.

By developing an improved understanding of existing policy instruments and gaps in soil protection, the project findings aim to contribute to developing a baseline on which to build further policy action on soils in the EU and are intended as a basis for discussion around the role of policy for soil protection in Europe.

The starting point for the analysis was the establishment of a collaborative web platform (Soil Wiki), developed together by the study team and national Member State experts. The Soil Wiki covers 35 EU level policies and 671 instruments across the 28 EU Member States. Given the cross-sectoral nature of soil issues and the diversity of environmental and socio-economic pressures and governance conditions across Europe, it is not surprising that many different policy instruments at EU and Member State level exist. These instruments either explicitly reference soil threats or soil functions, or implicitly offer some form of protection for soils.

The major share of the Member State instruments included in the Soil Wiki are regulatory instruments (74%), such as regulations, ordinances, decrees and others, and the majority of these instruments (61% out of 671 instruments) are binding in nature. In addition, the Wiki

also includes non-regulatory instruments, specifically monitoring, funding and awareness-raising schemes. Thereby the Soil Wiki provides an overview of actions in all EU 28 Member States. Nonetheless, it is important to note that the Soil Wiki currently does not capture the full diversity of regional activities relevant to soil protection. In later phases of the Wiki development, incorporating regional actions may offer additional innovative examples of solutions for soil protection.

In terms of the relationship to EU level legislation, nearly half of all Member State instruments in the Soil Wiki are directly linked to EU policies (45%), i.e. their implementation is mandated by the EU *acquis*. Another 21% are linked partly to EU binding instruments, which means that they implement the EU binding legislation but also go beyond the *acquis* in either the degree of ambition that they set for EU requirements or they regulate additional areas that do not derive from the EU *acquis*. This means that a total of 225 identified instruments (35.5%) are 'nationally initiated' policies, i.e. policies partly linked to EU non-binding policies or not linked to any EU requirements.

The cross-policy analysis has shown a number of strengths relating to the coverage of soil threats and functions by existing EU laws. Importantly, existing EU policies do offer relatively strong protection, for example, against new point source emissions from regulated installations and funding mechanisms and State Aid Guidelines enable the support of soil focused priorities.

Furthermore, there are opportunities for soil protection that can emerge from improved use of existing legislation or through upcoming EU policy dossiers. In terms of improved usage of existing legislation, there is potential to further build on priorities within the 7th Environment Action Programme (7thEAP), and promote more holistic soil management as a tool for delivering sustainable land management and more sustainable and resource efficient nutrient cycling. The 7th EAP mandate to the European Commission to pursue a binding legislative proposal remains an opportunity, although at present other priorities appear to dominate.

The climate and energy package for 2020 – 2030 includes potential opportunities for soil protection linked to GHG emission reduction targets through better soil organic matter protection and management, and the more sustainable use of inorganic (especially nitrogen) fertilisers. Specifically, there is some potential for soil protection in the current proposals for a Land Use and Land Use Change and Forestry Regulation (LULUCF) and an Effort Sharing Regulation (ESR), requiring GHG emission reductions from sectors excluded from the EU Emissions Trading Scheme, including agriculture up to 2030.

The CAP is a key policy for soil protection on agricultural and forest land. It requires Member States to define minimum soil protection standards at national or local level as a condition of receipt of Pillar 1 direct payments, which account for €41 billion of EU expenditure each year and cover around 90% of the UAA (utilized agricultural area) in the EU. The EU legislative framework requires the national or regional competent authorities, when defining the soil protection standards, take account of the specific characteristics of their area. The soil standards could be strengthened to ensure more effective protection, particularly of soil organic matter. Pillar 2, which has a high level of subsidiarity, is one of the most important soil policy instruments for agricultural and forest land. It allows Member States and regions to design and target a wide range of very specific soil protection measures tailored to their priorities and needs, under their Rural Development Programmes. These choices are made in the context of many other competing rural development priorities and a smaller EU

contribution (compared to the Pillar 1 budget). In contrast to other environmental priorities that can be addressed by the 118 RDPs for 2014-20, including water, biodiversity and climate mitigation, there is no underpinning EU legislation on soil protection.

Whether the strengths and opportunities identified above indeed result in benefits for soil protection depends on how soil issues are integrated in these policy instruments. Member States have to prioritise agriculture as part of their efforts to maximise reductions in net GHG emissions and requirements should encompass sustainable soil management techniques that also deliver other soil functions. Similarly to climate change policies, water protection policies are important existing instruments identified for protecting Europe's soils. Nonetheless, there is no specific requirement in water quality legislation to remediate or protect soils in situ. Instead, the goal of water legislation is to prevent negative impacts on water bodies and this could be delivered in multiple ways.

When looking at the EU level policy instruments protecting Europe's soils, the lack of a strategic policy framework was highlighted across all policy clusters. This lack of a common strategic policy frame could be an important gap. A strategic policy framework could, in an integrated manner: (a) conceptualise soil issues (including, where appropriate, common definitions on good status); (b) set out priorities and targets; (c) define monitoring parameters and desired objectives; and (d) try to define the possible role of different policy instruments in delivering good soil status. In the absence of a common policy framework, soils are addressed in many policy instruments but there is no EU level political or legislative driver for establishing integration towards an agreed strategic aim or set of strategic objectives. Further analysis needs to be carried out to understand the potential value added of an EU common policy frame.

In addition to the EU level analysis, the study reviewed in more detail 225 nationally initiated policies included in the Wiki to examine how these Member State instruments complement and address the gaps identified in the EU legislation. Moreover, implementation approaches for the Common Agricultural Policy were reviewed for EU-28, including greening payment requirements, all soil-relevant Good Agriculture and Environment Standards (GAECs), and 40 Rural Development Programmes.

The analysis of nationally initiated policy instruments in the EU-28 Member States confirms that the lack of a strategic coordination and integration is an important theme. Some Member States have comprehensive policies in place that take account of soil protection. However, some of the policies that require the integration of and strengthening in relation to soil protection needs and objectives are EU level policies. This includes critical measures relating to agricultural land management, pollution prevention, and water and biodiversity protection. Member States' actions to address different threats to soil are the main step in the process to improve soil protection and the EU policy level could help this process.

The importance of integration is underlined by the fact that EU, national and regional policies interact with international policies, such as United Nations Convention to Combat Desertification, Alpine Convention and United Nations Framework Convention on Climate Change. Several Member States highlighted both the EU and international policies as important drivers of policy decision making on soil issues. The emphasis being placed on halting and reversing land degradation within the Sustainable Development Goals (Goal 15) and work on the conceptualisation of land degradation neutrality also offer potential

opportunities for increasing emphasis on soil protection in Europe. In this context, stopping soil sealing appears to be an absolute priority.

In addition to the lack of strategic coordination of soil concerns at EU level, other weaknesses identified in the coverage of EU law included:

- That soil protection is an outcome mostly derived from protecting other environmental resources, addressing other environmental threats or delivering other goals or targets;
- Key policies that offer some strategic vision are non-binding. As such they cannot be used as a clear basis for integrating and reinforcing the protection of soil within existing EU laws in the way that, for example, water protection laws such as the Water Framework Directive can be cross referenced within IED or under Statutory Management Requirements set out in CAP cross-compliance.
- Land protection may not equate to soil protection. Thus, land is not protected against soil sealing at the EU level and insufficiently at Member State level. In some key EU policies protection from contamination is focused on land protection and not explicitly on soil protection. These are not necessarily one and the same thing. Land can be protected but important soil functionality can be lost.
- Historic contamination that persisted before the introduction of key EU policies, such as IED (and prior to IED IPPC) and the Environmental Liability Directive is not addressed by EU laws and there are no binding rules in place for detecting or defining contaminated sites.
- There is limited elaboration in EU law of soil functions, what these consist of and the actions that their protection implies. Moreover, a question has also emerged during the study regarding the elaboration of the role of ecosystem services provided by soils and the limited representation of these in legal texts.

Limited evidence was identified in this study to suggest that across Europe, at the national level, action has been taken to address the weaknesses identified in EU law. In some Member States mechanisms exist that address EU level gaps, in particular to define contaminated sites, coordinate action on historic contaminated sites and the identification of contaminated sites. Some Member States have also put in place comprehensive soil protection legislation. For the majority of countries, however, it was concluded that coverage of key weaknesses and issues at EU level was partial. In some Member States coordinated action on soil protection and soil threats appeared to be lacking.

1 Introduction

Soils in the EU are a vital resource, delivering soil functions and many essential ecosystem services such as water and nutrient cycle regulation, food production, providing a physical basis for construction, and providing habitat for various species. EU soils, however, are affected by a wide range of degradation processes. The EU Soil Thematic Strategy identifies the key soil threats in the EU as erosion, floods and landslides, loss of soil organic matter, salinisation, contamination, compaction, sealing, and loss of soil biodiversity (COM 2006). In its recent report on the state of the European Environment, the European Environment Agency established that loss of soil functions and land degradation remain major concerns, and that these are expected to show continued deteriorating trends in the future (EEA, 2015b).

The scale of soil degradation in the EU is significant with approximately 22% of European land affected by water and wind erosion (Jones et al. 2012). Around 45% of the mineral soils in Europe have low or very low organic carbon content, soil contamination is affecting up to three million sites, and an estimated 32-36% of European subsoils are classified as having high or very high susceptibility to compaction (Jones et al. 2012). An increase in soil sealing has also been identified due to construction and infrastructure development (EEA 2015b). These soil threats moreover drive the loss of soil biodiversity. Due to accelerating drivers behind degradation such as increasing urbanisation, land abandonment, and intensification of agricultural production, soil degradation processes continue to undermine soil functions and the delivery of ecosystem services.

The ongoing deterioration of soils also reflects the lack of an overarching and integrated legal and policy framework for soil protection in Europe. The proposal for the Soil Framework Directive was withdrawn by the European Commission largely due to Member State arguments focused on subsidiarity and administrative costs, thus leaving soils as a key natural resource not protected through an integrated EU-wide approach (with water and air quality both the subject of directives).

The European Commission has committed to finding ways of achieving the sustainable management of EU soils in its 7th Environment Action Programme (Decision No 1386/2013/EU). Under priority objective 1, the EAP states that by 2020 'land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway' (paragraph 28(e)) and that to do so, this requires 'increasing efforts to reduce soil erosion and increase soil organic matter, to remediate contaminated sites and to enhance 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' (paragraph 28 (vi)). It also proposes that addressing issues facing EU soil resources within 'a binding legal framework' should be revisited as soon as possible. Furthermore, the Roadmap to a Resource Efficient Europe also established the goal of reducing the amount of land take to 'no-net land take' by 2050 (COM 571/2011).

1.1 Project Objectives

Against this background, this project aimed to take stock of existing soil protection policies and measures at the EU, national and, where applicable, regional level and identify key gaps in soil protection. Specifically, the project:

- Developed an inventory of existing and upcoming policy instruments at EU level and in the EU 28 Member States compiling this information in a collaborative Wiki web platform
- Carried out a cross-policy analysis, examining the coverage of soil threats and functions in EU policies and the strengths, weaknesses, opportunities and threats represented by existing policy. On this basis a list of outstanding questions and potential gaps in EU level policy have been identified.
- Analysed how the Member State instruments across the EU-28 complement and address the gaps identified in the EU legislation.
- Fostered discussion regarding current and future policy initiatives with experts at Member State and EU level on the policy inventory and assessment results by participating in the discussions of the Expert Group on Soil Protection and co-organising the Soil Stakeholders' conference.

A clearer understanding of existing policy instruments and gaps in soil protection can provide a baseline on which to build further policy action on soils in the EU.

1.2 Methodological Approach

1.2.1 Approach for Wiki Development

Developing the online inventory of soil policy instruments (Wiki collaborative platform or in short 'Soil Wiki') was a collaborative and reiterative process that took place between January and October 2016. The first version of the Soil Wiki was prepared by the study team. The core team developed the page tree structure for the Wiki, as well as the template for the Wiki's basic building block – the soil policy instrument pages. These all follow the same structure, which was initially tested for 2 Member States in order to ensure that the structure allowed for the capture of relevant information and to provide complete examples. Drawing on studies reviewing soil protection policies, an initial list of relevant instruments for each Member State was prepared and agreed on by the core study team.

Member State assessors, i.e. members of the extended study team with geographic and thematic knowledge of their respective Member States, then used this template and prepared individual pages for selected policy instruments. Slightly adjusted templates were prepared for the Common Agricultural Policy Instruments (Good agricultural and environment condition standards under Cross-compliance, Greening payment requirements, Rural development programmes).

To ensure that available information from the existing EU-wide reviews was captured in the Wiki, the EU-wide studies were screened and relevant information for each Member State extracted. To a certain extent, the information from existing studies could not be transferred

into the Wiki because, while providing broad overviews, it did not have the relevant detail on specific instruments to populate the policy instrument pages. In preparing individual policy instrument pages, Member State assessors screened original legislative texts for policy instruments and other national sources of information.

The first version of the Soil Wiki was completed by the study team in April 2016 and a review process with the Expert Group took place between May and August 2016. Member State experts reviewed the Wiki pages for their MS and proposed, where necessary, changes. In the review phase a number of new policy instrument pages were added to the Wiki. A separate request was sent to the EIONET NRC Soil group by JRC, to provide additional entries to the Wiki focused on monitoring schemes. In the review process, additional 160 instruments were added to the Soil Wiki and final changes to the Wiki were integrated by the study team.

1.2.2 Approach for Gap Analysis

The Terms of Reference for the project stated that ‘based on the inventory the contractor should perform a preliminary gap analysis contrasting soil threats covered by the policy instruments and the available information at all levels on the state and trends of soil degradation’. The analysis also considers gaps in relation to the protection of soil functions. Within the project, and in discussion with the European Commission and the expert group working on soil protection, it was decided to define this as a two tier assessment looking first at EU level policies and their coverage of soil protection issues. Once areas of interest and potential gaps at EU level were identified, the approaches adopted by Member States that might compliment EU level action were reviewed using the information gathered in the Wiki. A simplified approach to the analysis is set out in Figure 1.1. Conclusions were then drawn across the clusters and EU / Member State levels about the key gaps that appear to persist in the protection of soils in Europe and questions/issues that remain for further investigation.

EU Level Analysis¹

As a first step, individual policy assessments were carried out. A list of 35 EU level legislative, strategic policy and funding instruments adopted by the EU institutions was identified as being potentially relevant to soil protection. Each of these policies was then analysed to understand:

- Their coverage and relevance in terms of soil protection examining their relationship to soil management issues and specifically looking at whether they explicitly or implicitly focus on a given soil threat or function;
- Each policy’s Strengths, Weaknesses, Opportunities and Threats in relation to soil protection.

The second step consisted of a clustered assessment of the coverage of soil threats and functions. The individual EU laws and policy instruments were clustered around key thematic themes and issues, reflecting six priority areas identified by the European Commission. The ‘clustered’ policies were analysed to understand the relevance and coherence of coverage

¹ Further details of the coverage of the EU level analysis and clusters are set out in Chapter 3.

within the policy cluster as a whole, as well as the Strengths, Weaknesses, Opportunities and Threats that emerge once the policies are combined. Based in particularly on the Threats and Weaknesses , a list of issues and potential gaps in policy coverage at EU level were identified and shortlisted for each cluster.

Understanding Member State Policy Instruments and their Complementarity with EU Policy Instruments

The online inventory of soil policy instruments at the national (and regional level) was examined to understand the nature of nationally initiated policy instruments, i.e. *those instruments not directly linked to binding EU level rules or requirements, or instruments linked to EU non-binding requirements (e.g. Soil Thematic Strategy, or 7th EAP)*. The Member State instruments included in the Wiki were not evaluated for their implementation or effectiveness. Instead, they were reviewed to understand how they complement the EU policies and to establish whether there is evidence that Member State action is filling gaps in EU level policies. If the latter were the case, it could be argued that while gaps may persist in EU policy instruments these gaps would not be of concern for soil protection in Europe.

Figure 1.1 demonstrates the twin track approach to the analysis and highlights that the review of Member State soil policies was determined by the gaps in EU level law. The gap analysis does not represent an evaluation of any one Member State’s policies for soil.

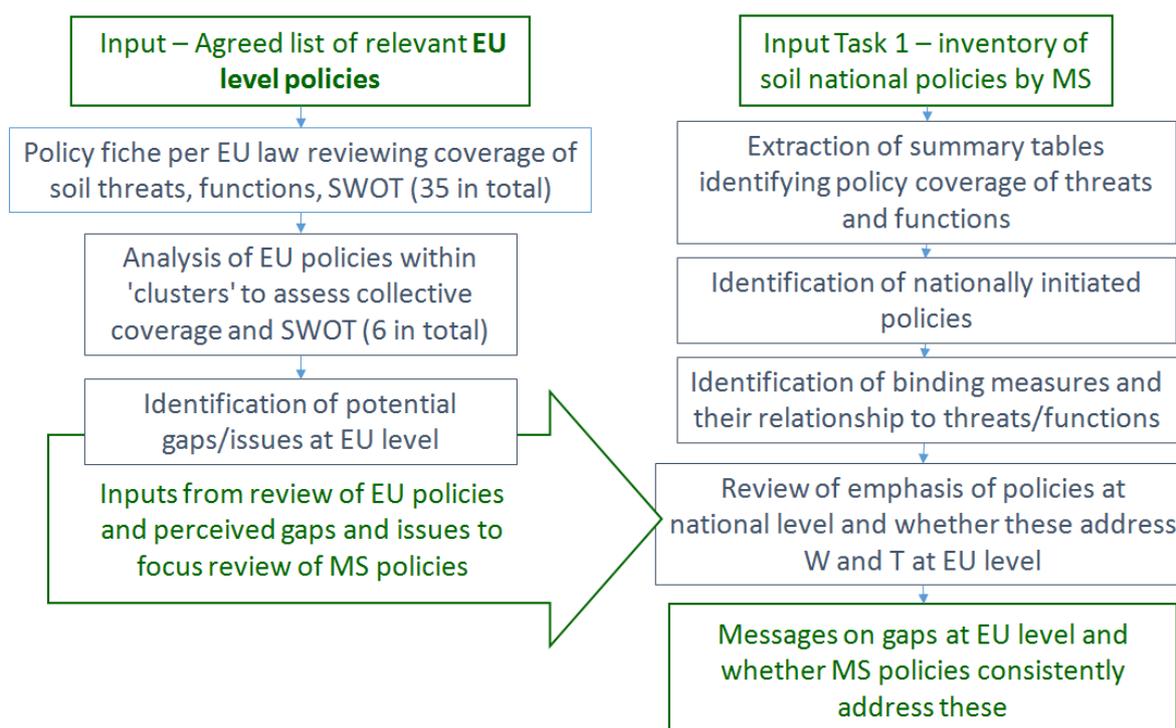


Figure 1.1 Key Analytical Steps Undertaken within the Gap Analysis

1.3 Structure of the Report

The report presents the results of the project, providing first an overview of the structure and content of the online inventory (Chapter 2). In Chapter 3 we then outline the approach taken to the analysis of the EU policies, specifically the gap analysis of the EU-wide policy instruments, as well as a review of how the Member State policies complement gaps in the EU policies. The analysis and the remainder of the report is then structured along six policy clusters, focused on different themes, i.e.: overarching instruments relevant to soils (Chapter 4), Common Agricultural Policy (CAP) and complementary measures on agricultural and forest land (Chapter 5), Industrial and point source contamination of land (Chapter 6), Diffuse pollution and water management (Chapter 7), Nature, land use planning and soil sealing (Chapter 8), Climate Change and Energy (Chapter 9). Conclusions stemming from this study are presented in Chapter 10. Annexes 1 – 3 contain supporting materials (Annex 1 – Labels in Soil Wiki, Annex 2 – Soil Stakeholders' Conference Report, and Annex 3 – EU Policy Instrument Fiches).

2 Online Inventory of Soil Protection Policy Instruments in the EU

2.1 Introduction

The project developed an online inventory of soil protection policy instruments (referred to as the Soil Wiki). The Soil Wiki was compiled as an internal working tool in order to provide an overview of soil relevant policy instruments at EU level (EU-wide policy instruments) as well as in the 28 Member States (Member State instruments). The Wiki includes regulatory instruments, such as directives, regulations, ordinances, decrees and others. It also includes non-regulatory instruments, for example, monitoring, economic and awareness-raising schemes and initiatives. The focus of the Soil Wiki, however, is on legislative/regulatory instruments and on monitoring instruments. The inventory includes both binding and non-binding instruments. The majority of instruments included in the Soil Wiki are already in place and only a small number of instruments are in the pipeline or planned.

2.2 Soil Wiki Structure

The structure of the Soil Wiki is determined by the standardised page segmentation, the labelling, the page tree, and the use of macros. Figure 2.1 show the layout of the Soil Wiki.

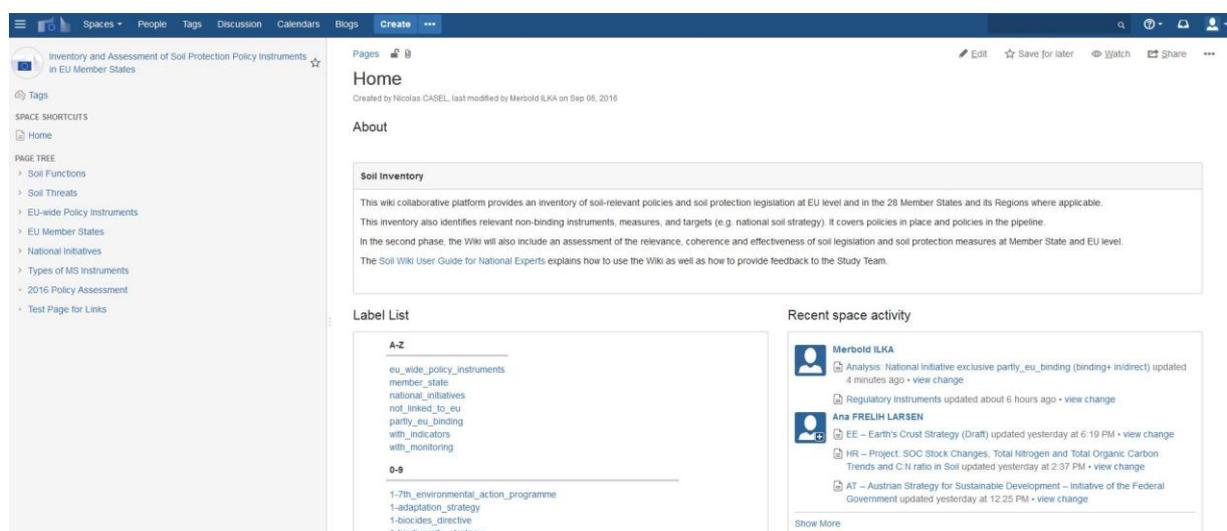


Figure 2.1 Layout of the Soil Wiki Website

To the left of the homepage, a page tree is available which enables the navigation across the main pages and the sub-pages. The page tree contains the following subpages: Soil Functions, Soil Threats, EU-wide policy instruments, EU Member States, National Initiatives, Types for MS instruments and 2016 policy assessment. These then include further sub-pages. An overview of the page tree and the macros used is given in Table 2.1 below which describes the contents and includes information on the macros used. The page segmentation and label use is explained below.

Table 2.1 Structure of the Wiki and Macros Used

Page	Child	Grandchild	Content description + [Macros]
Soil			Introduction to the wiki Label List Recent space activity Space contributors
Functions			Introduction to soil functions [Children Display]
	Soil Function		List by MS of all MS instruments that address this soil function implicitly and explicitly [Content by Label]
Soil Threats			Introduction to soil threats [Children Display]
	Soil Threat		List by MS of all MS instruments that address this soil threat implicitly and explicitly [Content by Label]
EU-wide Policy			[Children Display]
Instruments	EU Policy Instrument		Introduction to this EU policy instrument List by MS of all MS instruments that implement this EU policy instrument [Content by Label]
			[Children Display]
EU Member States	Member State		Study team contact for this MS Soil policy instruments of this MS [Children Display] 2016 policy assessment for this MS
		MS Instrument	[Numbered Headings] Text following standardised page segmentation and labelling (for details see above).
			List by MS of all national MS instruments that are not linked to an EU-wide Policy Instrument [Content by Label]
National Initiatives			[Children Display]
Types of MS Instruments	Type of instruments		[Children Display]

2.2.1 Page segmentation

Each Member State (MS) has its own page in the Soil Wiki, where all the policy instruments that have been identified for this Member State are listed. The Member State pages contain the sub-pages for individual policy instruments – each Member State policy instrument that has been identified has its own Soil Wiki page and each of these pages follows the same structure of sub-headings. These include:

- Brief description of the instrument
- Institution(s) responsible for the implementation and/or evaluation of the policy instrument
- Type of instrument
- Status of policy instrument
- Budget dedicated to soil protection
- Territorial coverage
- Sectoral coverage
- Soil threats addressed by instrument

- Soil functions addressed by instrument
- Land cover classes addressed by the instrument
- Evaluations of the instrument
- Monitoring mechanisms and indicators
- Soil protection measures promoted through the policy instrument
- Which EU-wide policy instrument(s) does the instrument implement?
- National Initiatives
- Links to reference documents
- Other available information

2.2.2 Labels

The MS instrument pages are labelled to enable overview lists, for instance with all MS instruments that implement soil related aspects of the Water Framework Directive. Since it is not possible to group labels in a Wiki, a number has been put in front of the label to group them, which is helpful for instance in the labels list on Home (which is sorted alphanumerically). The Soil Wiki contains the following types of labels: EU-wide instruments (group 1 labels), type of Member State instruments (group 2 labels), Member State (group 3 labels), soil threats (group 4 labels), soil functions (group 5 labels), land cover classes (group 6 labels), and further labels (e.g. national initiatives not linked to EU instruments). The complete list of labels used in the Wiki can be found in Annex 1.

2.3 Soil Wiki Content

The Soil Wiki contains a wide range and type of policy instruments implemented to address soil protection at Member State level. At EU level, 35 instruments were identified as being relevant for soil protection (see Table 3.1. for the full list). The EU policies which are most frequently linked to the Member State instruments include (number of tags is listed in brackets):

- Water Framework Directive (96)
- Soil Thematic Strategy (82)
- Nitrates Directive (73)
- Habitats and Birds Directive (68)
- Environmental Impact Assessment Directive (63)
- Common Agricultural Policy - Cross Compliance (56)
- Common Agricultural Policy – Rural Development Programme (56)
- Industrial Emissions Directive (56)
- Sewage Sludge Directive (55)
- Waste Framework Directive (55)

As shown in Figure 2.2, a total of 671 Member State instruments are included in the Soil Wiki, or an average of 24 instruments per Member State. Approximately 74% of these 671 instruments are regulatory instruments, and the majority of instruments (61%) are binding instruments. Moreover, 12% of instruments are regulatory non-binding instruments (e.g., strategies and action plans), and 27% are non-regulatory instruments (monitoring, funding and awareness-raising schemes).

Nearly half of all Member State instruments included in the Soil Wiki are directly linked to EU policies (45%), i.e. their implementation is mandated by the EU acquis. Another 141 instruments (21%) are linked partly to EU binding instruments, which means that they implement the EU binding legislation but also go beyond the acquis in either the degree of ambition that they set for EU requirements or they regulate additional areas that do not derive from the EU acquis. This means that a total of 225 instruments (35.5%) are what we define in this study as ‘nationally initiated’ policies, i.e. policies partly linked to EU non-binding policies or not linked to any EU requirements.

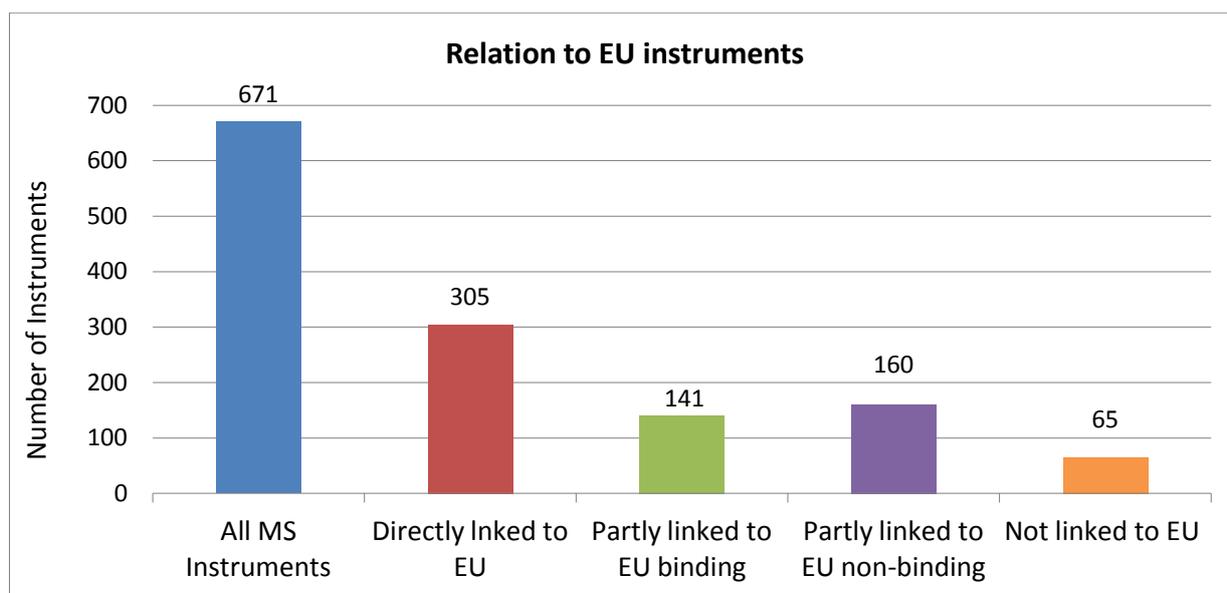


Figure 2.2 Link of Member State Instruments to EU Policies

Some examples of nationally initiated policy instruments include:

- Soil Protection Acts / Decrees (e.g. AT, BE, DE, NL, SK)
- Agricultural / Cultivated Land Acts / Decrees (e.g. BG, HR, SI, CZ, PL, DK, UK)
- Acts / Decrees related to contamination and remediation (e.g. AT, FI, SE)
- Subsurface / subsoil use (e.g. LV, NL)

Policy instruments implemented at Member State level were also tagged / labelled with regards to their expected impact on soil protection, differentiating between a direct and indirect impact. The label ‘direct impact to soil protection’ is used where the instrument explicitly aims to address soil protection objectives (and this is also clearly stated in the scope, aims, mechanisms that the instrument pursues). For example, this would include soil protection laws or strategies, or decrees dealing with soil contamination. Indirect impact, on the other hand, is defined as occurring when soil protection objectives are not explicitly stated, but it can be inferred from the policy’s content that the policy contributes to soil protection. This, for example, is the case in policies dealing with water protection, where meeting water quality or water quantity objectives requires the implementation of soil management measures (e.g. against soil erosion), however soil protection objectives are not actively or coherently pursued by the instrument. It is important to note that this label entails a degree of expert judgment.

Figure 2.3 provides an overview of the Member State instruments in relation to their direct / indirect impact on soil protection. It shows that the majority of Member State instruments in the Soil Wiki have direct impact on soil protection, i.e. they explicitly contribute to soil protection objectives. Between 65 - 90% of the Member State instruments are expected to have a direct impact on soil protection. The Figure also illustrates that there is some variation in the number of instruments that are included for each Member State. While a couple of Member States have up to 50 instruments in place (i.e. United Kingdom and Belgium), several countries (Finland, Germany, Austria, France, Portugal, Hungary, Ireland, Italy, Lithuania, Croatia, the Netherlands, Estonia and Poland) also have a high number ranging between 20 and 30 instruments (except for Finland which has 37 instruments). Overall, there is no Member State with less than 12 policy instruments. Several countries with a larger number of instruments included in the Soil Wiki have a federal structure (United Kingdom, Belgium, Austria, and Germany).

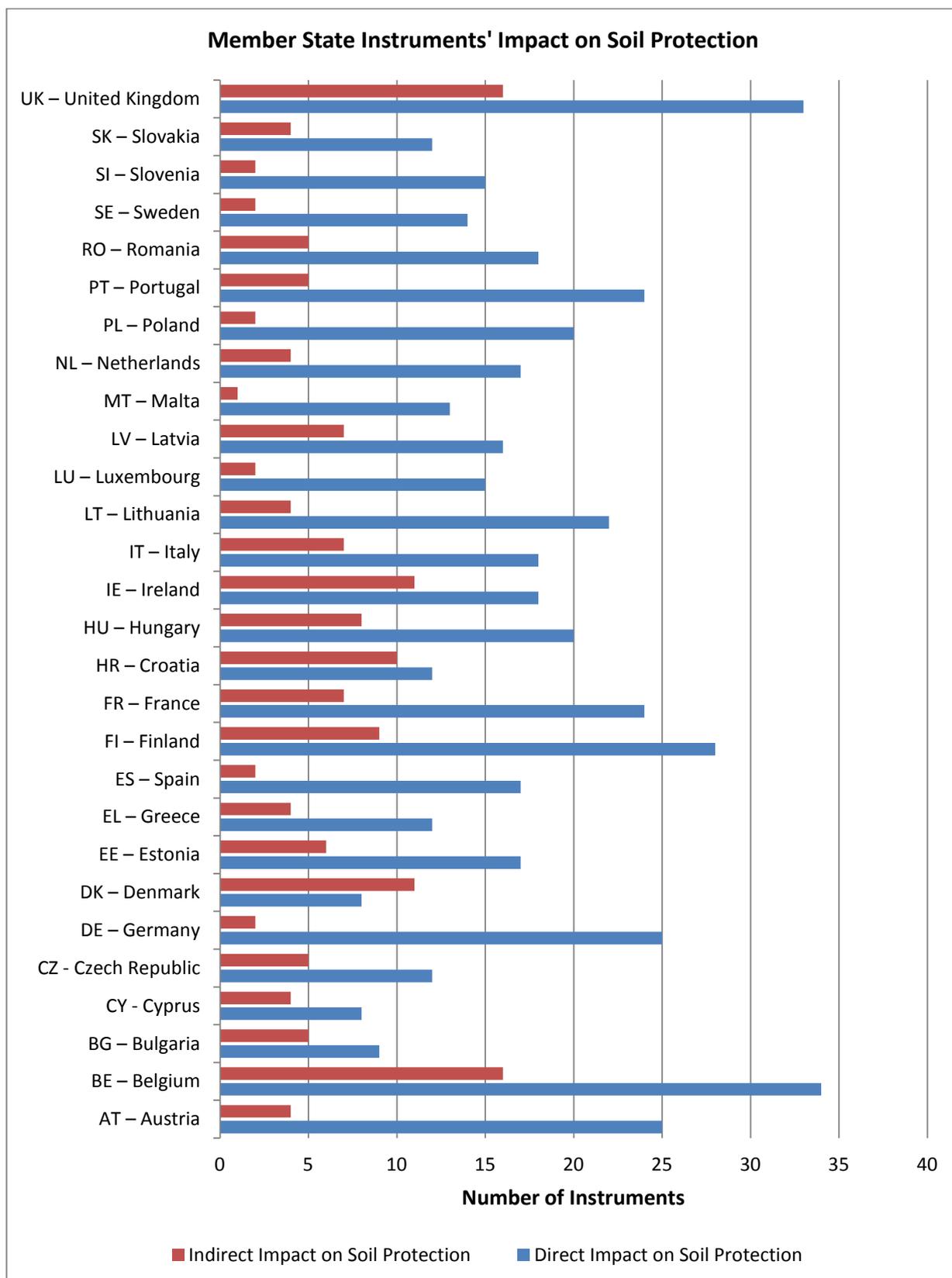


Figure 2.3 Number of Member State Instruments with Direct / Indirect Impact on Soil Protection

With regards to soil functions, Member State instruments (ca. 70 %) mostly frequently address the functions: soil as pool for biodiversity, soils as a platform of human activities and the water and nutrients’ cycling and storage. Secondly, biomass production (60 %) and soils as a carbon pool (54 %) are addressed by 60% and 54% of instruments respectively. Finally, the provision of raw materials (41 %) and storing geological and archeological heritage (23 %) are addressed to a lesser extent (see Figure 2.4). The soil instruments included in the Wiki more frequently address soil functions explicitly (i.e. these are stated in the content of the policy) rather than implicitly (considered to be relevant based on the content of the measure).

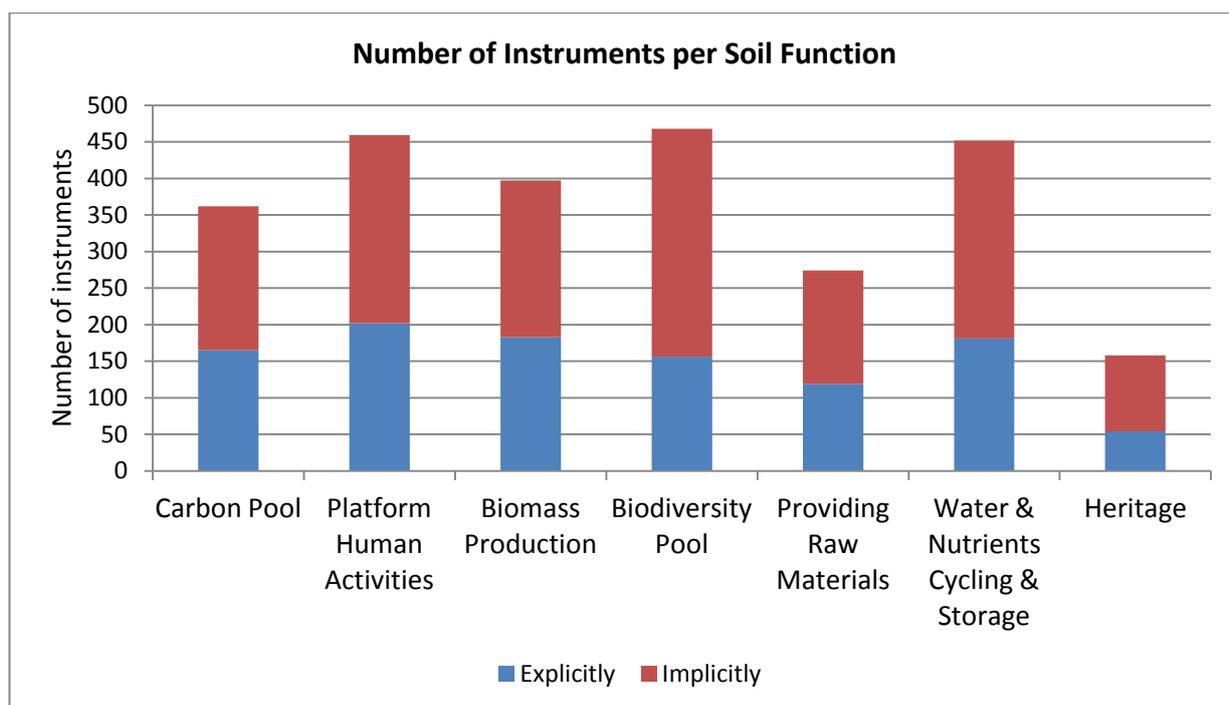


Figure 2.4 Coverage of Soil Functions by Member State instruments (aggregating MS instruments)

The picture is more mixed when looking at the extent to which soil threats are addressed by Member State instruments as shown in Figure 2.5. Soil threats tagged most frequently include (in descending order): loss of soil biodiversity (64 %), loss of soil organic matter (59 %), soil erosion by water (56 %) and diffuse contamination (54 %). Industrial and point source contamination (44 %), soil erosion by wind (35 %), soil sealing (34 %) and soil compaction (31 %) appear less frequently. Soil salinisation (20 %), acidification (8 %) and desertification (6 %) have been tagged infrequently driven in part by the fact that these soil threats are only of concern to a few Member States.

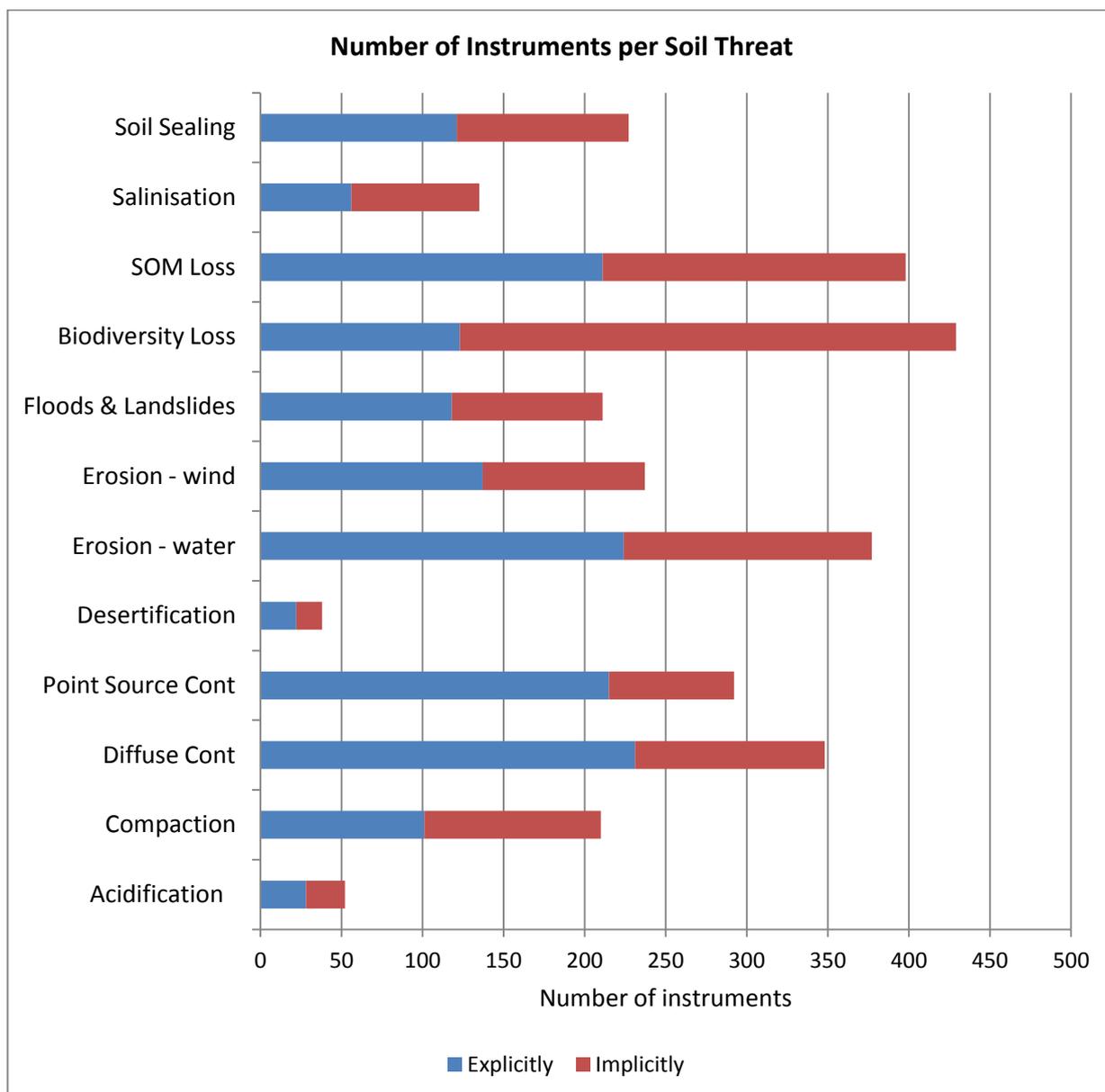


Figure 2.5 Coverage of Soil Threats across the EU (aggregating MS instruments)

When looking at the share of explicit vs. explicit coverage of soil threats, it is interesting to note that more instruments address soil threats explicitly than this is the case with soil functions. Moreover, while loss of soil biodiversity has the highest number of tags for all soil threats, it is mostly implicitly addressed. This is not surprising since soil biodiversity is affected by most other threats, and can be seen as composite indicator of soil health.

3 Analysis of EU and National Policies for Soil Protection

3.1 Introduction

As set out in Section 1.2, a two tier approach to assessing policies was completed, combining an EU level assessment with a review of how nationally initiated policies complement EU level actions. The goal of this analysis is to understand gaps and issues at EU level and whether nationally initiated policies identified in the Soil Wiki help to address or resolve these outstanding questions and gaps. As mentioned above, for the purpose of the analysis, nationally initiated policies are defined as: *those not directly linked to binding EU level rules or requirements, or policies which are linked to EU non-binding instruments (e.g. Soil Thematic Strategy, or 7th Environment Action Programme).*

This Chapter provides an outline of how the analysis at EU and national level has been structured around ‘policy priority clusters’. Chapters 4 – 9 then present the results from this analysis for each cluster. Conclusions are drawn for each cluster bringing together the EU level analysis and review of nationally initiated policy instruments to understand where issues and outstanding questions remain. In Chapter 10, overall conclusions are made, integrating messages around policy needs, gaps and remaining questions across the whole suite of policies analysed.

Given the breadth of policies that potentially impact or interact with soil protection, it was necessary to organise the policy analysis in some way. It was, therefore, decided to use the six clusters (presented in Box 3.1) to structure the analysis. The clusters essentially represent issues or policy topics deemed of particular importance for soil protection and act as an organising principle for the work.

Box 3.1 Six Priority Policy Clusters

Policies were allocated to six priority clusters as an organising principle for the analysis. Although some policies cross over and cover more than one cluster, this approach enables us to messages regarding the interconnectivity and collective impact of policy measures.

- Common Agricultural Policy (CAP) and complementary measures on agricultural and forest land;
- Overarching instruments relevant to soils, including strategic EU policies and EU funds;
- Diffuse pollution/ water management;
- Industrial and point source contamination of land;
- Nature, land use planning and soil sealing;
- Climate change and energy.

The approach to analysis, with the different steps involved, and the role of the clusters is illustrated in Figure 3.1.

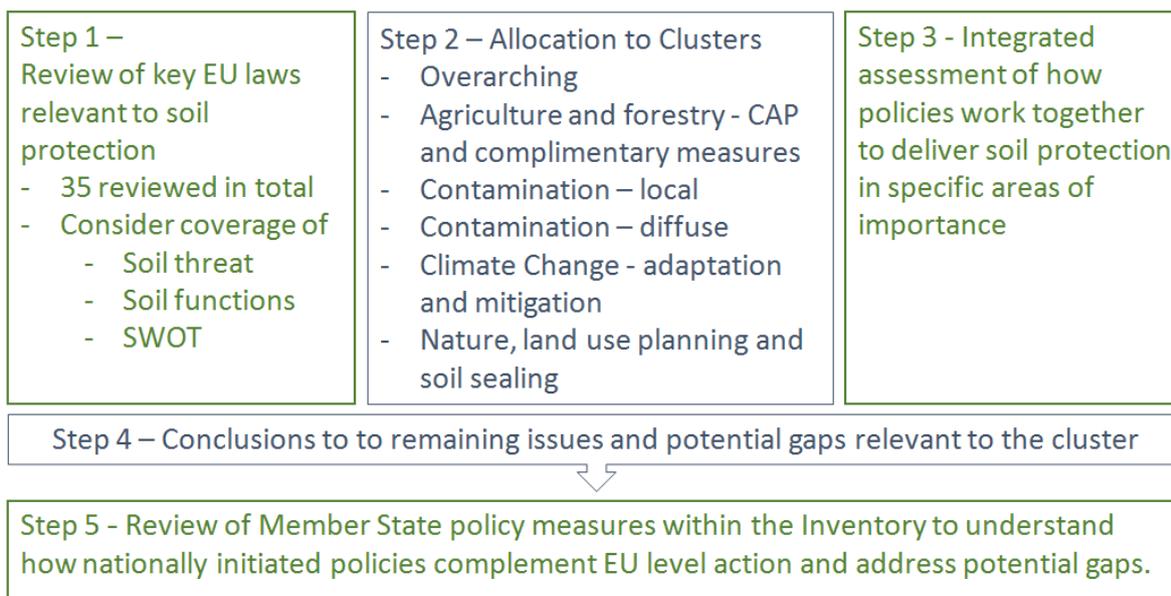


Figure 3.1 Analytical Steps and Clusters

Table 3.1 sets out the full list of 35 EU level policies that were analysed and their allocation among the six clusters.

Table 3.1 Polices Covered Within the EU Level Policy Assessment

Policy instrument ²	Allocation to Priority Policy Cluster (s) ³
Strategic Initiatives	
Adaptation Strategy	Climate Change and Energy
Biodiversity Strategy	Biodiversity Nature, land and soil sealing
Circular Economy Action Plan	Overarching instruments
7th Environmental Action Programme	Overarching instruments
EU Forest Strategy	CAP and complementary measures
Resource Efficiency Road Map	Overarching instruments
Soil Sealing Guidelines	Nature, land and soil sealing
Soil Thematic Strategy	Overarching instruments

² In the final review process two additional directives were identified as relevant (Seveso Directive and INSPIRE Directive). These will be integrated in the Wiki during the follow-up project.

³ It should be noted that some policies span a number of policy clusters and contain actions relevant to more than one aspect of soil protection. For example, action under the CAP is relevant to clusters a, c, e and f.

Policy instrument ²	Allocation to Priority Policy Cluster (s) ³
<i>Binding Measures – Directives, Regulations, Decisions</i>	
Drinking Water Directive	Diffuse pollution/water management; Industrial and point source contamination of land
Effort Sharing Decision	Climate change and energy
Environmental Impact Assessment Directive	Nature, land and soil sealing
Environmental Liability Directive	Industrial and point source contamination of land
Fertiliser Regulation	Diffuse pollution/water management
Floods Directive	Nature, land and soil sealing; water management
Groundwater Directive	Diffuse pollution/water management;
Habitats and Birds Directives	Nature, land and soil sealing; CAP and complementary measures
Industrial Emissions Directive	Diffuse pollution/water management; Industrial and point source contamination of land
Landfill Directive	Diffuse pollution/water management; Industrial and point source contamination of land
LULUCF Decision	Climate change and energy
Mercury Regulation	Industrial and point source contamination of land
National Emission Ceiling Directive	Diffuse pollution/water management; Industrial and point source contamination of land
Nitrates Directive	Diffuse pollution/water management; CAP and complementary measures
Pesticides Directive	Diffuse pollution/water management; CAP and complementary measures
Renewable Energy Directive	Climate change and energy
Sewage Sludge Directive	Diffuse pollution/water management; Industrial and point source contamination of land
Strategic Environmental Assessment Directive	Nature, land and soil sealing
Waste Framework Directive	Diffuse pollution/water management; Industrial and point source contamination of land
Water Framework Directive	Diffuse pollution/water management; Industrial and point source contamination of land

Policy instrument ²	Allocation to Priority Policy Cluster (s) ³
Funding Instruments	
Cohesion Fund (CF)	Industrial and point source contamination of land
Common Agricultural Policy	CAP and complementary measures
European Regional Development Fund (ERDF)	Industrial and point source contamination of land
European Social Fund (ESF)	Industrial and point source contamination of land
H2020 Actions	Overarching instruments
LIFE+ Programme	Overarching instruments
State Aid Guidelines	Industrial and point source contamination of land

3.2 Assessment of the Common Agricultural Policy and Complementary Measures on Agricultural and Forest Land

The approach to the assessment of the Common Agricultural Policy (CAP) policy cluster at both EU and national level differs from that in other clusters. The complex legislative framework of obligations and options for CAP implementation at Member State level, and the importance of the CAP as a driver of land management decisions across the EU made it necessary to undertake a more specific review of measures adopted by Member States to implement the CAP.

At EU level the assessment of the CAP cluster follows a similar methodology to that for other policy clusters, covering the soil-relevant elements of cross-compliance in relation to the standards of Good Agricultural and Environmental condition (GAEC), the green direct payments under Pillar I and the 2014-20 Rural Development Programme (RDP) priorities and measures under Pillar II, including measures for forests and other wooded land. The EU Forest Strategy is also assessed in this cluster.

The Member State level assessment takes the form of an EU-28 review of key elements of CAP implementation by Member States that affect soil protection. This review covers Member States' definition of GAEC cross-compliance standards for soils and landscape features, implementation of greening requirements and, in the case RDPs, the choice of soil-relevant priorities, target indicators and agri-environment-climate sub-measures.⁴ (In the case of the greening requirements for Ecological Focus Areas (EFAs), information on the implementation choices made by farmers is also reviewed).

The following sources have been used for the analysis of Member State CAP implementation:

⁴ For each of the federal Member States IT, FR DE and ES three regional RDPs were selected for analysis (chosen to reflect differences in soils and land use). For the UK and BE all the regional RDPs were reviewed. None of the RDPs for the outermost regions were reviewed, nor the RDP for the Åland Islands in FI.

- Unpublished analysis by the Commission (JRC and DG Environment) of Member States' 2015 GAEC standards for soils and landscape features
- Analysis by the Commission (DG Agriculture) of implementation of greening requirements (EC 2016)
- For 2014-20 RDPs: details of focus areas, target indicators and needs was extracted from individual RDPs approved during 2015; information on agri-environment-climate sub-measures was taken from RDP text extracts provided and machine translated by the Commission.

The approach to the EU-28 analysis of Member State implementation is based on typical soil-relevant land use and management practices required or incentivised by the CAP measures reviewed for this study. Four groups of management practices were identified: 1) arable and permanent crops and cultivation techniques; 2) input management; 3) permanent grasslands and wetlands; and 4) buffer strips, landscape features and trees. Information was compiled for individual Member States, showing which CAP measures have been used to require or support each of the identified management practices and this was analysed at EU-28 level to reveal the diversity of approaches to CAP implementation.

4 Overarching European Policies

4.1 Conceptualisation of the Policy Cluster

The cluster covers virtually all environmental policy areas, which, however, have a variable degree of relevance to soil protection. The degree to which the instruments in this cluster contribute to addressing soil threats and functions are in most cases dependent on the priority given to soil issues within the EU agenda and/or the extent to which Member States seek to emphasise soil when implementing sectoral policies and legislation. Therefore, while the policies in this cluster include some overarching aspects related to soil protection, the relative importance of these soil aspects may be more limited compared to the other environmental objectives that are addressed. In almost all cases, soil protection may be an additional outcome derived from protecting other environmental issues.

4.1.1 Coverage of Policies and Issues in the Cluster

The cluster encompasses the following policy instruments:

Strategic policy instruments	<ul style="list-style-type: none">• The 7th Environment Action Plan (EAP) (Decision 1386/2013/EU) (1)• Roadmap to Resource Efficient Europe (COM (2011) 571) (2)• Circular Economy Action Plan (COM (2015) 614) (2)• Thematic Strategy for Soil Protection (COM (2012) 46) (4)
Funding instruments	<ul style="list-style-type: none">• LIFE Programme 2014 – 2020 (Regulation 1293/2013) (3)• Horizon 2020 programme 2014 – 2020 (Regulation 1291/2013) (3)

The policies in the cluster are split between different types

- policies which have the aim to provide long-term direction for specific environmental priority areas (i.e. natural capital – including soil; resource efficiency and low carbon solutions, i.e. climate, energy and waste) and human health and the environment (air and water pollution, noise and chemicals) (1 in table above);
- policies dealing with economy and the use of environmental resources (2 in table above);
- policies providing funding support (3 in table above).
- only one instrument is explicitly dedicated to soil protection (4 in table above).

In this cluster, the Thematic Strategy for Soil Protection is the **policy instrument directly dedicated to fostering soil protection at EU level**. It provides a strategic framework for action to address almost all soil threats in Europe (except acidification and flooding). The Thematic Strategy contains four pillars, setting out a framework for undertaking action on awareness-raising, research, integration of soil protection issues in the design and implementation of national and EU policies, and a proposal for framework legislation for soil protection (see Box 4.1).

Box 4.1 Proposal for a Directive on Soil Protection

The proposal for a Soil Framework Directive that accompanied the Thematic Strategy for Soil Protection focused on the protection of soil and the preservation of the capacity of soil to perform all recognised functions (COM 232/2006). To this end, it included the following requirements:

Soil threats	Requirements
Erosion, organic matter decline, salinisation, compaction and landslides	<ul style="list-style-type: none"> • Within five years from transposition date, Member States shall identify the areas (“risk areas”) in their national territory where there is evidence or grounds of suspicion that one or more soil degradation processes has occurred or are likely to do so in the near future. The risk areas are reviewed every ten years (article 6); • For each risk area, Member States shall draw up a programme of measures including at least risk reduction targets, the appropriate measures for reaching those targets, a timetable for implementation and an estimate of the funding allocation. The programmes have to be in place at the latest eight years after transposition date (Article 8)
Contamination	<ul style="list-style-type: none"> • Member States shall take appropriate measures to limit the intentional or unintentional introduction of dangerous substances or in the soil (Article 9); • Member States shall also identify the sites in their national territory where there is a confirmed presence of dangerous substances (“contaminated sites”) at a level to pose a significant risk to human health and the environment. Member States shall establish an inventory of contaminated sites, to be reviewed every five years (Article 10); • Where a contaminated site is to be sold, the owner of the site shall produce a soil status report (Article 12); • Member States shall ensure that contaminated sites are remediated (Article 13). A National Remediation Strategy shall be published within seven years from transposition date (Article 14)
Sealing	<ul style="list-style-type: none"> • Member States shall take appropriate measures to limit sealing or to mitigate its effects, where it is carried out (article 5)
Soil biodiversity loss	<ul style="list-style-type: none"> • The Directive does not directly cover biodiversity. It will directly benefit from action proposed on other threats.

The proposal for a Soil Framework Directive was withdrawn in 2014. Not only were specific actions to address key threats as set out above withdrawn, the proposed Directive also contained key requirements around the framing of soil with EU law and the integration of soil issues into the wider environmental acquis and beyond, e.g. within requirements set out in cross compliance under the CAP. The Proposal also put forward the concept of soil functions in EU law. It proposed the harmonisation of key definitions and monitoring practices and required the integration of soil issues in other EU and national legislation.

In addition to the Soil Thematic Strategy, the cluster contains policy instruments that aim to improve **the implementation of current legislation that may support soil protection, propose new legislation or further integration of soil-related considerations into sectoral EU policies.** The 7th Environment Action Programme (EAP) aims to promote the implementation of environmental legislation that may contribute to the protection of natural capital e.g. habitats, biodiversity, air, water, and that tackle climate change, chemicals, industrial emissions and waste, which also ease the pressures on soil. It also seeks the integration of soil related considerations in agriculture and forestry, i.e. greening of the CAP, renewable energy,

and Member States' planning decisions. The 7th EAP supports the strengthening of the regulatory context and networks as well as the creation of guidelines to contribute to soil protection. It also encourages the EU and Member States to reflect on the introduction of a risk-based approach within binding legal framework (including a target) on soil.

The Roadmap to a Resource Efficient Europe sets out milestones for the conservation of: 1) natural capital, including the maintenance of soil fertility; 2) water, with the implementation of the WFD River Basin Management Plans leading, inter alia, to increased water retention in soils, and 3) soil, including reduced soil erosion and loss of organic matter, and remedial work on contaminated sites. The Roadmap also promotes the need for further research on the sustainable supply of phosphorous, in relation to soil fertilization.

The Circular Economy Action Plan includes legislative proposals on waste that, if adopted, could contribute to reduced soil contamination. It also announces proposals on fertilisers and water reuse in agriculture, with the aim reduce the input of contaminants to arable soils and promote the recovery of nutrient from local biomass. Finally, other instruments may contribute to **advancing soil protection through financing relevant research and innovation** or action by civil society and industry. These include the LIFE Programme and the Horizon 2020 programme, which provide 2014 – 2020 budget for projects that may be relevant to soil depending on the coverage of the calls, the nature of proposed work submitted and ultimately the projects funded. The outcomes for soil are ultimately dependent on the prioritisation of soil issues in the EU agenda and within any initiatives put forward by Member States.

4.1.2 Links to Other Key Clusters

This cluster contains overarching strategic policies. Inherently, these policies link to and potentially guide interpretation of policies within the other clusters examined in the study. The Thematic Strategy for Soil Protection should inherently be linked to the policies examined within all other clusters given that policies have been examined for their links to soil protection. Life+ and Horizon 2020 funding also relate to other clusters, given that funding can support multiple actions.

The resource efficient road map for Europe is more specific in its links, in that certain elements link to specific clusters for example: elements on the implementation of biodiversity legislation and on use of organic fertilisers relate to the nature, land use and biodiversity cluster, in addition they also apply to the diffuse pollution and CAP clusters.

The 7th EAP is directly relevant to the CAP cluster and also the local contamination cluster due to its requirements related respectively to sustainable land management and nutrient cycling and on contaminated site remediation.

4.1.3 Relevance to Soil Threats and Functions

The relevance of the instruments in this cluster to different soil threats varies. Soil threats that are most explicitly addressed by the cluster include:

- Soil sealing;
- Contamination;

- Erosion;
- Loss of soil organic matter.

These threats are explicitly recognized in the Thematic Strategy for Soil Protection, as well as the 7th Environment Action Plans and the Roadmap for Resource Efficient Europe. These instruments explicitly propose, support or call for legislative measures, action or projects to reduce the soil threats listed above. The Horizon 2020 and the LIFE programme may address explicitly and implicitly – through financing of relevant projects – contamination, erosion, loss of soil organic matter and soil sealing.

The withdrawn (in 2014) proposal for a Framework Directive on Soil, as enclosed in the Thematic Strategy for Soil Protection, would have dealt with all soil threats, except acidification, by requiring Member States to establish risk areas and associated measures and targets for soil threats relevant in their country.

In terms of soil functions, the policy cluster addresses all functions, although generally implicitly, i.e. the soil functions are not explicitly mentioned in the general goals or objectives of the policy but their relevance can be deduced from the text. This is attributed to the high-level, overarching scope of the policies. All soil functions (except for the function of storing geological and archeological heritage) seem to have equally weak link with the cluster.

4.2 Assessment of the Key Policies within the Cluster

4.2.1 Coverage of Soil Threats across the Cluster

Table 4.1 below summarises the ways in which the different instruments in this cluster interact with specific soil threats. The main threats covered are the following:

- **Soil sealing** – Many of the policies and funding instruments included in the cluster highlight the need to address the widespread issue in Europe. It is therefore considered a highly relevant threat for the cluster.
- **Contamination** (diffuse and industrial and point source) – This is explicitly or implicitly addressed by all the policies and funding instruments within the cluster, in that proposed legislation on waste management under the Circular Economy Action Plan could reduce soil contamination;
- **Erosion** – Erosion, either by wind or by water, is explicitly addressed by three out of six policies within the cluster, including the Thematic Strategy for Soil Protection, the 7th Environment Action Plan and the Roadmap to Resource Efficient Europe. It is therefore considered a highly relevant threat for the cluster;
- **Loss of soil organic matter** – This threat is explicitly addressed by three out of six policies within the cluster, including the Thematic Strategy for Soil Protection, the 7th Environment Action Plan and the Roadmap to Resource Efficient Europe, and implicitly by the remaining three policies and funding instruments. It is therefore considered a highly relevant threat for the cluster.

- **Acidification** – It is only tangentially relevant to the cluster, in that projects supported by the Horizon 2020 programme may implicitly address this threat (though this is dependent on the specific call for projects);
- **Compaction** – It is explicitly addressed by the Thematic Strategy for Soil Protection, however, references relate to the importance of the threat and the importance of reporting under the proposed (and then withdrawn) soil framework Directive. Projects financed under the LIFE and Horizon 2020 programme may lessen this soil threat (though this is dependent on the specific call for projects);
- **Desertification** – It is explicitly addressed as a soil threat by a limited number of policies within the cluster, namely the Thematic Strategy for Soil Protection and the 7th Environment Action Plan. Otherwise, the Horizon 2020 programme and the Roadmap to Resource Efficient Europe address this only implicitly. It is therefore considered tangential to the cluster;
- **Flooding/landslides** – It is tangentially relevant to the cluster, as the references to this threats mentions mainly the implementation of the Floods Directive;
- **Loss of biodiversity** – This is captured by the policies covered in so far that they refer to the need to implement biodiversity-related legislation more generally. Thus, there are potential positive effects from the policies and funding instruments included in this cluster;
- **Salinisation** – Except for the Thematic Strategy on Soil Protection, which addresses this threat explicitly, the effects on salinisation by the policies included in this cluster are generally implicit i.e. there may be some support or opportunities but this is not the direct focus.

The most relevant soil threats addressed by the cluster are loss of soil biodiversity, contamination (diffuse and industrial / point source), erosion (by wind and water) and loss of soil organic matter. All other soil threats are relevant to this cluster to a different extent depending on the policy in question.

Table 4.1 provides a summary of how each instrument contributes to tackling the most relevant soil threats for the cluster.

Table 4.1 Summary of Soil Threats Addressed by the Overarching European Policies Cluster

Threats	Soil Thematic Strategy	7th Environment Action Plan	Resource Efficient Europe Roadmap	Circular Economy Action Plan	Life+ Programme	Horizon 2020
Soil sealing	<p>E – The Strategy recognizes soil sealing as a soil threat. It suggests that a national or regional approach is more appropriate to deal with soil sealing.</p> <p>The proposed Directive required Member States to take appropriate measures to i) limit soil sealing by rehabilitating Brownfield sites or ii) if not possible, to mitigate its effects by using constructions techniques and products.</p>	<p>E – In the context of Thematic Priority 1.23, the 7th EAP recognizes soil degradation due to sealing. In response to such threat, the Commission has developed guidelines on how to deal with soil sealing (see dedicated fiche), while calling for ‘further efforts to strengthen the regulatory context, develop networks, share knowledge, produce guidelines and identify examples of best practice can also contribute to better soil protection’.</p>	<p>E – The Roadmap anticipates that in 2012 the European Commission is to publish guidelines on best practice to limit, mitigate or compensate soil sealing.</p>	N/A	<p>E – Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III, letter c, para ii) require the European Commission to select projects with activities “for the Soil Thematic Strategy, with special emphasis on [...] compensation of soil sealing [...]”.</p>	<p>I – By supporting projects to address Societal Challenges (Part III) that may focus on better understanding of soil management, in relation to food security, forestry, sustainable agriculture, marine and maritime research and the bio-economy, climate action, environment, resource efficiency and raw materials. Projects in the above areas undertaken by JRC are also relevant.</p>
Contamination	<p>E – The Strategy recognizes contamination as a soil threat. On the basis of a common definition of contaminated sites and an agreed list of polluting activities, the TS calls for Member States to be required to identify the contaminated sites (at least for those polluted by Annex II substances) on their territory within five years from transposition, and establish a national remediation strategy. However, the legal obligation to act was set out within the proposed (and withdrawn) framework Directive on soil protection.</p>	<p>E – In the context of Thematic Priority 1.23, the 7th EAP recognizes soil degradation due to contamination. It calls for the integration of environmental considerations on water protection and biodiversity conservation into planning decisions relating to land use, with a view to making progress towards the objective of ‘no net land take’ by 2050.</p>	<p>E – The Roadmap urges Member States to set up an inventory of contaminated sites, and a schedule for remedial work by 2015</p>	<p>I – The approval and implementation of the proposed legislation on waste management could indirectly contribute to reduce soil contamination.</p>	<p>I – Under the sub-programme for Environment, the Thematic priorities for Waste (Annex III, letter b) require the European Commission to select projects for better waste management, which could indirectly contribute to reduce soil contamination.</p>	<p>I – By supporting projects to address Societal Challenges (Part III) that may focus on better understanding of soil management, in relation to food security, forestry, sustainable agriculture, marine and maritime research and the bio-economy, climate action, environment, resource efficiency and raw materials. Projects in the above areas undertaken by JRC are also relevant.</p>

Threats	Soil Thematic Strategy	7th Environment Action Plan	Resource Efficient Europe Roadmap	Circular Economy Action Plan	Life+ Programme	Horizon 2020
Erosion	<p>E – The Strategy recognizes erosion as a soil threat, as well as its transboundary impact between countries.</p> <p>The proposed Directive recognizes that erosion may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. MS are required to report to the Commission on progress regarding soil erosion.</p>	<p>E – Under Priority objective 1, the 7th EAP calls for increasing efforts to reduce soil erosion – thus potentially including erosion by water – while calling for enhanced integration of land use aspects into decision-making, supported by the adoption of targets on soil.</p> <p>In the context of Thematic Priority 1.23, the 7th EAP recognizes soil degradation due to erosion (by water). It calls for the integration of environmental considerations on water protection and biodiversity conservation into planning decisions relating to land use, with a view to making progress towards the objective of ‘no net land take’ by 2050.</p>	E – The Roadmap urges Member States to implement the action needed for reducing erosion	N/A	I – Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III, letter c, paras i, ii and iii) require the European Commission to select projects including activities on forest monitoring and information systems, as well as shifting the system to a green and circular economy. This could indirectly reduce food production and support soil protection through the reduction of soil erosion.	I – By supporting projects to address Societal Challenges (Part III) that may focus on better understanding of soil management, in relation to food security, sustainable agriculture, marine and maritime research and the bio-economy, climate action, environment, resource efficiency and raw materials. Projects in the above areas undertaken by JRC are also relevant.

Threats	Soil Thematic Strategy	7th Environment Action Plan	Resource Efficient Europe Roadmap	Circular Economy Action Plan	Life+ Programme	Horizon 2020
Loss of soil organic matter	<p>E – The Strategy recognizes loss of soil organic matter as a soil threat, as well as its transboundary impact between countries.</p> <p>The proposed Directive recognizes that soil organic matter decline may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. MS are required to report to the Commission on progress regarding soil organic matter.</p>	E – Under Priority objective 1, the 7th EAP recognizes loss of soil organic matter as a serious threat and calls for increasing efforts to address this issue.	E – The Roadmap urges Member States to implement the action needed for increasing soil organic matter content.	I – Through the revision of the EU regulation on fertilisers, which will ease the access to the entire EU market for organic based fertilisers .	I – Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III, letter c, paras i, ii and iii) require the European Commission to select projects including activities on forest monitoring and information systems, as well as shifting the system to a green and circular economy. This could indirectly reduce food production and support soil protection through the reduction of SOM loss.	I – By supporting projects to address Societal Challenges (Part III) that may focus on better understanding of soil management, in relation to food security, forestry, sustainable agriculture, marine and maritime research and the bio-economy, climate action, environment, resource efficiency and raw materials. Projects in the above areas undertaken by JRC are also relevant.

4.2.2 Coverage of Soil Functions across the Cluster

Almost all soil functions are addressed implicitly within this policy cluster, except the function of storing geological and archeological heritage, which is not addressed. The proposed Soil Framework Directive would have translated the soil functions into legal form and thus increased the focus on all functions listed below. In its absence, soil functions are addressed as follows by the policy cluster:

- Carbon pool – Potentially relevant for those policies/funding instruments aiming at better implementation of legislation tackling climate change or supporting research projects in relation to these areas, namely 7th EAP; Roadmap for Resource Efficient Europe; LIFE programme; Horizon 2020 programme;
- Platform for human activity – Potentially important for policies/funding instruments aiming at better implementation of legislation tackling industrial pollution and waste or supporting research projects in relation to these areas, namely 7th EAP; LIFE programme; Horizon 2020 programme;
- Biomass production – Potentially important for policies/funding instruments aiming at better implementation of legislation dealing with the provision and re-use of biomass (i.e. RES) or supporting research projects in relation to these areas, namely 7th EAP; Circular Economy Action Plan; RE Roadmap; LIFE programme; Horizon 2020 programme;
- Hosting biodiversity – Potentially important for policies/ funding instruments aimed at better implementation of legislation tackling Habitats and Birds Directives or supporting research projects in relation to these areas, namely 7th EAP; RE Roadmap; LIFE programme; Horizon 2020 programme;
- Providing raw materials – Potentially important for policies/ funding instruments aiming at better implementation of legislation dealing with the provision and re-use of raw materials or supporting research projects in relation to these areas, namely 7th EAP; Circular Economy Action Plan; RE Roadmap; LIFE programme; Horizon 2020 programme;
- Storing, filtering and transforming nutrients and water – Potentially important for policies/funding instruments aiming at better implementation of water and nutrient-related legislation or supporting research projects in relation to these areas, namely 7th EAP; Circular Economy Action Plan; RE Roadmap; LIFE programme; Horizon 2020.

The policies pursuing the approval of new, dedicated legislation linked to soil or the improved implementation of existing laws offer the greatest opportunities for the future in terms of making positive changes to soil status. The Circular Economy Action Plan includes proposals on waste management, associated with preventing soil contamination, and potentially a revised Fertiliser Regulation, which could contribute to improving soil organic carbon and reduce the risk of soil contamination linked to proposed limits on contaminants. The Roadmap on Resource Efficient Europe and the 7th EAP pursue the improved implementation of a wide range of legislation supporting soil protection and functions through sectoral

measures. Table 4.2 below provides a summary of how the instruments in the policy cluster contribute to supporting the soil functions relevant to this cluster.

Table 4.2 Summary of Soil Functions Addressed by the Overarching European Policies Cluster

Function	Soil Thematic Strategy	7th Environment Action Plan	Resource Efficient Europe Roadmap	Circular Economy Action Plan	Life+ Programme	Horizon 2020
Carbon pool	N/A – Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection. All soil functions were recognized by the withdrawn proposal for a framework Directive.	I – Through Member States' implementation of legislation tackling climate change.	I – Through Member States' implementation of legislation tackling climate change.	N/A	I – Through Member States' undertaking of activities under sub-programme for Climate Action, priority area 'Climate change mitigation', this could indirectly contribute to actions for soil sequestration. This could also be supported by mitigation activities for the Soil Thematic Strategy, as well as for forest monitoring and information systems, under sub-programme for Environment, Thematic priorities for Resource Efficiency.	I – Through undertaking of projects with a focus on soil management in relation to food security, forestry, sustainable agriculture, marine and maritime research and the bio-economy, climate action, environment, resource efficiency and raw materials. Projects in the above areas undertaken by JRC are also relevant.
Platform for Human Activities	Ditto	I – Through Member State's implementation of legislation tackling industrial pollution and waste.	?	I	I – Through Member States' undertaking of activities under sub-programme for Environment, Thematic priorities for Waste and for Resource Efficiency, for the implementation of the Roadmap for a Resource-Efficient Europe and the 7th EAP.	Ditto
Biomass production	Ditto	I – Through Member States' implementation of legislation dealing with the provision of raw materials, including the Renewable Energy Directive (RED).	I – Through Member States' implementation of legislation dealing with the provision of raw materials, including in relation to the production of energy.	? – By encouraging measures and legislation for the re-use of waste and raw material, this could avoid further soil to be used for biomass production.	I – Through Member States' undertaking of activities under sub-programme for Environment, Thematic priorities for Resource Efficiency, for the implementation of the Roadmap for a Resource-Efficient Europe and the 7th EAP.	Ditto

Function	Soil Thematic Strategy	7th Environment Action Plan	Resource Efficient Europe Roadmap	Circular Economy Action Plan	Life+ Programme	Horizon 2020
Hosting biodiversity	Ditto	I – Through Member State’s implementation of the Habitats and Birds Directives.	I – Through integration of biodiversity and conservation protection values, including on soil, in other EU policies, and their implementation.	N/A	I – Through Member States’ undertaking of activities under sub-programme for Environment, Priority area Nature and Biodiversity, for the implementation of the Birds and Habitats Directive.	Ditto
Providing raw materials	Ditto	I – Through Member States’ implementation of legislation dealing with the provision of raw materials, including the Renewable Energy Directive (RED).	I – Through Member States’ implementation of legislation on agriculture and fisheries.	? – By encouraging measures and legislation for the re-use of waste and raw material, this could avoid further soil to be used for biomass production.	I – Through Member States’ undertaking of activities under sub-programme for Environment, Thematic priorities for Resource Efficiency, for the implementation of the Roadmap for a Resource-Efficient Europe and the 7th EAP.	Ditto
Storing, filtering and transforming nutrients and water	Ditto	I – Through Member States’ implementation of water and nutrient-related legislation, including Water Framework Directive, Urban Wastewater Directive, Nitrates Directive, Marine Strategy Framework Directive, Floods Directive.	E – Member States to set up water efficiency targets by 2020 at river basin level.	I – The Commission is tasked to take a series of actions to promote the reuse of treated wastewater, including legislation on minimum requirements for reused water in agriculture.	I – Through Member States’ undertaking of activities under sub-programme for Environment, Thematic priorities for Water, for the implementation of Water Framework Directive, the Floods Directive and the Marine Strategy Framework Directive.	Ditto

4.2.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection - Understanding the Relevance and Limits of Policies within the Cluster

The strength of this policy cluster is that the instruments either call for stronger policies/legislation or additional research and innovation relating to soil protection. All the policies in the cluster provide explicit or implicit strategic direction, a framework of action or funding support to advancing soil policy in the EU. This is especially the case with the Thematic Strategy for Soil Protection.

The most important weakness in the cluster is the lack of mandatory requirements related to soil, due mainly to the non-binding nature of the instruments in the cluster. This also implies that the approach and level of ambition of soil-relevant measures and projects is mainly dependent on Member States' willingness to implement sectoral or dedicated legislation (e.g. the proposed framework Directive on Soil, as enclosed in the Thematic Strategy for Soil Protection). Although the Thematic Strategy offers a framework of action and identifies priorities for soil protection, it lacks an underpinning legislative mandate that could ensure the delivery of soil protection measures. Key policy documents were all drafted before the withdrawal of the proposal for a soil framework Directive, it therefore, is unclear how certain actions/goals set out will be met and how efforts to integrate soils into EU policy will be coordinated. In addition, no instrument within the cluster explicitly supports, defines or sets out requirements for the protection of soil functions. In relation to soil threats addressed by the cluster, acidification and loss of soil biodiversity are only very tangentially considered. It is unclear to which extent funding instruments or the EU biodiversity strategy are ensuring sufficient protection.

The opportunities stem from a number of contexts. The first opportunity emerges from the Member State implementation of current legislation in biodiversity, agriculture, water, waste, climate policy, and other areas. Although the proposed Framework Directive on Soil was withdrawn, the mandate to explore a binding legal framework to address EU soil-related issues remains, especially in the 7th Environment Action Programme and Thematic Strategy for Soil Protection. In tandem, there remains a potential opportunity to take forward a strategic document that addresses some of the questions that remain following the withdrawal of the proposed Soil Framework Directive – key elements of the coverage are set out in Table 4.3. In addition, other relevant proposals, i.e. on better waste management as enclosed in the Circular Economy Action Plan, may contribute to address soil contamination, provided there is sufficient adoption and systematic implementation.

Given the variety of projects and activities that can be pursued by Member States through the instruments within the cluster, the approaches to soil protection are likely to vary significantly see Table 4.3 below.

Table 4.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection: Overarching European Policies Cluster

- **Strengths** - what does the policy cover well in relation to soil protection?
- **Weaknesses** - are there aspects limiting the protection afforded?
- **Opportunities** - are there any potential opportunities linked to the legislation which could benefit soil protection (in the context of this study, opportunities are understood as arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?
- **Threats** - are there any potential elements within the policy that might put the protection of soils at risk?

Policy Instrument	Strengths	Weaknesses	Opportunities	Threats
7th Environment Action Plan	<ul style="list-style-type: none"> • Strategic direction for advancing soil protection through policy in 2020 and beyond and an overarching framework for coordination of sectoral policies relevant to soil 	<ul style="list-style-type: none"> • No soil-related mandatory requirements are included in the 7th EAP; thus reliance on Member States implementation and monitoring of current EU policies relevant to soil 	<ul style="list-style-type: none"> • The Programme proposes that a 'binding legal framework' to address EU soil issues is examined 	<ul style="list-style-type: none"> • Not in the 7th EAP itself, but from the non-implementation of enabling policies by Member States
Roadmap to Resource Efficient Europe	<ul style="list-style-type: none"> • The Roadmap provides strategic direction for Member States to put in place action to protect soil and integrating soil issued into other environmental and non- EU policies 	<ul style="list-style-type: none"> • There are no soil-focused targets, nor specific quantitative requirements as to the reduction of soil threats 	<ul style="list-style-type: none"> • Member States could decide to go beyond the requirements of the European Commission's guidelines on soil sealing, with the aim of approving ambitious legislation 	<ul style="list-style-type: none"> • Not in the Roadmap itself, but from the non-implementation of enabling policies by Member States
Circular Economy Action Plan	<ul style="list-style-type: none"> • Overarching framework for taking action on waste and better use of resources, which may implicitly support soil protection 	<ul style="list-style-type: none"> • Non-binding measure, whose action on soil ultimately depend on the willingness of the European Institutions and Member States to, respectively, pass the legislation proposed and implement it 	<ul style="list-style-type: none"> • Proposals of legislation on waste, packaging waste, landfill and WEEE that may implicitly contribute to reducing soil contamination; • Proposal that Fertiliser Regulation is revised with a focus on improving the access to the market for organic based fertilising products; • Highlighted that the EC will publish a legislative proposal on minimum requirements for reused water, which may support soil protection; • A set of indicators will be proposed to monitor progress. Some indicators – such as on waste management – may be relevant to soil protection 	<ul style="list-style-type: none"> • Not in the Strategy itself, but from the non-implementation of legislation supporting soil protection by Member States, or the non-passing of legislation over the EU decision-making process

Policy Instrument	Strengths	Weaknesses	Opportunities	Threats
Thematic Strategy for Soil Protection	<ul style="list-style-type: none"> Overarching policy framework for addressing soil-related issues in Europe; Addressing directly almost all soil threats 	<ul style="list-style-type: none"> The only mandatory requirement included in the Strategy – the approval of a framework Directive on soil protection – was withdrawn in 2014; Key actions and needs set out in the TS were lost meaning due to the withdrawal of the proposed framework Directive meaning that statements are no longer accurate; For those soil threats that are not directly addressed by the Strategy, their coverage depends upon implementation of related policy/legislation by Member States 	<ul style="list-style-type: none"> The Strategy includes a proposal for a Directive on soil protection. Although this has been withdrawn, it sets out a framework of action as a basis for proposing EU legislation or action on soil in the future; Possibility to put in place voluntary actions by Member States in the fields of research, policy integration and awareness-raising. 	<ul style="list-style-type: none">
Horizon 2020 programme 2014 – 2020	<ul style="list-style-type: none"> Comprehensive funding mechanism providing support to research and innovation projects between 2014 and 2020, which may explicitly and implicitly support soil protection 	<ul style="list-style-type: none"> The extent to which the project will have a positive impact on soil protection is dependent upon the specification of the calls for proposals 	<ul style="list-style-type: none"> Very substantial budget available and on a long-term period of time; Opportunity to fund pan-European projects with a focus on applicable, technological development and research, which may explicitly and implicitly support soil protection and land degradation 	<ul style="list-style-type: none"> Not in the instrument itself. However, given the variety of areas and projects that may be funded, there might be opportunities for some projects to have a counteractive impact on soil protection and land degradation

4.3 Integrated Assessment of the Overarching Policy Cluster

The policy instruments within this cluster relate strongly to a number of soil threats, most importantly soil sealing, contamination, erosion and loss of soil organic matter. Given the wide scope of the policy and funding instruments included, the cluster may be implicitly important to virtually all soil functions, although no instrument directly supports them or formally references their preservation – with the proposed (and withdrawn) soil framework Directive envisaged to fulfil this role. The withdrawal took place after key strategic documents were adopted; therefore, the implications of this shift have not been taken into account in strategic policy terms.

While the cluster includes a range of both strategic and funding instruments that may contribute to soil protection, they are, by definition, predominantly non-binding when it comes to soil protection. While many soil threats are explicitly addressed, the level of ambition and approaches as to the protection of soil depend on Member States’ willingness to implement sectoral or dedicated legislation relevant to soil, on the one hand, and how high soil is on the EU agenda, on the other.

Goals relating to the delivery of soil protection are set out under the 7th EAP; these are presented in Table 4.4 below alongside the requirements intended to secure them. However, as noted above the 7th EAP was adopted before the withdrawal of the proposal for a soil framework Directive and while some subsequent actions (such as the adoption of a proposed revision to the Fertiliser Regulation) would seek to deliver the goals and requirements there is a more limited legislative basis to support change at present than anticipated.

Table 4.4 Goals and Requirements for Soil Protection under the 7th EAP

To protect, conserve and enhance the union’s natural capital the 7th EAP shall ensure (among other priorities) that by 2020:	This requires in particular:
land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway;	increasing efforts to reduce soil erosion and increase soil organic matter, to remediate contaminated sites and to enhance 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;
the nutrient cycle (nitrogen and phosphorus) is managed in a more sustainable and resource-efficient way;	taking further steps to reduce emissions of nitrogen and phosphorus, including those from urban and industrial wastewater and from fertiliser use, inter alia, through better source control, and the recovery of waste phosphorus.

With regard to the coherence of policies in the cluster, it can be noted that the overall vision and specific soil objectives or measures laid out in the Thematic Strategy for Soil Protection are integrated to a limited degree into the other policy instruments within the cluster. In addition, with the exception of the Thematic Strategy for Soil Protection, voluntary soil relevant requirements in the other policies within the cluster are phrased in rather general terms (i.e. the need to put in place action to address certain soil threats, or further research efforts). There is a lack of referencing to specific objectives or measures, for example in the

Circular Economy Action Plan. Funding instruments, i.e. the Horizon 2020 and the LIFE programmes 2014–2020, do not directly focus on soil protection. Given the variety of projects and activities that are available to Member States through the instruments within the cluster, the approaches to soil protection are likely to vary significantly. Nonetheless, the policy cluster is not generally incoherent per se since the scope and objectives of the instruments do not conflict with each other.

As a result, a number of issues and limitations stand out in relation to the extent to which this policy cluster addresses soil protection:

- Acidification and loss of soil biodiversity are only very tangentially considered. In both cases, it is unclear the extent to which funding programmes and EU biodiversity policy is likely to ensure sufficient soil biodiversity protection;
- No instrument explicitly supports, defines or sets out requirements for the protection of soil functions;
- The policy measures contain non-binding statements in relation to soil and the emphasis on soil depends in many cases on the importance perceived by project proposer, Member State experts or the profile within the wider EU agenda. Although the Thematic Strategy offers a framework of action and identified priorities for soil protection, it lacks an underpinning legislative mandate that could ensure the delivery of soil protection measures. Key policy documents were all drafted before the withdrawal of the proposal for a Soil Framework Directive. Therefore, it is unclear how certain actions/goals set out will be met and how efforts to integrate soils into EU policy will be coordinated.
- There are clear gaps left in terms of monitoring and the definition of issues around soil protection following the withdrawal of the Soil Framework Directive proposal, particularly in defining thresholds and providing consistent baselines for integrated action on soils.

Opportunities to address some of the limitations highlighted above may come from:

- Member State implementation of current legislation in policy areas relevant to soil – inter alia biodiversity, agriculture, water, waste, climate.
- The mandate to explore a binding legal framework to address EU soil-related issues remains set in the 7th Environment Action Plan and the Thematic Strategy for Soil Protection. However, reaching consensus on a new piece of legislation on soil would require a changed political landscape at EU level. There is also the potential opportunity to take forward a strategic document that would: 1) address some of the questions left after the withdrawal of the Soil Framework Directive, 2) build on the actions outlined in the Soil Thematic Strategy, and 3) take forward action left unresolved due to the slow progress of the anticipated Land Communication.
- The adoption of relevant proposals – such as the provisions on better waste management included in the Circular Economy Action Plan – and their systematic implementation may help contribute to addressing soil contamination. However, these would require a clear basis for setting objectives and targets for soil protection and the role of the different policies in meeting these objectives.

A number of issues and challenges associated with the delivery of soil protection based on EU policy requirements can be identified for this cluster. These are summarised below in Box 4.2. However, EU policy does not act in isolation to regulate Europe's environment. Member States can also take forward actions that go beyond the EU acquis to protect their environment. The nationally initiated policy instruments gathered for the 28 Member States in the Soil Wiki were examined to understand how they might complement EU law and potentially address the issues and gaps identified at EU level. The following section looks at the extent to which these nationally initiated policies⁵ address the gaps and issues that exist at the EU level.

Box 4.2 Key Issues and Potential Gaps in EU Policy for Further Investigation

- At EU level there is no binding overarching framework that strategically defined policy priorities or parameters for soil protection. The Thematic Strategy on soil protection is non-binding.
- There remain gaps in terms of strategic definitional questions, elaboration of issues of soil functionality and information on soil monitoring that are not set out formally in EU policy. This is a consequence of the withdrawal of the Soil Framework Directive that, among other things, would seek to address this.
- Soil protection outcomes in the policies examined are mostly derived as a consequence of delivering environmental objectives that are not explicitly soil focused, such as achieving water quality, reducing GHG emissions. Only the Thematic Strategy on soil protection is explicitly dedicated to soil protection.
- Limited integration of soil specific objectives and measures exists across the cluster of policies examined and more generally. In the absence of a clear policy baseline setting out the soil goals, objectives and targets for Europe integration has no consistent basis from which to build.
- There is no clear definition of what should be achieved when seeking to protect soils, i.e. what are we monitoring, what should a soil deliver, what should a soil's integral environmental value and value to society be in Europe. Without this strategic frame setting a basis for monitoring and ensuring consistent and effective consideration of soil protection within linked policies is challenging. For example, this is the case when considering the goal of delivering soil carbon and soil organic matter in order to deliver GHG emission reductions.

4.3.1 Review of Key Issues and Potential Gaps

Within the review of nationally initiated policy instruments adopted by Member States⁶ in relation to soil protection the following issues were identified as of interest. These are

⁵ For the purpose of the analysis, nationally initiated policies are defined as those not directly linked to binding EU level rules or requirements ie policies developed at the national level not linked to any requirements stemming from EU acquis, or policies which are linked to EU non-binding requirements (e.g. Soil Thematic Strategy, or 7th EAP).

⁶ This review was completed based on the inventory and supported by inputs from the expert group and use of historic studies when necessary ie where no contemporary data was available.

examined systematically in the sections below to understand the approach pursued by Member States.

- Strategic direction and coordination of soil protection – does the Member State have a Strategy Soil Protection Policy and, if not, are there alternative measures in place that might coordinate the protection of soils?
- Monitoring of soils and soil condition – do Member States systematically monitor soils and monitor trends in soil quality?

Strategic Soil Protection Policies

The Soil Wiki inventory was examined to understand if Member States appear to have a national policy in place to strategically coordinate actions on soil protection and their integration into wider policies. The analysis showed that only a limited number of Member States have in place explicit, overarching policies for soil protection for example Germany and Italy which both have in place Soil Protection Acts. In some Member States, for example Austria, a regional approach to soil management is undertaken. In Austria there is no national soil protection law as this is regulated by soil protection laws of the federal states; currently five federal states have a soil protection law. While some federal states have very extensive soil protection legislation (e.g. Salzburg) or non-binding soil-focused instruments such as the Soil Protection Concept Vorarlberg, there is no soil protection legislation in some other federal states).

For a limited number of Member States there is no evidence of strategic, nationally initiated policy action focused on soil protection. In the majority of instances coverage is partial. For example, there may be no policy in place to address the entire picture of soil protection; however, policies may be in place to address specific land uses and their impact on soils, commonly agricultural or forestry soils. For example, this is the case in Lithuania (Law on Land), Hungary (Act on Cultivated Land), Poland (the Act on Protection of Agricultural and Forest Land) and Slovakia (Act No. 220/2004 Coll. Concerning the Protection and Use of Agricultural Soil). These Member States have in place instruments focused on agricultural soils explicitly and coordinating action in an overarching manner.

In contrast, a number of different policies are in place focusing on environmental protection at a high level. Depending on how exactly these are defined and implemented it is possible that these may provide strategic coverage of soil issues. Further investigation into how the groups of policies interact would be needed in order to fully understand the nature of their coverage and whether these comprehensively prioritises all key soil protection actions relevant to that Member States circumstances. For example, Sweden has in place an Environmental Act that sets out environmental quality objectives to be achieved including indicators relevant to soil protection.

Sweden's policy approach can also be used to illustrate that in some Member States a wider debate surrounding the utility of land is ongoing, leading to new approaches to soil protection. Specifically, Sweden is currently in the process of developing a Strategy for Sustainable Land Use that will consider issues of long term sustainable land use and sustainable use of land and water with the goal of developing a long term plan for sustainable land use. Similarly in the Netherlands there is an ongoing dialogue around restructuring

policies in relation to societies needs from the soil and sub surface and coordinating regulation more effectively.

Monitoring of Soil Quality

Within soil monitoring there are essentially two elements to understanding the coverage. Are Member States surveying soils? And if they are surveying soils, are they assessing parameters that enable an assessment of soil condition and trends on an ongoing basis?

From the review of soil monitoring it is clear that Member States pursue very different approaches to their monitoring regimes. This can be driven by a strong emphasis of concern focused on a specific soil type, for example, as for the overarching policy question in some Member States the emphasis is strongly placed on the monitoring of agricultural soils. For example, in Poland the emphasis is on monitoring arable soil chemistry and fertility and in Lithuania parameters measuring the quality and condition of soils on agricultural land. In other Member States the link is to a concern regarding other environmental consequences for example: linked to habitats and water contamination in Denmark; linked to landslides, land take and soil sealing in Italy; and erosion in Spain. Within some Member States, such as Sweden monitoring priorities are linked to wider environmental priorities and indicators set out in Environmental Quality Objectives.

In some Member States there is evidence of soil monitoring but it only addresses so issues or part of the question of soil condition. For example soil surveys to identify the nature of a given soil exists comprehensively, in Ireland; however, there is limited evidence in the inventory of a focus on quality of soil condition with an emphasis being more on the pedology types and classification of soils. In Spain soil surveys appear focused on a specific pressure of concern, i.e. erosion, but there is no evidence in the inventory of comprehensive coverage of issues. In other Member States policy and monitoring systems appear to still be under development, for example, in Cyprus a system of soil indicators is under development as part of efforts to identify priority soil issues and the corresponding relevant indicators.

Comprehensive systems of monitoring are being taken forward in some Member States, for example, in the Netherlands the monitoring of soil, its quality and services is considered ambitious with a broad coverage of parameters going beyond pure soil status indicators and also considering effectiveness of measures and impacts of policies. The level of ambition in many Member States is high in terms of the level and intensity of monitoring. For example, the Hungarian Soil Conservation Information and Monitoring System monitors spatial distribution and changes in condition over time and has done so since 1992. SIMS provides yearly data regarding condition of Hungarian soils with annual soil sampling with over 1000 sampling points across the country covering arable, forest and areas of special interest.

In some Member States soil surveys and indicator sets are still under development (e.g. Cyprus) or are in the process of being renewed and reinvigorated (e.g. the Netherlands).

4.4 Comparing Coverage of EU and National Policies – Outstanding Questions and Conclusions on Policy Coverage

When looking at the limitations identified at EU level in terms of overarching policy coverage and strategic policy direction for soil protection it is clear that different strategies are pursued

across Member States. These strategies both for defining soil protection in national law and the supporting monitoring approaches are conceptually different and emphasise different aspects of soil protection. There is no apparent common basis for integrating soil issues into wider policies or defining their role in delivering wider environmental protection and services.

Table 4.5 summarises the key issues and potential gaps identified in the review of EU level policies and compares these to national approaches. There remain clear outstanding questions around the promotion of soil priorities and how these should be conceived and integrated into wider policy and monitoring solutions.

It should however, be noted that further investigation is needed before defining any approach to addressing potential gaps and issues. As noted earlier in the text several Member States have been actively exploring alternative approaches to conceptualising soil issues and their inherent value to society. In addition, this represents an initial analysis. It should be noted that the inventory information provides an overview of policies and their interlinkages. Further detailed work should be undertaken to understand how groups of policies interact at Member State level to provide a picture of protection of soil. However, a further challenge of there being no organising measure on soil protection in Europe is that Member States do not have to consistently conceive or report approaches on soil issues. This means that even the combination of policies they choose to present represents the different conceptions of what issues are important.

Table 4.5 Comparing EU Gaps to Coverage by Member States

EU Level Issue/ Gap	Summary of National Approaches	Outstanding Issues
Strategic policy setting out the direction for soil protection	National approaches are highly varied, a small proportion have adopted strategic, binding soil protection policies. While few have not addressed the question of soil protection at all in binding measures many have done so on a partial basis only covering certain soil threats, soil types or adopting a piecemeal approach to integration into policies in other sectors	There remains a question of how to represent in policy in Europe the core goals of soil protection and on what basis these should be integrated into other policy areas.
Clear conceptualisation of soil issues and value	Different and evolving linked to the value of land and society.	Need for further dialogue on how soil protection needs should be conceptualised moving forward in Europe. This is important for delivering of soil protection but also delivering of other linked goals for example on climate change
Coordinated monitoring of soil condition	This in some ways follows from the conception of soils. In Member States where the approach to soil protection is more clearly defined there are often	In the absence of a clear conception of soil protection issues there also remains a lack of coordination in terms of the

EU Level Issue/ Gap	Summary of National Approaches	Outstanding Issues
	<p>more coordinated efforts to assess and review soil parameters. There appears to be no consistent approach to soil monitoring in Europe. Some Member States are advanced while others have partial systems or indicators systems that remain under development.</p>	<p>monitoring of soil condition and also importantly understand is soils condition is delivering against environmental needs and societal goals. There is some pressure to coordinate monitoring on some aspects more at EU level for example on SOM monitoring. However, this needs to be combined with a wider vision for the approach to soil condition.</p>

5 Common Agricultural Policy (CAP) and Complementary Measures on Agricultural and Forest Land

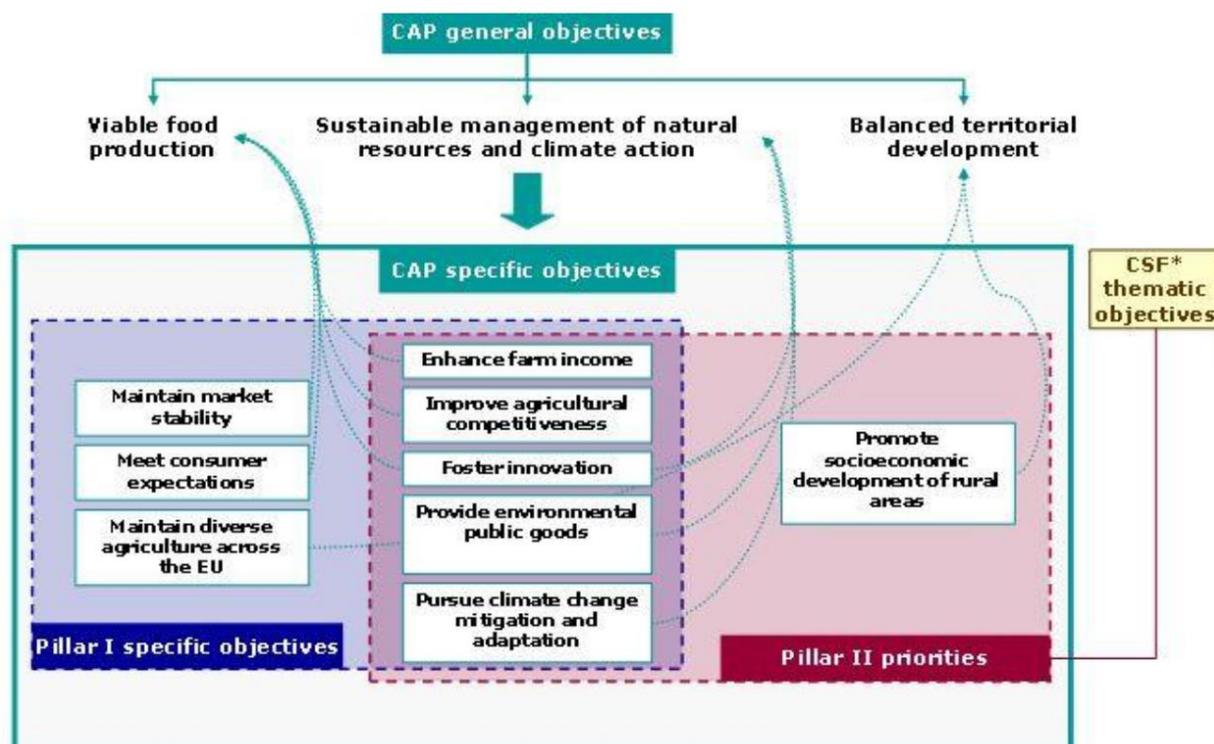
5.1 Conceptualisation of the CAP Policy Cluster

This cluster covers the key elements of the Common Agricultural Policy (CAP) and associated policies which are expected to affect the management of agricultural, forest and other wooded land across the EU, by influencing directly or indirectly the day-to-day decisions of individual land managers. These policy instruments are:

- CAP cross-compliance standards of Good Agricultural and Environmental Condition (GAEC)
- CAP Pillar 1 greening payments
- CAP Pillar 2 Rural Development Programmes (RDPs)
- EU Forest Strategy 2013

The CAP is an important economic driver for farming decisions across the EU and has the potential to advance soil protection in both agriculture and forestry through Member States' and land managers' implementation of its measures and associated obligations. Although the level of EU competence for forestry is much more limited than it is for agriculture, the implementation of the EU Forest Strategy 2013 is closely linked to the CAP, which remains the only source of EU funding to provide incentives for environmental afforestation, agroforestry and sustainable forest management. However, in many Member States national forest policies are a more important influence than the CAP on forest soil management.

The CAP for 2014 to 2020 has three general objectives - viable food production, sustainable management of natural resources and climate action, and balanced territorial development - which collectively feed into the Europe 2020 objectives of smart, sustainable and inclusive growth. Both CAP pillars contribute to the general objectives, which are then broken down into specific objectives, some of which are common to both Pillars, whereas others are linked either to Pillar I or to Pillar II. A simplified graphical presentation of these general objectives and their breakdown into specific objectives (for rural development, these are shown as 'Pillar II priorities') is presented Figure 5.1.



* CSF: Common Strategic Framework including the ERDF, ESF, CF, EAFRD and EMFF

Figure 5.1 General and specific objectives of the CAP 2014-20

Source: Technical Handbook on the Monitoring and Evaluation Framework of the Common Agricultural Policy 2014-2020 – European Commission - Directorate-General for Agriculture and Rural Development (October 2015)

The CAP, which has a budget that accounts for about 37 per cent of the EU’s Multi-annual Financial Framework, is structured as two ‘Pillars’:

- Pillar 1 is funded by the European Agricultural Guarantee Fund (EAGF) and mainly provides **direct payments** (including the Pillar 1 greening payment) to farmers per hectare of land farmed; it also makes provision for some market measures.
- Pillar 2, co-financed by the European Agricultural Fund for Rural Development (EAFRD) supports Member States’ and regions’ **Rural Development Programmes (RDPs)** with a wide range of measures to address environmental, social, and economic priorities in the agricultural and forestry sectors, and rural areas more widely.
- Horizontal elements of the CAP, applicable to both Pillars, include **cross-compliance rules** and a requirement for Member State to provide a **Farm Advisory Service (FAS)**.

Soil is one of the basic resources for all agriculture and forestry production. The CAP objective of sustainable management of natural resources and climate action, and more specifically the provision of environmental public goods and the pursuit of climate change mitigation and adaptation, are clearly relevant to the soil protection and improvement.

5.1.1 Coverage of Policies and Issues in the Cluster

CAP measures available in 2014-20 are the result of a series of incremental reforms since the policy was first introduced in 1962, and some measures relevant to soils have been available for decades. For example, RDP support for afforestation and environmental land management contracts dates from the 1980s (EEC 1985) and CAP cross-compliance originated in requirements for 'good farming practice' first introduced in the 1990s (EC 1999).

The three CAP 2014-20 instruments most relevant to influencing land use and management in a way that potentially could benefit soil protection are GAEC cross-compliance standards, Pillar 1 greening payments and a wide range of measures in RDPs. The EU Forest Strategy 2013 is also relevant to implementation of RDP forest measures.

GAEC cross-compliance standards

Farmers receiving direct payments under Pillar 1 and area-based payments under Pillar 2 must comply with cross-compliance requirements across the whole farm holding, or risk losing part of their CAP payments. The cross-compliance system incorporates within the CAP '*basic standards concerning the environment, climate change, good agricultural and environmental condition of land, public-health, animal health, plant and animal welfare*' (EU 1306/2013, Recital (54)). There are two types of cross-compliance requirement:

- Statutory Management Requirements (SMR) which are derived from existing regulatory requirements under other EU legislation, including the Nitrates, Habitats and Birds Directives; and
- Standards for Good Agricultural and Environmental Condition (GAEC) which are defined by individual Member States within the framework set out in the EU legislation.

Because the SMRs refer to EU legislation that also applies to farmers not receiving the CAP support payments, they are not reviewed as part of the agriculture and forestry cluster but, where relevant, are referenced in other policy clusters.

Member States must define seven specific GAEC standards, taking into account '*the specific characteristics of the areas concerned, including soil and climatic conditions, existing farming systems, land use, crop rotation, farming practices and farm structures*' (EU 1306/2013, Article 94). Of the seven, three are of explicit relevance to soil protection: GAEC standard 4 (minimum soil cover), GAEC standard 5 (minimum land management reflecting site specific conditions to limit erosion) and GAEC standard 6 (maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons). Two other GAEC standards are also relevant to soil protection: GAEC standard 7 (retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces) which can help to limit soil erosion and maintain/improve soil organic matter content; and GAEC standard 1 (establishment of buffer strips along water courses) which, apart from contributing to limiting water pollution, can also help to protect the soil along water courses. The GAEC standards reviewed as part of the agriculture and forestry cluster are shown in bold in Table 5.1.

Table 5.1 Extract from EU Rules on Cross-Compliance

Main issue	Requirements and standards		
Water	SMR 1	Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L375, 31.12.1991, p.1)	Articles 4 and 5
	GAEC 1	Establishment of buffer strips along water courses ⁽¹⁾	
	GAEC 2	Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures	
	GAEC 3	Protection of ground water against pollution: prohibition of direct discharge into groundwater and measures to prevent indirect pollution of groundwater through discharge on the ground and percolation through the soil of dangerous substances, as listed in the Annex to the Directive 80/68/EEC in its version in force on the last day of its validity, as far as it relates to agricultural activity	
Soil and carbon stock	GAEC 4	Minimum soil cover	
	GAEC 5	Minimum land management reflecting site specific conditions to limit erosion	
	GAEC 6	Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons ⁽²⁾	
Biodiversity	SMR 2	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L20, 26.1.2010, p.7)	Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)
	SMR 3	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L206, 22.7.1992, p.7)	Article 6(1) and (2)
Landscape, minimum level of maintenance	GAEC 7	Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species	
<p>Notes</p> <p>(1) The GAEC buffer strips must respect, both within and outside vulnerable zones designated pursuant to Article 3(2) of Directive 91/676/EEC, at least the requirements relating to the conditions for land application of fertiliser near water courses, referred to in point A.4 of Annex II to Directive 91/676/EEC to be applied in accordance with the action programmes of Member States established under Article 5(4) of Directive 91/676/EEC.</p> <p>(2) The requirement can be limited to a general ban on burning arable stubble, but a Member State may decide to prescribe further requirements.</p> <p>Source: Compiled using Regulation (EU) No 1306/2013, Annex II.</p>			

Pillar 1 Greening payment

Member States must use 30 per cent of their national ceilings for direct payments to grant an annual payment, on top of the basic payment, for compulsory practices to be followed by farmers addressing, as a priority, both climate and environment policy goals. Those practices should take the form of simple, generalised, non-contractual and annual actions that go beyond cross compliance and are linked to agriculture (EU 1307/2013, Article 47). The three Pillar 1 greening measures are: crop diversification, maintenance of permanent grassland and Ecological Focus Areas (EFA). Member States have a certain degree of flexibility to define the rules applicable to crop diversification (e.g., the list of crops permitted) and EFA obligations (types of EFA permitted). Moreover, individual farmers have a certain degree of flexibility in choosing how to implement these rules (i.e. crops chosen for diversification and type of EFA selected, among those permitted by the Member State). This flexibility is important to accommodate the diversity of agricultural systems and the different environmental situations across the Union. Moreover, some farmers are exempt from certain or all of the Pillar 1 greening requirements. For example, farmers with an arable area of up to 10 hectares are exempt from crop diversification, "*taking into account the difficulty for smaller farms to diversify*" (see recital 41 of EU Reg. 1307/2013); organic farmers are exempt from all Pillar 1 greening requirements, "*given the recognised environmental benefits of organic farming systems*" (see recital 38 of EU Reg. 1307/2013); farmers whose holdings are fully or partially situated in "Natura 2000" areas are exempt from the obligation to adopt Pillar 1 greening practices, if these are not "*compatible with the objectives of the Wild Birds and Habitats Directives*" (see recital 37 of EU Reg. 1307/2013).

Crop diversification

This requirement applies only to farms with more than 10 hectares of arable land. Those with up to 30 ha of arable land have to grow at least two different crops on their arable land, and farmers with more than 30 hectares of arable land have to grow at least three crops. In both cases the main crop cannot cover more than 75% of the arable land. Fallow land and grass and other herbaceous forage also count as crops. The objective of the crop diversification requirement is the improvement of soil quality (EU 1307/2013, Recital (41)), but in practice the soil protection benefits will depend on the way in which individual farmers implement the diversification requirements.

Permanent grassland

There are two different Pillar 1 greening requirements for the maintenance of permanent grassland⁷, aimed particularly at carbon sequestration benefits (EU Reg. 1307/2013, Recital (42)). Firstly, Member States must ensure that the ratio of the area of permanent grassland to the total utilised agricultural area does not decline by more than 5%, and they have the option of apply this at national, regional or sub-regional level. Secondly, Member States must designate environmentally sensitive permanent grassland (ESPG) in areas covered by the

⁷ For the purposes of the 2014-20 CAP 'permanent grassland' means 'land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that has not been included in the crop rotation of the holding for five years or more; it may include other species such as shrubs and/or trees which can be grazed provided that the grasses and other herbaceous forage remain predominant as well as, where Member States so decide, land which can be grazed and which forms part of established local practices where grasses and other herbaceous forage are traditionally not predominant in grazing areas' (EU 1307/2013, Article 4(1)b).

Birds and Habitats Directives, including *'in peat and wetlands that are situated in these areas, and which need strict protection in order to meet the objectives of those Directives'* (EU 1307/2013, Article 45 (1)). At farm level the Pillar 1 greening requirement prohibits converting or ploughing the ESPG, thus protecting soil carbon stocks. Member States also have the option to designate further ESPG areas elsewhere, offering the opportunity to protect significant soil carbon stocks outside Natura 2000 areas.

Ecological Focus Areas

- i. The EU Regulation defines 10 types of ecological focus area (EFA) (EU 1307/2013, Article 46 (2)) which can be established in order to safeguard and improve biodiversity on farms (EU 1307/2013, Recital (44)). These are:
 1. Land lying fallow;
 2. Terraces;
 3. Landscape features, including hedges or wooded strips, isolated trees and trees in lines or groups, field margins, ponds, ditches and traditional stone walls (these features can be within or adjacent to the arable land) (EU 1659/2014 Article 45 (4));
 4. Buffer strips, including buffer strips covered by permanent grassland provided these are distinct from the adjacent eligible agricultural area;
 5. Areas of agro-forestry that receive(d) support under the agro-forestry measure of the 2007-13 or 2014-20 RDPs;
 6. Strips of eligible hectares along forest edges;
 7. Areas with short rotation coppice with no use of mineral fertilizer and/or plant protection products (these do not have to be located on the arable land of the farm);
 8. Afforested areas that receive(d) support under the forestry measures of the 2000-2006, 2007-13 or 2014-20 RDPs and which are still eligible for direct payments (these do not have to be located on the arable land of the farm);
 9. Areas with catch crops, or green cover established by the planting and germination of seeds;
 10. Areas with nitrogen fixing crops.

- ii. Member States must select one or more of these types of EFA to compile their own national list from which farmers can choose how to meet their EFA requirement. This applies to farmers with more than 15 hectares of arable land, who must ensure that an area corresponding to at least 5% of their arable land is an EFA. Farms with a large proportion of grassland are not required to meet the EFA requirements, and there are other exceptions, including organic farms. The potential soil benefits depend on Member States' decisions on what is to be considered as EFA and on farmers' choice of EFA type and location, but could include improved soil cover and other anti-erosion effects as well as improved soil organic matter content (e.g., in agroforestry areas and areas with nitrogen fixing crops).

Rural Development Programmes

EU rural development policy forms Pillar 2 of the CAP. The overall aim is to promote sustainable rural development in a way that contributes to the development of a more

territorially and environmentally balanced, climate-friendly and resilient, competitive and innovative agricultural sector and of overall rural areas. All Member States must prepare for Commission approval, implement and monitor a seven-year rural development programme (RDP) at national and/or regional level – there are 118 RDPs in total for the period 2014-2020. In contrast to Pillar 1 of the CAP, which is wholly financed by the EAGF, RDPs are partly funded by the EAFRD and co-financed by the Member State's national and/or regional authorities.

The EAFRD Regulation defines six EU level priorities of which every RDP must address at least four, and within each priority there are several focus areas (18 in total) (EU 1307/2013, Article 45 (1)). The relationship with soil protection is potentially strong because the legislation defines two focus areas specifically relevant to soils:

- focus area 4C preventing soil erosion and improving soil management; and
- focus area 5E fostering carbon conservation and sequestration in agriculture and forestry.

The EAFRD Regulation offers a total of 19 RDP measures from which Member States/Regions may choose to address their needs (only the agri-environment-climate measure and the Leader approach are obligatory). Under their RDPs, Member States/Regions can then provide for sub-measures/operations tailored to specific local needs or priorities. At least 30 per cent of the EAFRD contribution to each RDP must be reserved for specific measures relevant to climate change mitigation and adaptation and the environment. The RDP measures judged to have most potential for soil protection are listed in Box 5.1 below.

Box 5.1 RDP Measures Most Relevant to Supporting Soil Protection in Agriculture and Forestry

M1: Knowledge transfer and information actions *Optional*: can support vocational training, demonstration activities, Information provision, farm and forest management exchanges and visits.

M2: Advisory services, farm management and farm relief services *Obligatory*: this measure funds part of the cost of the CAP Farm Advisory System (FAS) which Member States must provide, covering the following: cross compliance; Pillar 1 greening requirements; RDP measures to improve economic performance; obligations under the WFD; requirements for integrated pest management; farm safety; advice for first-time farmers. *Optional*: can support additional advisory services helping farmers, forest holders and other land managers to improve the economic and environmental performance as well as climate friendliness and resilience of their holding or enterprise; can also support training of advisors.

M4: Investments in physical assets *Optional*: can support tangible and intangible investments aimed at improved performance and sustainability of farms, processing and marketing, farm and forest infrastructure, energy and water supply/saving and non-productive environmental investments linked to agri-environment-climate objectives, Natura 2000 or other high nature value systems.

M5: restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention *Optional*: can support investments in preventive actions to reduce consequences of probable natural disasters and adverse climatic events as well as investments to restore agricultural land damaged by such disasters and events.

M6: Farm and business and development *Optional*: investment support and other payments aimed at young farmers, small farms and setting up non-agricultural businesses.

M7: Basic services and village renewal *Optional*: a wide range of support including investment in small-scale renewable energy, increasing environmental performance and awareness, drawing up protection and management plans for Natura 2000 and other high nature of value areas, and studies/investments associated with upgrading rural landscape.

M8: Investment in the forest area development and improvement of the viability of forests *Optional*: support for wide range of investments for *inter alia*: afforestation and creation of woodland; establishing new agroforestry systems; prevention and restoration of damage to forests from fires, natural disasters and climate related threats; and improving the resilience, environmental value and mitigation potential of forest ecosystems. For holdings above a certain size (to be defined by the Member State/Region), support is conditional upon the presence of a forest management plan or equivalent instrument in line with sustainable forest management as defined by the Ministerial Conference on the Protection of Forests in Europe of 1993.

M10: Agri-environment-climate *Compulsory*; this is the only measure that must be made available throughout the Member State's or region's territory, in accordance with national, regional or local specific needs and priorities. It offers farmers and other land managers multi-annual contracts for agricultural practices that make a positive contribution to the environment and climate. The baseline above which payments are calculated includes CAP cross-compliance requirements, and there are strict rules to avoid double funding of actions that are Pillar 1 greening options, such as EFA buffer strips, areas with catch crops or green cover.

M11: Organic Farming *Optional*: offers annual payments through multi-annual contracts for conversion to and/or maintenance of organic farming practicing and methods.

M12: Natura 2000 and Water Framework Directive payments *Optional*: basic compensatory payments applying to an area where there are restrictions on land management related to farm-level requirements under the WFD river basin management plans or under Natura 2000 designations on agricultural and forest areas.

M13: Areas facing Natural Constraints (ANC) payments *Optional*: basic payments for farmers in mountain areas and in other areas where there are natural constraints on agricultural production.

M15: Forest-environment-climate *Optional*: similar to M10, offers multi-annual land management contracts to improve environmental and climate management of forests and other wooded land. Only commitments going beyond mandatory requirements established by national law are eligible for support. Moreover, for forest holdings above a certain size (to be defined by the Member State/region), support is conditional upon the presence of a forest management plan or equivalent instrument in line with sustainable forest management as defined by the Ministerial Conference on the Protection of Forests in Europe of 1993.

M16: Cooperation *Optional*: support for a wide range of cooperative activities by different actors and sectors, new clusters and networks; supports the establishment of operational groups linked to the work of the European Innovation Partnership for agricultural productivity and sustainability (EIP-Agri).

The agri-environment-climate measure (M10) is of particular importance because it allows Member States to support implementation of appropriate soil management requirements through multi-annual contracts with individual farmers. This measure may also be used by Member States to define 'equivalent practices' to meet Pillar 1 greening requirements, instead of those set out in the Pillar 1 legislation. Moreover, the support for non-productive investments linked to the achievement of agri-environment-climatic objectives (sub-measure 4.4) is crucial for the successful implementation of certain agri-environment-climate commitments.

Some examples of how the agri-environment-climate measure and non-productive investments can support sustainable soil management practices are given in Box 5.2 below. While these examples show that M10 and sub-measure 4.4 are often targeted at other

environmental objectives, not just soil protection, they illustrate how benefits for soil organic matter content, soil biodiversity and reducing the risk of soil erosion and diffuse pollution can be realised in many different ways.

Box 5.2 Examples of soil-relevant agri-environment-climate sub-measures programmed in 2014-20 Rural Development Programmes

Sustainable olive growing in Andalusia: Olives are the main crop in Andalusia, grown on a third of the land with slopes of more than eight percent. This scheme aims to promote sustainable soil management of olive groves to minimize soil erosion and degradation. Instead of tilling the soil between the trees farmers must maintain plant cover (spontaneous or sown) between 15 October and 15 March of the following year. They have the option of receiving an additional payment for shredding the olive prunings and spreading these as mulch on the soil to increase the organic matter content.

Erosion dams on arable land in Flanders, Belgium: Straw is used to create micro dams on arable soils prone to erosion. The flow of water and sediment from land further up the slope is slowed down, allowing the soil particles and sediment to settle in the dam as the water seeps through. This has the additional benefit of reducing the risk of soil erosion downstream of the dam because peak flows are capped. The dams are maintained in the same place for the duration of the five-year agri-environment-climate contract.

Soil erosion control in Bulgaria: This sub-measure offers farmers a choice of erosion control measures for different farming systems including: conversion of arable land into permanent grassland using perennial grass mixtures; growing grass between the rows and/or building and maintaining protective run-off furrows across the slope in vineyards and permanent crops; establishing and maintaining buffer strips and/or crop rotation strips on arable land.

Precision farming in Baden-Wuerttemberg, Germany: Precision arable farming involves very specific, targeted soil and crop management within individual fields. It uses ICT-based sensor technologies and software to link in-field variables such as soil type and nutrient levels with farming practices such as tillage, seeding, and fertilizer, herbicide and pesticide applications, often carried out by computer guided machinery. Optimising inputs in this way helps to reduce the risks of soil pollution and compaction. The initial steps in precision farming require soil sampling and analysis of soil properties and nutrient content in sub-plots throughout the field.

Wildlife strips in arable fields in Croatia: Support is provided for establishing two types of sown strips in arable fields of at least 1 ha, aimed at biodiversity objectives but with benefits for soils too. Flower strips, whose primary function is to provide habitats for pollinators and a source of pollen and nectar during spring and summer; and grass strips, providing habitats for birds such as Corn Bunting (*Emberiza calandra*), Grey Partridge (*Perdix perdix*) and Yellowhammer (*Emberiza citrinella*).

Permanent conversion of arable land to grassland in Mecklenburg Vorpommern, Germany: This scheme is aimed primarily at water quality and biodiversity objectives (reducing nutrient inputs to surface waters and groundwater) but also has benefits for flood and erosion control, protecting soil carbon and soil biodiversity. Permanent grassland is established on arable land in lowland floodplains by sowing grass or other herbaceous forage of a type traditionally found in natural pastures or meadows. Pesticides are not permitted, and the land must be kept as permanent grassland, not converted back to arable cropping.

Multifunctional field margins - bio-belts on arable land Slovakia: A seeds mixture of year-round flowering plants is sown each year on strips of arable land at least 5m wide and 200m long (1000 sq.m in area) along the edge of a block of arable land or between two different arable crops, and managed without chemical pesticides or mineral fertilizers.

Conservation of steep meadows in Slovenia: The aim is to preserve grassland habitats on very steep slopes,

preventing biodiversity loss on the one hand and reducing the risk of erosion on the other. This sub-measure applies to meadows with a slope of 50% or more, and annual agri-environment-climate payments compensate farmers for the continued use of existing practices of manually cutting and harvesting the grass, which are a net cost to the farm business.

Wetland management in England, UK: The England RDP offers a wide range of measures to maintain, restore or create ponds, ditches, bogs, fens and reedbeds, supported by a combination of the agri-environment-climate (M10.1) and non-productive investment (M4.4) measures. For example: creating buffer strips of tussocky grass and low scrub at least 10 m wide around ponds and along ditches, to be maintained by mowing and without the use of organic or mineral fertilisers; implementing a water management regime, including disabling ditches and drains where appropriate, to maintain or restore the quality and extent of wildlife-rich wetland habitats; constructing earthworks to re-create these habitats from previous wetland sites on, for example, arable land on deep peat.

Maintaining lowland peat bogs in Scotland UK: The aim is to keep the bog surface (both the vegetation and the peat) as intact, undisturbed and as wet as possible. The plants that grow there such as Sphagnum mosses are adapted to wet conditions with limited nutrients, and they contribute to the active creation of peat and also help to reduce flood risk by holding large volumes of water.

Source: machine translations of extracts from approved 2014-20 RDPs, provided by the European Commission; the translation varied in quality and not all aspects of the schemes may be covered by these extracts.

This policy offers a high degree of subsidiarity which enables Member States to choose RDP measures and sub-measures that address their specific soil threats and needs. As illustrated above, these sub-measures can include, for example, multi-annual contracts for environmental land management for both agriculture and forestry. They can also support afforestation, agroforestry, investment in carbon-saving technologies and equipment; and 'indirect' measures such as advice, training, information and innovation. All of these have the potential to address key soil protection issues, and the flexibility of the legislation allows managing authorities to design a coherent package of different measures and sub-measures to address specific needs and, if necessary, to include specific operations under sub-measures targeted at particular land management systems or geographical areas and tailored to suit specific local circumstances.

EU Forest Strategy 2013

The Strategy's forest objectives for 2020 are to ensure and demonstrate that all forests in the EU are managed according to principles of sustainable forest management (SFM) and that the EU's contribution to promoting sustainable forest management and reducing deforestation at global level is strengthened. These objectives are linked to eight priority topics in three groups, which identify specific activities for the Commission and Member States. The Commission expects Member States to use their RDP measures to support the implementation of sustainable forest management (SFM) which, as defined by Forest Europe, includes the criterion of '*maintenance and appropriate enhancement of protective functions in forest management (notably soil and water)*' (Forest Europe 2015).

5.1.2 Links to Other Key Clusters

The agriculture and forestry cluster is linked to two other policy clusters.

The diffuse pollution and water management cluster legislation is specifically linked through: SMR cross-compliance requirements linked to the Nitrates Directive and GAEC standards for water (including GAEC 1 riparian buffer strips, which can also be EFA buffer strips), and through RDP sub-measure M4.4 (non-productive investments), measure M10 (agri-environment-climate) and sub-measure M12.3 (which provides compensation for additional costs and income foregone resulting from disadvantages, in the agricultural areas concerned, related to the implementation of the Water Framework Directive). There are similar links to the nature, land soil sealing cluster legislation through SMR cross-compliance requirements under the Habitats and Birds Directive, through the protection of ESPG within Natura 2000 areas, and through the RDP measures M12.1 and 12.2 (which provide compensation for additional costs and income foregone resulting from disadvantages in agricultural and forest areas located, respectively, in Natura 2000 areas).

Potential links between these two policy clusters and Pillar 2 of the CAP include specific references in the EAFRD Priorities 4 and 5 to restoring, preserving and enhancing biodiversity (including Natura 2000 areas), to improving water management (including fertiliser and pesticide management) and to increasing efficiency of water use in agriculture. These could be achieved through Member States' targeted use of a range of RDP measures, for example M4.4 (non-productive investments), M10 (agri-environment-climate) and M15.1 (forest-environment-climate).

5.1.3 Most Relevant Soil Threats and Functions

The main threats which are the focus of this policy cluster are those most closely linked to the management of soil in terms of keeping the soil in place (the threat of **soil erosion**) and maintaining the organic matter content of the soil, particularly in wet and carbon rich soils (the threat of **loss of soil carbon**). Linked to these two, but usually indirectly, is the threat of **loss of soil biodiversity** which may also be linked to the threats of **compaction and of diffuse contamination**, particularly on intensive arable land. However, the threat of loss of soil biodiversity is difficult to quantify, as is any possible positive or negative impacts on soil biodiversity produced through CAP or other EU policy instruments.

The key soil functions addressed by this cluster are closely related to maintaining the fertility, resilience and productive capacity of soils for agriculture and forestry. These functions are also related to addressing the soil threats identified above, because many of the farm and forest management practices which limit the risks of soil erosion and protect/improve the existing soil carbon content will also enhance the **carbon sequestration** capacity of the soil, promote soil **biodiversity**, and help to maintain the soil as a basis for **biomass production** (for example through sustainable forest management, protection of 'woody' landscape features, afforestation and agroforestry).

5.2 Integrated Assessment of the Key Policies within the Cluster

5.2.1 Coverage of Soil Threats across the Cluster

The agricultural and forestry policy cluster addresses all soil threats directly or indirectly, except the threat of soil sealing.

- **Acidification** – can be addressed through SFM promoted under the EU Forest Strategy and by RDP environmental land management contracts and other RDP measures.
- **Compaction** – machinery traffic on farmland or livestock rearing may be contributory factors in soil compaction. GAEC standards, Pillar 1 greening obligations and RDP measures that help protect or increase levels of soil organic matter, maintain soil cover and promote SFM under the EU Forest Strategy all have potential to reduce the threat of compaction.
- **Contamination (diffuse)** – GAEC standards, Pillar 1 greening requirements and RDP measures have potential to address diffuse contamination of water bodies by reducing soil erosion (and hence transport of contaminants) and/or by prohibiting or limiting application of fertilisers and plant protection products and (in the case of RDPs) by supporting investments and other measures for efficient nutrient management.
- **Desertification** – is indirectly addressed through GAEC standards which form part of the baseline level of management required on farmland benefitting from CAP direct payments; it could also be addressed through RDP environmental land management payments for farmland and wooded land.
- **Erosion – by wind or by water**, is directly addressed by the three GAEC soil standards and indirectly by the GAEC standards for landscape features and riparian buffer strips, by RDP environmental land management contracts and other RDP measures, and by SFM under the EU Forest Strategy. It is considered a key threat addressed by the agriculture and forestry cluster.
- **Flooding/landslides** – this threat is tangentially relevant to all policies in the cluster, to the extent that land management to reduce the threat of soil erosion (particularly on slopes), and to improve soil organic matter is likely to slow peak flows and improve water infiltration.
- **Loss of soil organic matter** – is explicitly addressed by the GAEC soil standards and by the Pillar 1 greening requirements for ESG, by RDP environmental land management contracts and other RDP measures and by SFM under the EU Forest Strategy. It is considered a key threat addressed by the agriculture and forestry cluster.
- **Loss of biodiversity** - this is considered a key threat for the agriculture and forestry cluster because soil micro-organisms are essential to key soil functions, including the carbon pool and nutrient cycling. None of the policies in this cluster makes specific reference to *soil* biodiversity, but the wider objective of preserving farmland biodiversity is indirectly addressed by the GAEC standard for landscape features, and directly by Pillar 1 greening ESG requirements and EFA objectives. In RDPs, Priority 4 addresses the need for restoring, preserving and enhancing ecosystems related to agriculture and forestry, supported by a wide range of measures including Natura 2000, agri-environment-climate payments, non-productive investments and forest-environment-climate measures.

- **Salinisation** – this threat is addressed indirectly by measures which might influence the use of agricultural irrigation, for example the GAEC standard for water abstraction and the use of RDP measures to encourage more efficient water use in agriculture.
- **Soil sealing** – this threat is not addressed by this cluster, except if priority for support is given, under measure M4 and/or M7 of Rural Development Programmes, to restoration/improvement/upgrading of existing buildings or infrastructures rather than to the creation of new ones on agricultural or forest areas.

Table 5.2 below provides a summary of how each of the policies in the agriculture and forestry cluster contributes to addressing the soil threats identified above as relevant to this cluster.

Table 5.2 Summary of Soil Threats Addressed by the CAP Policy Cluster

Threats	GAEC cross-compliance standards for soils and landscape	Greening Direct Payments	RDP Measures ⁸	EU Forest Strategy
Acidification			M1, M2, M10 and M11	Through Member States' implementation of RDP forest measures, promoting SFM
Compaction	GAEC 5 land management conditions to limit erosion could be defined in a way that would limit compaction	Fallow, buffer strips, agroforestry, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8, M10, M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Contamination (diffuse)		Fallow, buffer strips, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M10, M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Desertification			M1, M2, M4, M6, M8, M10, M12, M13 M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Erosion	GAEC 5 standards are specifically to limit erosion. GAEC 4 standards for soil	Fallow, terraces, buffer strips, catch crops/green cover,	M1, M2, M4, M6, M8, M10, M12, M15 and M16	Through Member States' implementation of

⁸ Key to RDP measure codes: M1 knowledge transfer and information actions, M2 advisory services, M4 investments in physical assets, M5 restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention, M6 farm and business and development, M7 Basic services and village renewal in rural areas, M8 Investment in the forest area development and improvement of the viability of forests, M10 agri-environment-climate, M11 organic farming, M12 Natura 2000 and Water Framework Directive, M13 ANC payments, M15 forest-environment-climate, M16 cooperation.

Threats	GAEC cross-compliance standards for soils and landscape	Greening Direct Payments	RDP Measures ⁸	EU Forest Strategy
	cover, depending on when and where they apply, could also contribute to limiting erosion	agroforestry, afforested areas, short rotation coppice (SRC)		RDP forest measures, promoting SFM
Flooding/ landslides	Indirectly, by reducing soil erosion (which reduces the capacity of drainage channels), by slowing run-off (maintaining soil OM and soil cover) and by retaining landscape features	Terraces, buffer strips, agroforestry, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8, M10, M12, M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Loss of soil organic matter	GAEC 6 standards to maintain soil organic matter, and possibly GAEC 4 standards for soil cover, depending on how the cover is managed (e.g. if the green cover is permanent, or is incorporated in the soil before the next crop is established)	Fallow, buffer strips, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8, M10, M11, M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Loss of biodiversity	GAEC 4 standard maintaining soil cover and GAEC 6 standard maintaining soil organic matter may reduce the loss of soil biodiversity but other factors (for example use of PPP) could affect this	Fallow, buffer strips, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8, M10, M11, M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Salinisation	(Water abstraction under GAEC 2 standard is also relevant)		M1, M2, M4, M6, M10, M15 and M16	Through Member States' implementation of RDP forest measures, promoting SFM
Soil sealing			M4, M7 (if priority for support is given to restoration/improvement of existing buildings or infrastructures rather than to the creation of new ones on agricultural or forest areas)	

Of the policy instruments in this cluster, the RDP measures have the greatest potential to address all relevant soil threats on farmland and in forests (in conjunction with the EU Forest Strategy). RDP focus areas 4C and 5E explicitly address soil erosion, soil management and carbon conservation and sequestration. RDPs can offer both farming and forestry sectors a wide range of targeted environmental land management and investment support, backed up by indirect measures (e.g. training, advice) to support improved implementation on the ground. CAP measures focused on soil erosion and carbon sequestration may also address

indirectly other threats e.g. diffuse contamination and flooding/landslides. The Pillar 1 instruments address soil erosion (the GAEC 5 standard and several types of EFA) and loss of soil organic matter (the GAEC 6 standard, EFAs and the ESPG requirement) and loss of soil biodiversity (EFAs). Compaction could be addressed directly through the GAEC 5 standard for minimum land management reflecting site specific conditions to limit erosion and also by RDP measures, as could acidification, desertification and salinisation.

5.2.2 Coverage of Soil Functions across the Cluster

The CAP policy cluster is relevant to all soil functions, although for some this link is indirect:

- Carbon pool – this is a key function that is relevant to all policy instruments in the cluster, particularly those aimed at land use and management which protects the existing carbon pool and the sequestration potential both above and below ground. Examples of specific measures include GAEC standards, Pillar 1 greening requirements for permanent grassland, buffer strips, fallow and ‘woody’ EFAs; and a wide range of RDP measures, particularly for restoration, creation or management of permanent grassland habitats, wetlands, peatland, forests and other wooded land. The EU Forest Strategy points to the use of RDP funds to invest in improving the mitigation potential of forest ecosystems, to adapting forests to climate change and creating new woodland and agro-forestry systems.
- Platform for human activities – as a soil function this is addressed indirectly by the soil and carbon stock GAEC standards 4, 5 and 6, by several environmental land management measures in RDPs (including those for ANC, Natura 2000/WFD, agri-environment-climate, organic farming and different measures supporting the conservation, development and viability) and in the EU Forest Strategy’s emphasis on using RDP funds to support sustainable forest management.
- Biomass production – is directly addressed in rural development policy by Priority 5 which promotes the shift to a low-carbon and climate resilient economy, and through the use of RDP forest measures. The EU Forest Strategy points to the use of RDP funds to invest in optimising the sector’s contribution to the bio-economy. Although EFAs are aimed primarily at biodiversity objectives some types of EFA also have potential to produce biomass, for example areas with short rotation coppice, afforestation and agroforestry.
- Hosting biodiversity – because soil biodiversity is an essential component of soil organic matter content and the nitrogen cycle this function is indirectly relevant to all the policy instruments in this cluster which protect soil organic matter, promote carbon sequestration, support crop nutrient management and contribute to limiting or improving the use of plant protection products. Of particular relevance are EFAs (fallow, buffer strips, afforested areas, short rotation coppice), environmental land management measures under RDPs, the EU Forest Strategy’s emphasis on sustainable forest management, and the use of RDP funds in achieving nature and biodiversity objectives, including support for agri-environmental-climate operations related to Integrated Pest Management, to

organic production practices and methods and to different measures supporting the conservation, development and viability of forests.

- Providing raw materials – this function is not relevant to the agriculture and forestry cluster other than in the sense that well-managed agricultural or forest soils can protect the underlying parent material or rock from erosion.
- Storing, filtering and transforming nutrients and water – are important functions of agricultural and forest soils and relevant to efforts to reduce the threats of diffuse contamination and flooding. This function is directly linked to CAP instruments promoting soil cover, soil organic matter and soil biodiversity, including GAEC standards, EFA obligations and several environmental land management measures in RDPs (including those for ANC, Natura 2000/WFD, agri-environment-climate, organic farming and conservation, development and viability of forests). The EU Forest Strategy promotes this function indirectly through sustainable forest management.
- Storing geological and archaeological heritage – in both farmland and forest areas can be promoted by all policy instruments in the cluster, including GAEC standard 7 for landscape features, Pillar 1 greening requirements for permanent grassland (including ESPG designation of peatland and wetlands), and RDP environmental land management and non-productive investments.

Well managed agricultural and forest soils can provide a broad range of soil functions and ecosystem services. The long-term economic prospects of most agricultural and forest businesses depend on maintaining the productivity of the soil by protecting and enhancing soil functions, but in a highly competitive market the land management required to do this may not be the most economically rewarding in the short-term. This implies that in addition to promoting good soil management through GAEC standards, Pillar 1 greening requirements, RDP environmental land management contracts and investments, there is also an important supporting role for ‘indirect’ RDP measures. These can support knowledge transfer, advice, training and innovation to encourage farmers and forest holders to implement long-term strategies to preserve and improve the functionality of their soils.

Table 5.3 below provides a summary of how each of the policy instruments and measures in the agriculture and forestry cluster contributes to supporting the soil functions identified above.

Table 5.3 Summary of Soil Functions Addressed by the CAP Policy Cluster

Functions	GAEC cross-compliance standards for soils and landscape	Greening Direct Payments	RDP measures ⁹	EU Forest Strategy
Carbon Pool	GAEC 6 standards are specifically to maintain soil organic matter.	Permanent grassland ratio and ESPG	M1, M2, M4, M6, M8,	Through Member States’

⁹ Key to RDP measure codes: M1 knowledge transfer and information actions, M2 advisory services, M4 investments in physical assets, M5 restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention, M6 farm and business and development, M8 Investment in the forest area development and improvement of the viability of forests, M10 agri-environment-climate, M11 organic farming, M12 Natura 2000 and Water Framework Directive, M13 ANC payments, M15 forest-environment-climate, M16 cooperation.

Functions	GAEC cross-compliance standards for soils and landscape	Greening Direct Payments	RDP measures ⁹	EU Forest Strategy
	GAEC 4 standards for soil cover, depending on how the cover is managed, could also contribute to maintaining soil OM (e.g. if the green cover is permanent or is incorporated in the soil before the next crop is established)	designation EFA elements: Buffer strips, fallow catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC) and 'woody landscape features	M10, M11, M15 and M16	implementation of the RDP (optional) forestry measures, promoting SFM
Platform for Human Activities	GAEC standards are intended to protect soils on agricultural land		M1, M2, M4, M6, M8 and M16	Through Member States' implementation of the RDP (optional) forestry measures, promoting SFM
Biomass production		EFA elements: agroforestry, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8 and M16	Through Member States' implementation of the RDP (optional) forestry measures, promoting SFM
Hosting biodiversity	GAEC standard 4 maintaining soil cover and GAEC standard 6 maintaining soil OM may reduce the loss of soil biodiversity but other factors (for example use of PPP) may affect this	ESPG designation EFA elements: Fallow, buffer strips, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8, M10, M11, M15 and M16	Through Member States' implementation of the RDP (optional) forestry measures, promoting SFM
Providing raw materials				
Storing, filtering and transforming nutrients and water	N/A for soil GAEC standards (but SMR 1 and GAEC standards 1, 2, 3 and 7 are relevant)	EFA elements: Buffer strips, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC)	M1, M2, M4, M6, M8, M10, M12, M15 and M16	Through Member States' implementation of the RDP (optional) forestry measures, promoting SFM

5.2.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection - Understanding the Relevance and Limits of Policies within the Cluster

The chief strength of this policy cluster (see Table 5.4) lies in the extent of its application (potentially to all farmland and forest land in the EU) and in the economic leverage of CAP policies on the land management decisions made by individual farmers and forest holders. This applies particularly to GAEC standards and Pillar 1 greening requirements and more locally to RDP land management and investment measures (which may also influence decisions about managing forests and wooded land). The EU Forest Strategy strengthens the link with sustainable forest management (including soil protection) and guides Member States in the use of RDP forest measures to achieve this.

Potential weaknesses and threats lie in the subsidiarity that allows some degree of flexibility in the choices made by Member States for the implementation of GAEC standards and Pillar 1 greening requirements. There is no legal requirement for Member States to demonstrate that their GAEC standards and Pillar 1 greening requirements are targeted against specific needs and priorities for soils or other environmental objectives. Moreover, apart from the obligations to include agri-environmental-climate measures and the Leader approach and to reserve at least 30% of the total EAFRD contribution to the Rural Development Programmes for certain "environmental, climate and forest related measures"¹⁰. Member States (or regions) may decide whether or not to include other RDP measures, but the EU legislation does require that each RDP identifies the needs of the area concerned and establishes "the links between the needs identified, the targets set and the choice of measures to meet them"¹¹. The Commission checks that Member States' implementation decisions comply with CAP Regulations, and that there is no duplication between RDP agri-environment-climate commitments, GAEC standards and Pillar 1 greening requirements. The Commission also monitors how Member States check and control beneficiaries' compliance with GAEC standards, greening requirements and RDP commitments/requirements. Penalties are applied in cases where non-compliance is found. However, there is no legal requirement for Member States to demonstrate *synergistic use* of these three policy instruments as a coherent package.

On the other hand, it should not be overlooked that the subsidiarity of the CAP instruments is also a strength, because it allows a certain degree of freedom for Member States to make the best use of CAP policy instruments and measures to achieve soil protection benefits, for example by tailoring the whole package of GAECs standards, Pillar 1 greening requirements and RDP measures to address national/regional priority needs and local specific environmental situations.

Nevertheless, there are opportunities to strengthen elements of the EU legislation, particularly in relation to the soil GAEC standards, which could be further clarified, and to the Pillar 1 greening measures which could, if strengthened, make a greater contribution to soil protection. This includes, for example:

- The GAEC 6 standard for soil organic matter requires 'appropriate practices' to maintain soil organic matter but specifies only that these should include a 'ban on burning of arable stubble except for plant health reasons'; this could be strengthened, for example by applying it more widely to other crop residues (e.g. prunings from permanent crops) and adding a requirement to incorporate the residues, either directly or following mulching, composting or use as animal bedding;
- The rules for the maintenance of the ratio of permanent grassland under Pillar 1 greening allow farmers to convert significant areas of permanent grassland to arable land. Some Member States put in place additional rules to limit this, for example by requiring farmers to obtain prior approval for grassland conversion.

¹⁰ See Article 59(6) of EU Reg. 1305/20013.

¹¹ See Recital 9 of EU Reg. 1305/2013

Including this or similar farm-level requirements in the legislation could improve the protection of grassland soils.

- The rules for designating ESPG on carbon-rich soils to protect them from conversion or ploughing allow Member States not to protect any of these grasslands outside Natura 2000 areas. This protection could be strengthened by requiring Member States to justify why they have chosen not to protect these grasslands, especially those on carbon-rich soils.

Table 5.4 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection: CAP Policy Cluster

- **Strengths** - what does the policy cover well in relation to soil protection?
- **Weaknesses** - are there aspects limiting the protection afforded?
- **Opportunities** - are there any potential opportunities linked to the legislation which could benefit soil protection (in the context of this study, opportunities are understood as arising from, e.g., Member States' implementation, new proposals or improved use of existing legislation)?
- **Threats** - are there any potential elements within the policy that might put at risk the protection of soils?

Policy Instrument	Strengths	Weaknesses	Opportunities	Threats
GAEC cross-compliance standards for soils and landscape (GAEC 4, 5, 6 and 7)	<ul style="list-style-type: none"> • There are 3 GAEC standards specifically for soils, which apply to all agricultural land on farms receiving CAP area-based payments; • In defining their GAEC standards Member States are required to take into account the specific characteristics of the areas concerned, including soil and climatic conditions; • Member States are required to set up a Farm Advisory System (FAS) which must cover <i>inter alia</i> 'the standards for GAEC'; preferential access to the FAS may be given to beneficiaries who fail to comply with cross-compliance rules. 	<ul style="list-style-type: none"> • No requirement for Member States to implement GAEC, greening practices and agri-environment-climate measures in a synergistic and coherent way to address their specific soil protection needs; although they can choose to do so if they wish. • Lack of clarity in the EU Regulations on the 'minimum' appropriate practices for soil cover (GAEC 4) and land management to limit erosion (GAEC 5) • GAEC 6 (soil organic matter) minimum practice refers only to a ban on burning arable stubble, leaving Member States the option of defining additional practices (or not). 	<ul style="list-style-type: none"> • Development and Implementation by all Member States of a coherent package of GAEC, greening practices and agri-environment-climate measures, appropriate to address their specific local soils protection needs and tailored to suit the diverse national/regional agricultural systems. • In the rules on cross-compliance, clarify the 'minimum' appropriate practices for each of the three GAEC soil standards • Extend the minimum GAEC 6 requirement (ban on burning arable stubble) to include residue management practices and permanent crops 	<ul style="list-style-type: none"> • Mainly from weak implementation
Greening Direct Payments for agricultural practices beneficial for the climate and the environment	<ul style="list-style-type: none"> • Obligatory for all farmers who are eligible, including many large arable farms • All EFA types have the potential to provide soil benefits • Option for Member States to use equivalent certification schemes or 	<ul style="list-style-type: none"> • No requirement for Member States to implement GAEC, greening practices and agri-environment-climate measures in a synergistic and coherent way to address their specific soil protection needs; although they can choose to do so if 	<ul style="list-style-type: none"> • Development and Implementation by all Member States of a coherent package of GAEC, greening practices and agri-environment-climate measures, appropriate to address their specific local soil protection needs 	<ul style="list-style-type: none"> • Risk of Member States offering EFA options which do not prioritise their specific soil protection needs • Risks to wetlands and/or carbon-rich soils outside Natura 2000 areas) that have not been

Policy Instrument	Strengths	Weaknesses	Opportunities	Threats
	<p>M10 practices, and set more specific soil management requirements</p> <ul style="list-style-type: none"> • Opportunity for Member States to protect ESPG and wetland/carbon rich soils outside Natura 2000 areas, if these have not already been ploughed 	<p>they wish.</p> <ul style="list-style-type: none"> • Crop diversification, as currently defined, may not provide the soil benefits of crop rotation unless the farmer chooses to implement it in that way • EFA landscape features and terraces can, if Member States wish, be limited to those that they already protect under CAP cross-compliance • Some EFAs allow Member States to choose whether farmers may use fertilisers and PPP, which may limit some of the soil benefits. 	<p>and tailored to suit the diverse national/regional agricultural systems.</p> <ul style="list-style-type: none"> • Raise requirements for minimum number of EFA options chosen by both Member States and farmers • Define EFA options that are distinct from and additional to cross-compliance requirements • Improve implementation of ESPG designation on carbon rich soils and wetlands outside Natura 2000 areas • Restrict use of fertilisers and PPP on EFAs 	<p>designated as ESPG</p>
RDP measures	<ul style="list-style-type: none"> • The wide choice of RDP priorities, focus areas and measures offers the flexibility to tailor and target soil measures very specifically to needs and opportunities within the Member State or region • If chosen, priorities 4C and 5E are directly relevant to soil threats and functions, with associated targets for land under contract. • At least 30% of the EAFRD contribution to the RDP must be reserved for key environmental and climate measures. Sub-measures can be highly targeted at soil objectives. • CAP funds can be transferred by the Member State from its Pillar 1 direct payments budget to the RDP budget. 	<ul style="list-style-type: none"> • No requirement for Member States to implement GAEC, greening practices and agri-environment-climate measures in a synergistic and coherent way to address their specific soil protection needs; although they can choose to do so if they wish. 	<ul style="list-style-type: none"> • Development and Implementation by all Member States of a coherent package of GAEC, greening practices and RD measures, appropriate to address their specific local soil protection needs and tailored to suit the diverse national/regional agricultural systems and a sustainable management of forests. • Opportunity to use EIP focus areas and operational groups for soil-relevant innovation in agriculture and forestry. 	<ul style="list-style-type: none"> • The implementation gap left by weakly defined Pillar 1 greening measures and GAEC standards having to be filled by RDP funding. • Risk of RDP budget being reduced if the Member State transfers part of its EAFRD allocation can to Pillar 1 direct payments budgets.

Policy Instrument	Strengths	Weaknesses	Opportunities	Threats
EU Forest Strategy	<ul style="list-style-type: none"> The objective of ensuring that by 2020 all EU forests are managed according to the principles of sustainable forest management, which include the maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water). 		<ul style="list-style-type: none"> Member States could make more use of RDP forestry measures. The forest investment measure (M8) and the forest- environment and climate services and forest conservation measure (M15) are included in the list of environment and climate measures to which Member States must allocate 30% of their EAFRD funding. For holdings above a certain size (to be defined by the Member State/Region), EAFRD support to forest measures is conditioned to the presence of a forest management plan or equivalent instrument in line with sustainable forest management as defined by the Ministerial Conference on the Protection of Forests in Europe of 1993. Member States could define the above-mentioned size to a level that allows for covering a significant share of total national/region forest area. 	

5.3 Integrated Assessment of the CAP Policy Cluster

Of all the CAP policy instruments reviewed here the **GAEC cross-compliance standards** have the widest ‘policy reach’ across the EU, because they apply to all farms in receipt of Pillar 1 direct payments or Pillar 2 land management payments. In practice, for all GAEC standards the degree of the actual benefit to soil protection will depend on how rigorously Member States define the farm-level requirements and the actual implementation of those requirements by farmers.

Member States have a certain degree of flexibility to define the rules applicable regarding crop diversification (e.g. list of crops permitted) and EFA obligations (list and definition of the types of EFA permitted). Moreover, individual farmers have a certain degree of flexibility in choosing how to implement these rules (i.e. crops chosen for diversification and type of EFA selected, among those permitted by the Member State). This flexibility is important to accommodate the diversity of agricultural systems and the different environmental situations across the Union. In theory, these choices should be made in a way that requires changes in the land use and management of farmland without significant increases in the administrative burden for the farmer; and/or in a way that ensures the maintenance of existing good practices which contribute to achieving real benefits for soils, for example in soil cover, anti-erosion management, and agroforestry, SRC or woodland. There is an option for Member States to use equivalent practices for EFAs and other greening measures (via certification schemes or agri-environment-climate sub-measures) which offers the chance to provide more soil-focused Pillar 1 benefits. One limitation for soil benefits is the absence of a ban on the use of plant protection products (PPP) and fertilisers on certain EFA types (e.g., field margins and buffer strips).

Crop diversification requirements are obligatory for farmers with a total arable area above the threshold. Current rules aim to prevent the application of monoculture on a large part of EU arable land. However, improvement in soil quality will depend on the way in which individual farmers implement the diversification requirements (e.g., depending on the specific crops chosen for diversification, the share of different crops and the locations chosen for cultivating the diversified crops). The crop diversification requirement does not require implementation as crop rotation, which could offer more potential soil benefits. However, there is the possibility of supporting crop rotation under the agri-environment-climate measure of the Rural Development Programmes.

The **permanent grassland maintenance requirement** limits to 5% the possible decline in the ratio of areas of permanent grassland to the total agricultural area declared by farmers in their annual application for CAP payments. Member States are required to calculate this ratio each year. They can choose to apply the ratio at regional or sub-regional level instead of national level, and could design authorisation requirements that would in effect mean that no farmers could convert permanent grassland without prior authorisation. This would provide significant protection for the grassland soils. Designation of **Environmentally Sensitive Permanent Grassland** in Natura 2000 areas is obligatory for Member States, and protects these ESPG areas from ploughing or conversion, with potential to address the risks of loss of organic matter and erosion, and also offering potential benefits for the carbon pool, especially on carbon-rich soils. The opportunity to protect soils by designating ESPG also

applies to grasslands on wetland/carbon rich soils outside Natura 2000 areas, but here ESPG designation is entirely optional for Member States.

RDPs are one of the most important policy instruments for achieving soil objectives on agriculture and forest land throughout the EU, and also one of the most flexible of all EU policies, with a high degree of subsidiarity. This enables Member States to plan 7-year programmes including measures aimed at soil protection, and to design sub-measures that address their specific soil threats and needs. These could include, for example, supporting specific soil management practices at farm or field parcel scale using targeted multi-annual environmental land management contracts for both agriculture and forestry. Changes in farming and forest management systems to provide additional soil protection can be supported through RDP measures for afforestation and agroforestry, and investments in carbon-saving technologies and equipment; and by advice, training, information and innovation in soil management techniques. All of these have significant potential to address soil threats and needs (which can be specifically identified in an RDP).

The EU Forest Strategy 2013 encourages Member States to use RDP measures to support the implementation of sustainable forest management¹², and to provide RDP support for: modernising forestry technologies; optimising the sector's contribution to the bio-economy; improving the resilience, environmental value and mitigation potential of forest ecosystems; achieving nature and biodiversity objectives; adapting to climate change; conserving genetic resources; forest protection and information; and creating new woodland and agro-forestry systems. However, implementation of the Strategy is voluntary and its main effect within this policy cluster is to provide additional justification for Member States to allocate RDP funding specifically to these forest measures and to embed the principles of SFM in all RDP forest support.

The EU policy instruments covered by this cluster have the potential to influence soil management on almost all farmland in the EU and significant areas of forest and other wooded land, principally through payments made under both Pillars of the CAP. The scope of these policy instruments covers a wide range of site threats and functions, and they have particular potential to reduce the threat of soil erosion and loss of soil carbon, and to improve protection of the carbon pool and increase carbon sequestration. All the policy instruments are characterised by a significant degree of subsidiarity. This is particularly the case for RDPs, where Member States have a considerable margin of manoeuvre in the definition of the priority soil protection needs identified on the basis of the SWOT analysis, in the choice of the most appropriate RD measures or sub-measures to be used to address these priority needs and, where appropriate, in the design of possible operations targeting specific local needs and/or situations. Moreover, farmers and forest holders have a wide range of choice among the different measures, sub-measures and operations included in the national or regional RDP (within the limits of eligibility conditions defined by the Member State's or region's RDP).

It is difficult to assess gaps in the agriculture and forestry cluster at EU level when so much of the impact on soils depends on Member States' or regions' choices, which are made in the

¹² Which, as defined by Forest Europe, includes the criterion of 'maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water)'.

context of many other rural, environmental and agricultural priorities. Furthermore, any perceived gaps in implementation in some Member States may be difficult to address at the level of the EU legislation without constraining the flexibility necessary for effective soil protection elsewhere in the EU.

5.4 EU-28 analysis of Member State Implementation of Selected CAP Measures

5.4.1 Introduction

This section reviews the implementation decisions made by Member States for four of the CAP instruments described in the previous section – cross-compliance GAEC standards for soil and landscape features, EFA types identified under Pillar 1 greening obligations and RDP agri-environment-climate sub-measures. In the case of Pillar 1 greening obligations, the analysis also includes information on farm-level implementation. As far as possible this section covers data for 2015, except for the RDPs where information on the programmed sub-measures and target indicators applies to the whole 2014-20 programming period and is taken from the RDPs approved by the Commission in 2014.

Much of the analysis and data presented here is based on material provided by the European Commission. These and other sources are identified below.

5.4.2 GAEC Cross-compliance Standards for Soil and Landscape Features in 2015

Most Member States define GAEC standards nationally, but Belgium and the UK define their GAEC standards regionally, with separate standards for Flanders, Wallonia, England, Scotland, Wales and Northern Ireland. This means that there are 32 sets of GAEC standards covering the EU, not 28. Information on Member States' definitions of 2015 GAEC standards is based on analysis of JRC, 2015.

GAEC standard 4 - minimum soil cover

Definitions of GAEC standard 4 by different Member States or regions include requirements for the season, duration and minimum proportion of soil cover, and the type of land or crops to which the requirements apply. In some Member States or regions soil cover is required only on sloping land, mostly defined simply as a gradient. Portugal uses a composite indicator of soil erosion risk, based on the morphology of the plot. Of the 32 Member States or regions considered here, seven require soil cover all year and 14 require cover during the winter (mainly by crops, grass, stubble or spontaneous vegetation). The remainder specify cover during the growing season, or at other specific periods as shown in Figure 5.2 below. Not all Member States or regions appear to require complete green soil cover on all the relevant land or crops – in seven Member States or regions the minimum percentage green soil cover ranged from 30% to 80%, but in some cases this only applies in specific circumstances.

¹³ The outermost regions are not considered here.

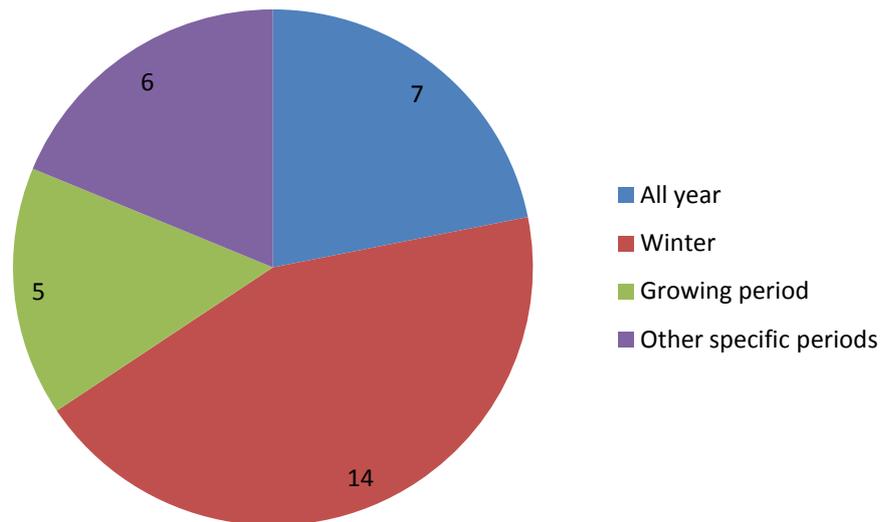


Figure 5.2 Time of year soil cover required under GAEC standard 4, by number of the 32 Member States or regions (2015)

(Source: own analysis based on JRC, 2015)

GAEC standard 5 - minimum land management reflecting site specific conditions to limit erosion

More than half the Member States or regions use slope as the criterion to identify the land where specific land management practices are required to limit erosion under GAEC standard 5, as shown in Figure 5.3. These practices include, for example, contour ploughing, ridge planting, reduced tillage, maintenance of grassland or woody vegetation, green winter cover, and restrictions on growing particular crops.

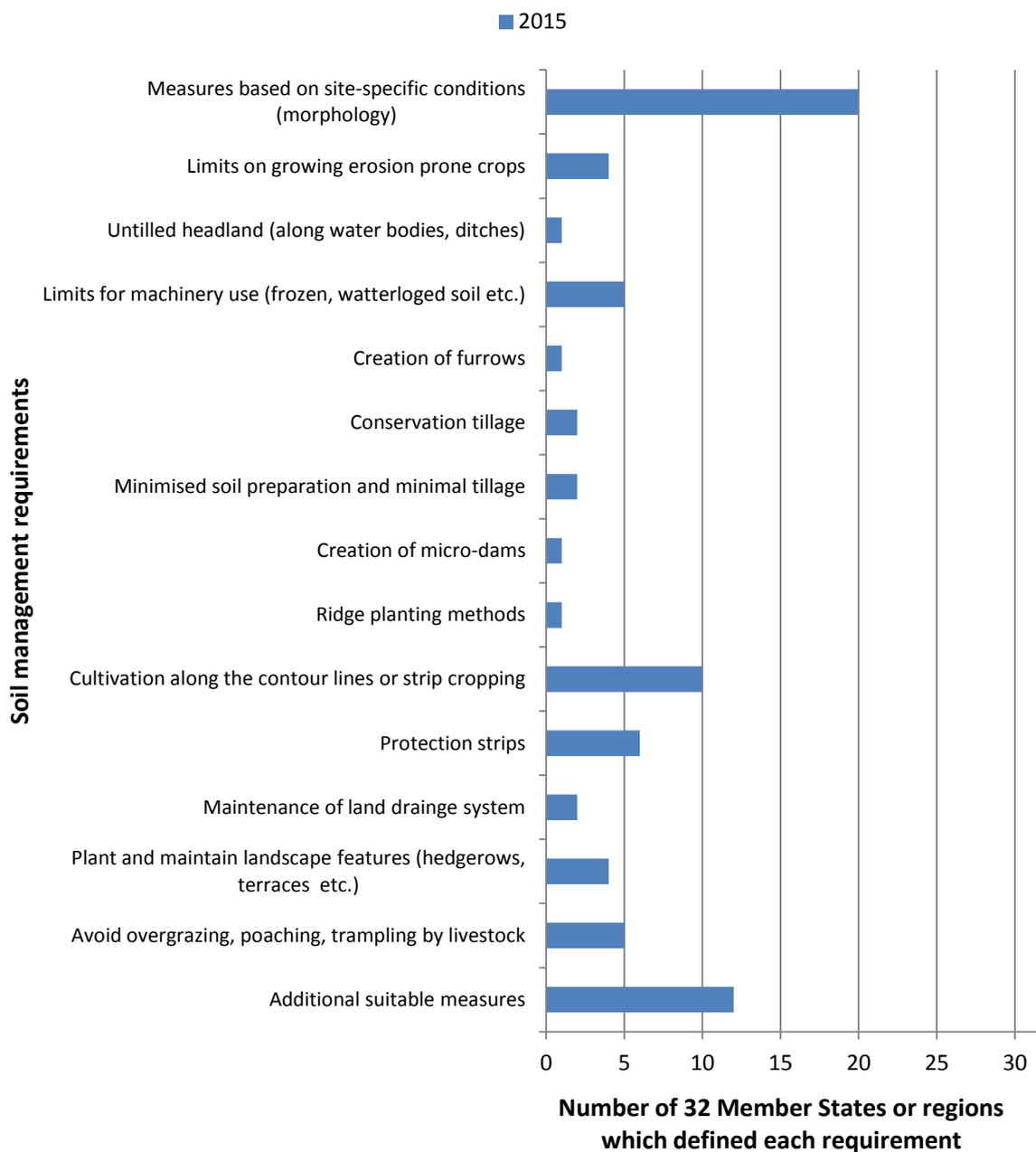


Figure 5.3 Management required to limit soil erosion under GAEC standard 5, by number of the 32 Member States or regions (2015)

(Source: own analysis based on JRC, 2015)

GAEC standard 6 - maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons

In 2015, a total of 15 Member States or regions defined the ban on stubble burning as the only requirement under GAEC 6. (The equivalent figure for 2014 was just 6 Member States or regions¹⁴).

The remaining 17 Member States or regions defined additional GAEC 6 requirements in 2015 including, for example, restrictions on entering land when it is waterlogged or frozen, use of crop rotations (including not growing successive crops with a high soil carbon demand), application of organic matter, soil testing and stubble management (see Figure 5.4).

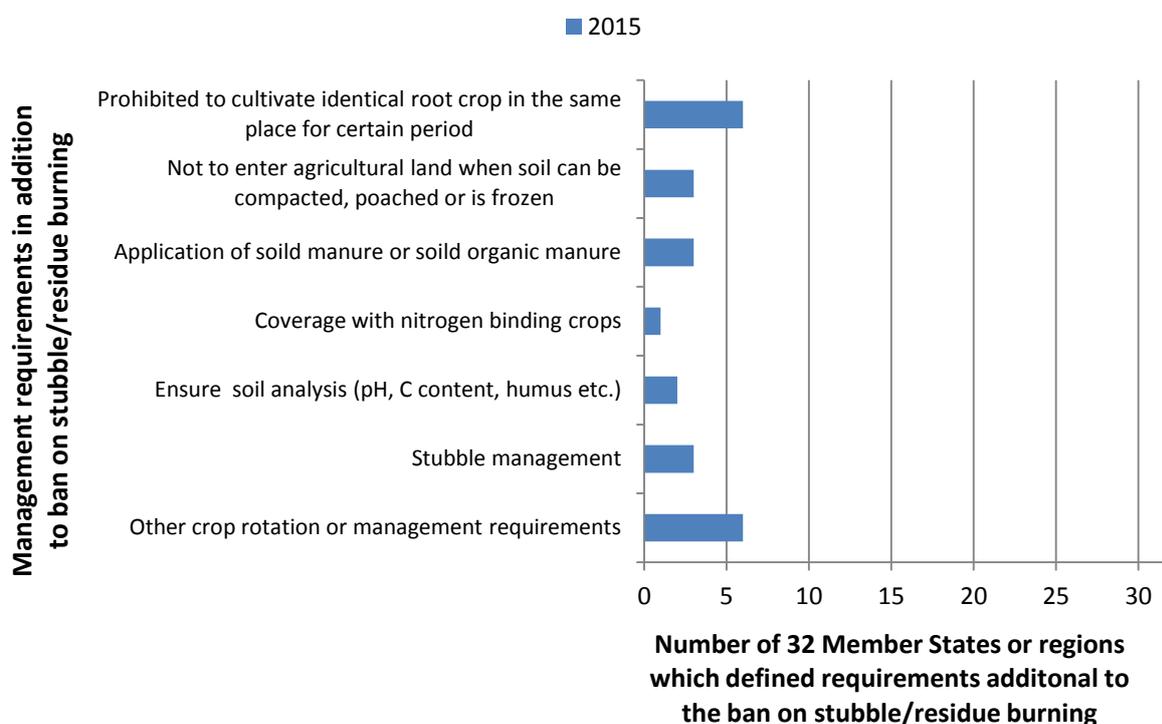


Figure 5.4 Requirements to maintain soil organic matter in addition to the ban on stubble/residue burning under GAEC standard 6, by number of the 32 Member States or regions (2015)

(Source: own compilation based on JRC, 2015)

GAEC standard 7 retention of landscape features

Although this GAEC standard does not address soil management directly, most types of protected landscape feature can also contribute to reducing the risk of wind and water erosion, protecting/improving soil organic matter content and the carbon sequestration potential of, for example, woody vegetation and wetlands. The most commonly protected features are groups of trees, ponds and hedges (in more than half of the Member States and regions), followed by trees in line, ditches, terraces and traditional stonewalls (in more than a third). The total number of different types of landscape feature protected under this standard by each Member State varies considerably from 10 or more, to a single category of

¹⁴ 2014 data excludes Wales, for which no information is available in JRC, 2015.

designated 'national monuments' (which encompasses several different types of feature). From 2015, landscape features defined and protected under this GAEC standard can also be identified by the Member State as EFA.

5.4.3 Greening Requirements under Pillar 1

The following information draws on data and preliminary analysis of the first year of implementation, presented in EC (2016):

- Crop diversification – farm-level obligations are defined in the EU legislation, not by the Member State; the EC has analysed the expected impact of the crop diversification obligations on cropping patterns of arable land, based on data on arable land in EU-28 Member States provided by Eurostat's Farm Structure Survey (FSS).
- EFAs - the choices notified to the Commission by EU-28 Member States in August 2014 on the eligible types of EFA from which farmers could choose to meet their obligation; and the EFA types chosen by farmers in 2015 (based on Member State reporting in December 2015).
- Protection of permanent grassland obligations – EU-28 Member States' ESPG designations for 2015¹⁵ and ESPG declarations made by farmers that year (this data does not cover all EU-28 Member States);

This analysis shows that 72% of the total agricultural area in the EU and 36% of the beneficiaries of Pillar 1 direct payments are subject to at least one Pillar 1 greening obligation. The agricultural area that is not subject to these obligations includes farms that receive Pillar 1 direct payments but are exempt from Pillar 1 greening obligations¹⁶, the 6% of EU farmland that receives the P1 greening direct payment but is used to grow permanent crops (for which there are no greening obligations), and the estimated 11% of farmland in the EU that is not under the P1 direct payment system.

As might be expected there is a very wide variation between Member States in the proportion of their farmland subject to at least one P1 greening obligation. This is shown in Figure 5.5 and reflects differences in farming systems and structures - for example, the proportion of small farms, permanent crop farms, and arable land.

¹⁵ Member States can choose to designate additional ESPG in subsequent years

¹⁶ Including those farmers opting for the Small Farmers Scheme

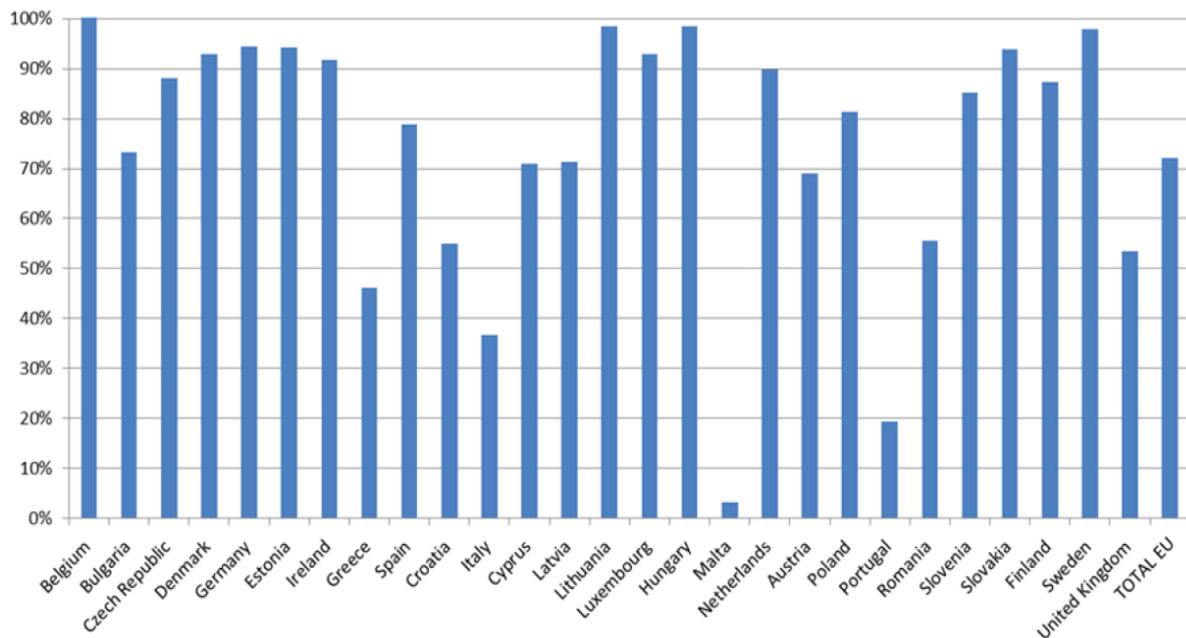


Figure 5.5 Management of total agricultural area under at least one greening obligation, by Member State

(Source: EC, 2016 based on Member States' reporting data for 2015 and Eurostat Farm Structure Survey 2013.)

Organic farms, which are entitled ipso facto to Pillar 1 greening payments, account for 4% of the EU total agricultural area, 3% of arable land and 7% of permanent grassland. In six Member States (the Czech Republic, Estonia, Italy, Latvia, Austria and Finland) organic farms account for more than 10% of the total agricultural area.

Crop diversification

Arable land under the crop diversification obligation amounts to 75% of the total EU arable land, with a range from less than 10% to more than 90% of arable land in different Member States. The lower percentages are in Member States which have a greater proportion of land exempt from Pillar 1 greening obligations or have a high proportion of permanent grassland. Figure 5.6 shows for each Member State the percentage of:

- arable land held by farms on which the crop diversification measure applies;
- arable land where the crops needs to be diversified; and
- farms which need to diversify crops.

The objective of the crop diversification obligation is improvement in soil quality¹⁷. Overall the Commission's analysis indicated that for 8% of the arable land in the EU farmers have had to adjust part of their crop production pattern to comply with the thresholds for crop diversification, but the area on which farmers have actually had to introduce a different crop

¹⁷ EU Regulation 1307/2013 Recital 41.

to meet their diversification obligations is estimated to be only around 1% of EU arable land (usually just a few hectares of the total arable land of the farm) (EC, 2016).

The Commission concluded that, in the first year of Pillar 1 greening, this obligation has contributed to avoiding a further deterioration of the current situation (EC, 2016).

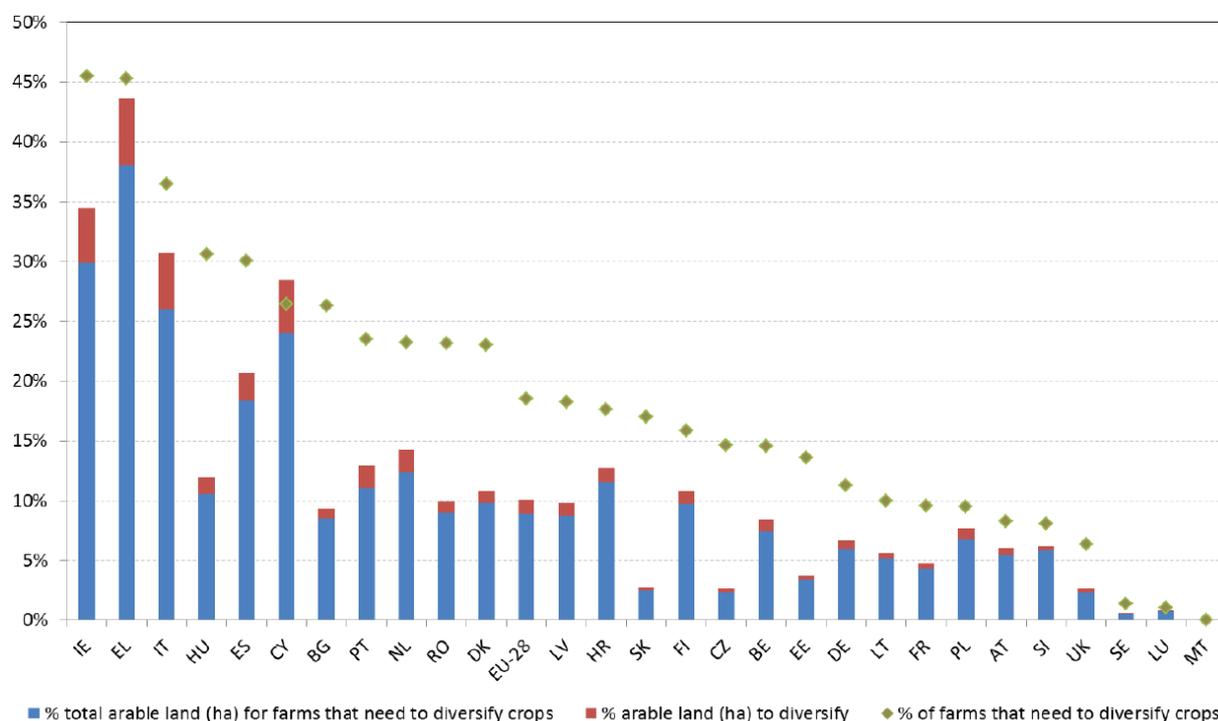


Figure 5.6 Arable land and number of farms concerned that need to diversify crops, as proportions of arable land and farms subject to the obligation, by Member State

(Source: EC, 2016 (based on analysis of Eurostat Farm Structure Survey 2010))

Member State choice of EFA types

Member States must identify at least one type of EFA to offer farmers to meet their EFA obligation. All Member States or regions offer farmers a list of several types of EFA (from two to eleven) as shown in Table 5.5. The EFA types most frequently offered to farmers were nitrogen fixing crops and fallow (without production) which were each identified by 31 of the 32 Member States or regions, followed by landscape features, SRC and catch crops or green cover.

Table 5.5 Number and type of elements considered to be EFA, in 32 Member States or regions

MS	Fallow	Terraces	Landscape Features	Buffer Strips	Agroforestry	Forest edges - with production	Forest edges - without production	SRC	Afforested areas	Catch crops etc.	N fixing crops	Total EFA types by MS (max=11)
AT	✓		✓					✓		✓	✓	5
BE - Fl	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	10
BE - Wa	✓		✓	✓	✓		✓	✓		✓	✓	8
BG	✓	✓	✓	✓			✓	✓		✓	✓	8
HR	✓		✓	✓			✓	✓		✓	✓	7
CY	✓			✓	✓				✓		✓	5
CZ	✓	✓	✓					✓	✓	✓	✓	7
DE	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	10
DK	✓		✓	✓				✓		✓		5
EE	✓		✓					✓			✓	4
EL	✓		✓	✓							✓	4
ES	✓				✓				✓		✓	4
FI	✓		✓					✓			✓	4
FR	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	10
HU	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	11
IE	✓		✓	✓				✓	✓	✓	✓	7
IT	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	10
LT	✓										✓	2
LU	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	10
LV	✓		✓	✓						✓	✓	5
MT	✓		✓								✓	3
NL			✓					✓		✓	✓	4
PL	✓		✓	✓		✓	✓	✓	✓	✓	✓	9

MS	Fallow	Terraces	Landscape Features	Buffer Strips	Agroforestry	Forest edges - with production	Forest edges - without production	SRC	Afforested areas	Catch crops etc.	N fixing crops	Total EFA types by MS (max=11)
PT	√		√		√				√		√	5
RO		√	√	√				√	√	√	√	7
SE	√		√		√			√		√	√	6
SI	√									√	√	3
SK	√	√	√	√				√		√	√	7
UK - EN	√		√	√						√	√	5
UK - NI	√		√		√			√	√		√	6
UK - SC	√		√	√						√	√	5
UK - W	√		√					√	√		√	5
EU 28	30	7	24	19	12	6	10	22	15	21	31	

(Source: EC, 2016)

In defining different types of landscape feature as EFAs, Member States or regions have the option of using:

- their existing cross-compliance definitions, if the landscape feature is already protected under GAEC 7 (landscape features) and/or SMR 2 and 3 (relevant sections of the EU Habitats and Species Directives); and/or
- EFA specific definitions for each feature, as set out in the legislation¹⁸;

Four Member States did not identify landscape features as EFA, and thirteen Member States chose four or fewer out of the possible 11 types of feature. Table 5.6 shows Member States/regions' choice of landscape features qualifying as EFA and the definitions used in each case. Just over half of the Member States/regions chose to consider features already protected under cross-compliance rules as EFA, so those definitions, in particular minimum and maximum dimensions, may be different from the same features defined under the EFA legislation.

¹⁸ As defined under Commission Delegated Regulation (EU) 639/2014 Article 45

Table 5.6 Definitions of landscape features qualifying as EFA, by Member State/region

Countries	Hedges or wooded strips	Isolated trees	Trees in line	Trees in group and field copses	Field margins	Ponds	Ditches	Traditional stone walls	Other landscape features under GAEC or SMR	No of LF per MS
Belgium — Flanders	Art. 45			Art. 45	Art. 45	Art. 45	Art. 45			5
Belgium — Wallonia	GAEC 7	GAEC 7	GAEC 7	GAEC 7	GAEC 7	GAEC 7	GAEC 7			7
Bulgaria	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45 GAEC 7	Art. 45	Art. 45			7
Czech Republic		GAEC 7	GAEC 7	GAEC 7	Art. 45		GAEC 7		GAEC 7	6
Denmark						GAEC 7			GAEC7	2
Germany	GAEC 7	GAEC 7	GAEC 7	GAEC 7	Art. 45 GAEC 7		GAEC 7	GAEC 7	GAEC 7	8
Estonia	GAEC 7		GAEC 7	GAEC 7			GAEC 7	GAEC 7		5
Ireland	GAEC 7		GAEC 7	Art. 45			GAEC 7		GAEC 7	5
Greece			Art. 45 GAEC 7	Art. 45			Art. 45			3
Spain										0
France	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45		8
Croatia	GAEC 7	GAEC7	GAEC7	GAEC7		GAEC7	GAEC7	GAEC7		7
Italy	GAEC 7 SMR 2 SMR 3	GAEC 7 SMR 2 SMR 3	GAEC 7 SMR 2 SMR 3	Art. 45	Art. 45	GAEC 7 SMR 2 SMR 3	GAEC 7 SMR 2 SMR 3	GAEC 7 SMR 2 SMR 3	Chosen but no description	9
Cyprus										0
Latvia				Art. 45	Art. 45	Art. 45			GAEC 7	4
Lithuania										0
Luxembourg	GAEC 7 SMR 2-3	GAEC 7 SMR 2-3	GAEC 7 SMR 2-3	GAEC 7 SMR 2-3	Art. 45	SMR 2-3				6
Hungary	Art. 45	Art. 45 GAEC 7	Art. 45	GAEC 7	Art. 45	GAEC 7	Art. 45		GAEC 7	8
Malta		Art. 45	Art. 45	Art. 45	Art. 45				GAEC7, SMR3	5
Netherlands					Art. 45					1
Austria						GAEC 7	GAEC 7	GAEC 7	GAEC 7	4
Poland	Art. 45	Art. 45 GAEC 7	Art. 45	Art. 45	Art. 45	Art. 45 GAEC 7	Art. 45 GAEC 7			7
Portugal									GAEC7, SMR2, SMR3	1
Romania	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45	Art. 45			7
Slovenia										0
Slovakia		GAEC 7 SMR 2 SMR3	GAEC 7 SMR 2 SMR3	GAEC 7 SMR 2 SMR3	GAEC 7 SMR3					4
Finland									GAEC7	1
Sweden					Art. 45					1
UK England	GAEC 7									1
UK Northern Ireland	GAEC 7						GAEC 7	GAEC 7	GAEC 7	4
UK Scotland					Art. 45					1
UK Wales	Art. 45							Art. 45		2
Member States/LF (incl. regions)	16	13	16	18	17	13	16	8	12	

(Source: EC, 2016)

EFA declared by farmers in 2015

In 2015 more than 73% of the total EFA area declared by farmers (before weighting factors are applied) is linked to agricultural production, in the form of nitrogen-fixing crops (45.4%) and catch crops (27.7%). Landscape features (including, but not necessarily limited to, those already protected under GAEC) accounted for 27.7%, and fallow land without production accounts for a further 21.2%. The main EFA types implemented by farmers are shown in Figure 5.7, based on the physical area of each type (before weighting factors were applied).

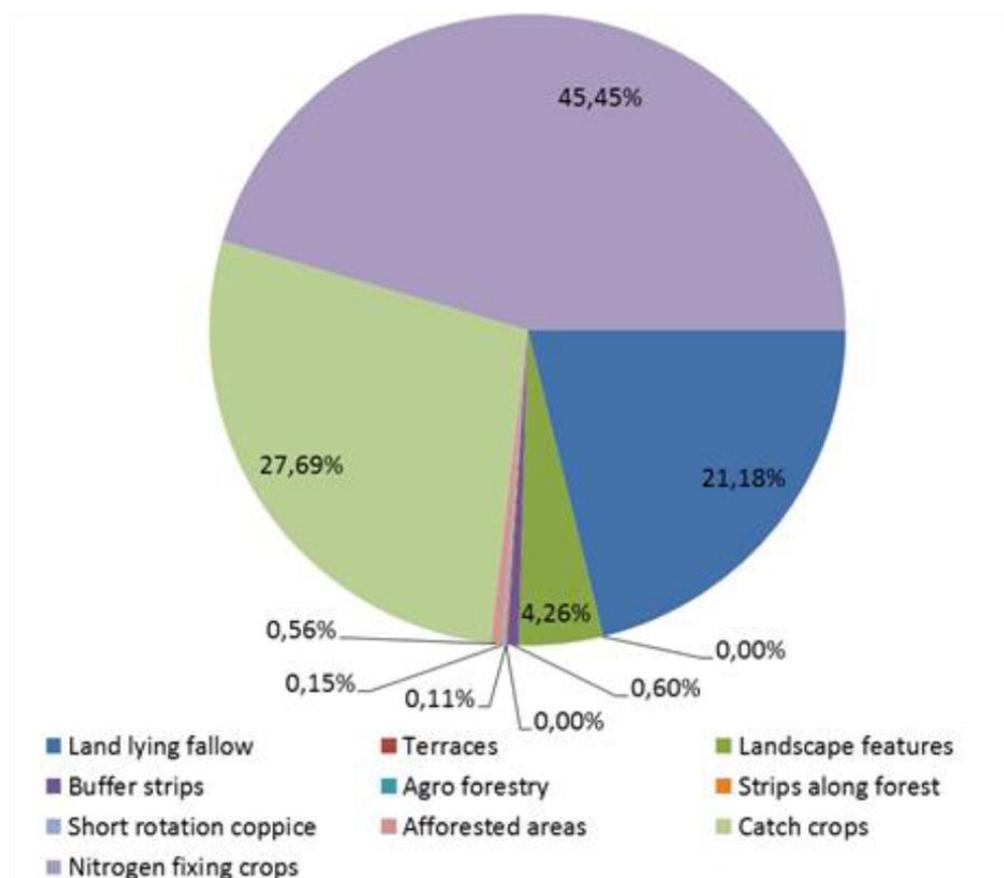


Figure 5.7 Proportion of different EFA types declared by farmers in 2015 (physical area, before weighting)

(Source: EC, 2016)

Permanent grassland designation as ESPG for 2015

Member States can choose to designate as ESPG all or a part of the permanent grassland located in Natura 2000 areas, and other further sensitive grasslands outside Natura 2000 areas, including grasslands on wetland and on carbon-rich soils. Member States can designate more ESPG in subsequent years. Conversion or ploughing of ESPG is prohibited and farmers subject to Pillar 1 greening obligations declare their ESPG grassland when applying for direct payments. However, in most Member States there are ESPG areas which are exempt from Pillar 1 greening obligations (for example, under the Small Farmers Scheme) or are located on farms not within the CAP direct payments system.

In the EU as a whole 75% of permanent grassland in Natura 2000 is designated as ESPG, but only 40% of the permanent grassland in Natura 2000 across the EU has been declared by farmers as ESPG, in submitting their direct payment applications.

The proportion of permanent grassland within Natura 2000 areas that has been designated as ESPG varies significantly, from 100% in ten Member States to less than 5%. Figure 5.9 shows the differences between Member States in the proportions of permanent grassland in Natura 2000 area that have been designated (or not) as ESPG, and the proportion of the designated ESPG area that was declared by farmers in 2015 (this data is incomplete and still subject to confirmation by Member States).

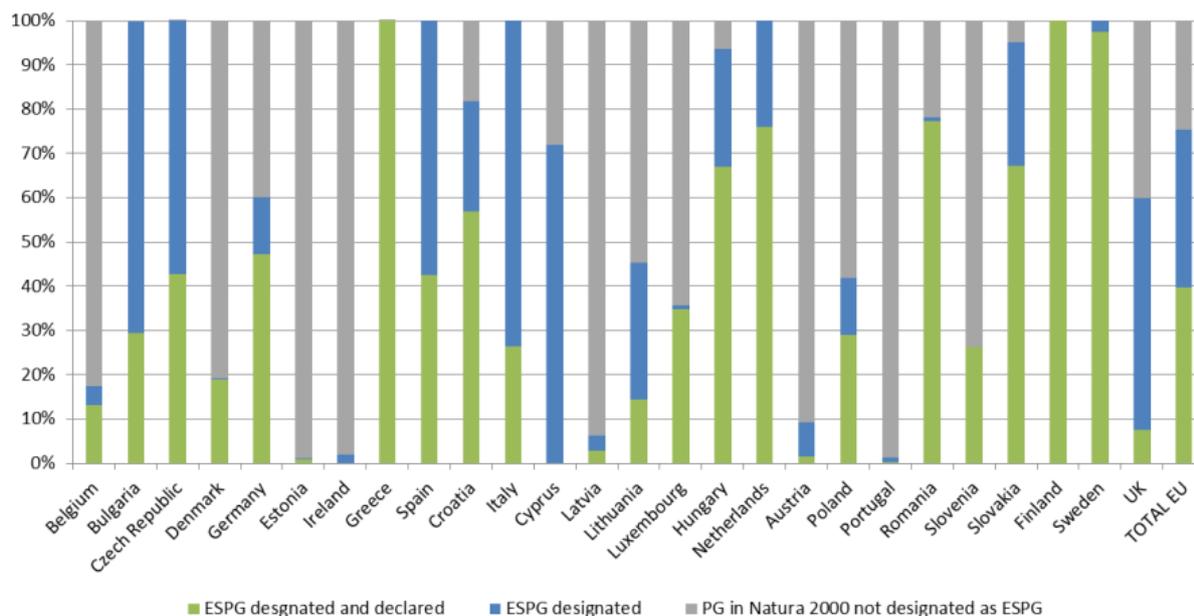


Figure 5.8 Proportion of permanent grassland in Natura 2000 designated and/or declared as ESPG in 2015, by Member State¹⁹

(Source: EC, 2016)

Just five Member States or regions decided to designate ESPG outside Natura 2000 areas in 2015, as shown in Table 5.7.

¹⁹ Data are missing for France and Scotland (UK); data for the declared ESPG area are missing for Cyprus, Ireland and England (UK); Malta does not have any permanent grassland; for other Member States, the data are taken from the most recent notifications available.

Table 5.7 ESPG designated outside Natura 2000 and declared by farmers in 2015

Member State/region	Designated ESPG area (ha)	Proportion of designated ESPG declared by farmers (%)
Flanders (BE) ²⁰	17 4 083	/
Czech Republic	273 211	76%
Latvia	7 088	58%
Luxembourg	3 508	96%
Wales (UK)	22 509	96%
TOTAL EU	310 399	76%

Permanent grassland ratio

The aim of this obligation is to ensure stability in the maintenance of permanent grassland. Member States were required to establish in 2015 a reference ratio of permanent grassland to total agricultural area²¹, then every year they must compare the actual ratio with the reference ratio. If the difference between the two is greater than 5%, the Member States is required to avoid further conversion of grassland and to issue reconversion obligations to farmers who have converted permanent grassland into other uses (unless this is afforestation, in which case reconversion is not normally required).

At EU level, permanent grassland accounts for 29% of total agricultural land, but as might be expected, there are wide variations between Member States, as shown in Figure 5.9 (Malta has no permanent grassland, as defined under the CAP rules).

²⁰ Flanders (Belgium) designated areas outside Natura 2000 for the first time in 2015; data on implementation are not yet available.

²¹ Taking into account data from 2012 to ensure continuity with the previous programming period.

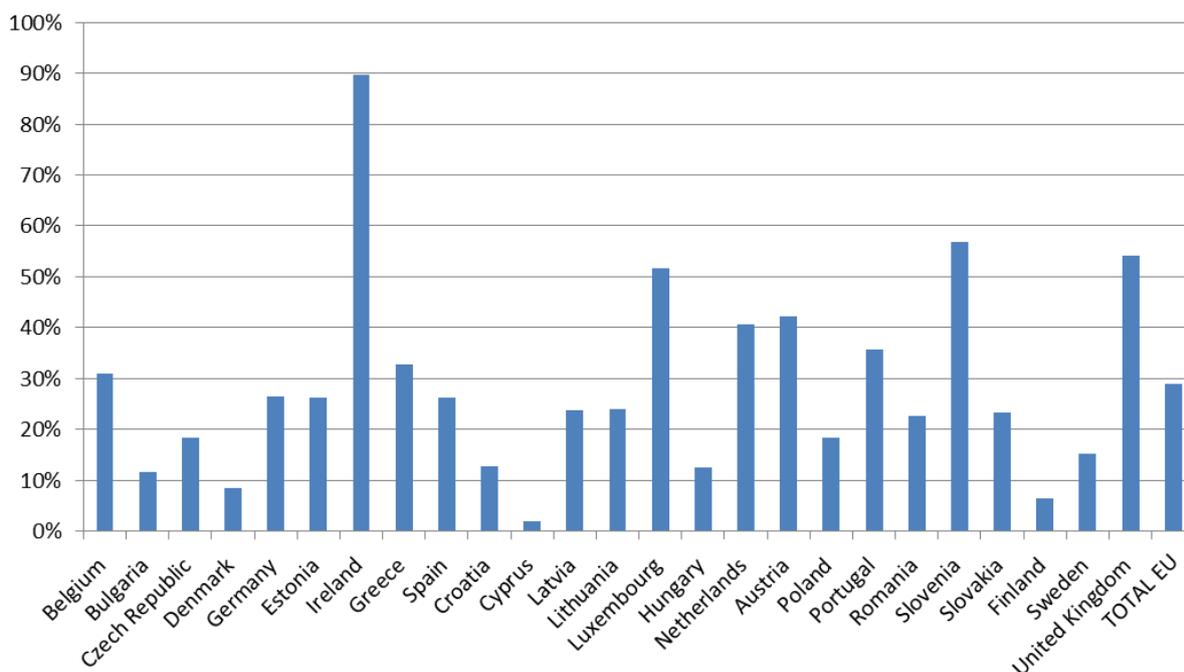


Figure 5.9 Areas of permanent grassland as a proportion of total agricultural area, by Member State²²

(Source: EC, 2016)

Member States are free to set the scale at which the ratio is applied (national, regional or sub-regional). Almost all Member States decided to manage the ratio at national level, just four (BE, DE, FR and the UK) opted for regional level. To safeguard permanent grassland Member States must monitor changes in the ratio and can choose to do this by requiring individual farmers to apply for prior authorization if they wish to convert permanent grassland. In 2015, only three Member States (DE, LU, and PT) implemented a prior authorisation system.

5.4.4 RDP 2014-16 Soil Relevant Target Indicators and Agri-environment-climate Sub-measures

Target indicators for the RDP focus area 4C soil erosion and soil management

Member States that have prioritised use of their EAFRD funding for measures contributing to the two most soil relevant focus areas 4C (soil erosion and soil management) and 5E (carbon conservation and sequestration) are required to identify target indicators for uptake, as percentages of agricultural and forest land under contract for these focus areas. However, the relationship of land management contracts and budgets to specific EAFRD priorities and focus areas is not necessarily clear-cut in practice. There are several reasons for this. Expenditure under specific measures and sub-measures can be designed to deliver benefits against several different focus areas. For example, an agri-environment contract for converting arable land to

²² Based on the data from the notification of the permanent grassland ratio, but data are missing for France and Scotland (UK); for other Member States, the data are taken from the most recent notifications available.

grassland, or an investment in new agroforestry systems, would be likely to benefit not just focus areas 4C and 5E but also biodiversity (4A) and water quality (4B). Similarly, the area of land under contract in these examples could be attributed to several different target indicators. These decisions are a matter of judgement for the managing authority. Figure 5.10 shows the target indicator values for focus areas 4C and 5E in the RDPs analysed for this study²³.

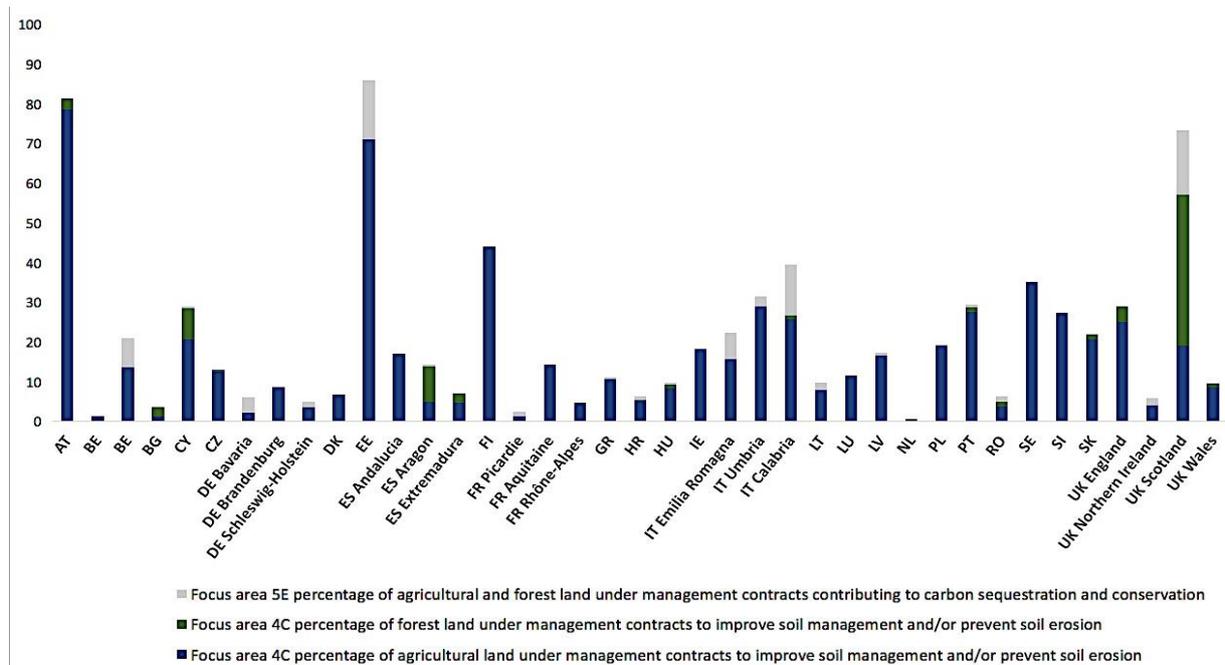


Figure 5.10 Target indicators for Focus area 4C and 5E in RDPs 2014-20 analysed for this study

(Source: own compilation based on data from 2014-20 approved RDPs)

Agri-environment-climate sub-measures programmed for 2014-20

Information on 2014-20 programmed implementation of the agri-environment-climate measure (which supports specific, targeted land management through multi-annual contracts with individual farmers) was compiled for 42 individual RDPs, from all EU-28 Member States²⁴. Extracts from the RDPs were reviewed to identify agri-environment-climate sub-measures that were likely to provide some soil benefits. The following analysis is based on

²³ The RDP analysis is based on 42 RDPs, of which 24 were for non-federal Member States, 6 were for UK and Belgium (all their regional RDPs), and for each of the other 4 federal Member States (IT, FR DE and ES) three regional RDPs were selected for analysis, chosen to reflect differences in soils and land use. (None of the RDPs for the outermost regions were reviewed, nor the RDP for the Åland Islands in Finland).

²⁴ The RDP analysis is based on 42 RDPs, of which 24 were for non-federal Member States, 6 were for UK and Belgium (all their regional RDPs), and for each of the other 4 federal Member States (IT, FR DE and ES) three regional RDPs were selected for analysis, chosen to reflect differences in soils and land use. (None of the RDPs for the outermost regions were reviewed, nor the RDP for the Åland Islands in Finland).

total of 40 management practices which were identified as having potential to address soil threats or support soil functions, grouped into four broad types of land management:

- arable and permanent cropping practices and cultivation techniques;
- input management;
- permanent grasslands and wetlands; and
- buffer strips, landscape features and trees.

Table 5.8 shows how many Member States use agri-environment-climate sub-measures to incentivise implementation of each of these management practices, either explicitly (where soil benefits are specifically mentioned) or implicitly (where the land management requirements are defined in a way that could have soil benefits even if these sub-measures are targeted at other environmental objectives, for example biodiversity or water quality).

Annex 4 shows examples of the types of agri-environment-climate sub-measures that have been programmed in 2014-20 RDPs.

Table 5.8 Soil-relevant management practices required by agri-environment-climate sub-measures programmed for 2014-20, by number of Member States²⁵

Arable and permanent crops and cultivation techniques	Explicit soil objectives (Nr Member States)	Implicit soil objectives (Nr Member States)
Restricted working on sloping land	6	1
Controlled field traffic	3	1
Optimize timing of tillage	3	1
Reduced/conservation tillage, direct drilling	13	8
No tillage	2	1
Soil conservation cropping practices	4	4
Catch crops / green or winter cover	10	7
Intercropping	3	0
Grass cover in orchards, vineyards, hop fields	4	0
Fallow (including self-greening)	3	3
Green manure/mulching	11	2
Soil analysis (organic matter)	4	0
Add organic matter to soil	4	0
Crop rotation with annual crops	14	5

²⁵ Based on 39 RDPs analysed for this study, which 21 were for non-federal Member States, 6 were for UK and Belgium (all their regional RDPs), and for each of the other 4 federal Member States (IT, FR DE and ES) three regional RDPs were selected for analysis, chosen to reflect differences in soils and land use. (None of the RDPs for the outermost regions were not reviewed, nor the RDPs for the Åland Islands in Finland and for Malta).

Arable and permanent crops and cultivation techniques	Explicit soil objectives (Nr Member States)	Implicit soil objectives (Nr Member States)
Legumes/nitrogen fixing crops	8	4
Wildlife strips/areas (nectar/bird food))	0	5
Crop rotation with perennial crops	1	0
Planting perennials/permanent crops	1	1
Permanent grassland and wetlands		
Arable conversion to grassland	7	2
Permanent pasture/meadows, retain/manage	10	12
Peatlands/wetlands/C-rich soil, retain/manage	3	9
Grazing/mowing requirements/restrictions	16	19
Basins/ponds/ditches	1	6
Wetland restoration/creation	1	2
Maintain existing land drains	0	1
Input management		
Precision/integrated crop management	2	1
Residue management	6	3
More efficient/no irrigation	3	1
Optimizing fertilizer application	6	4
Restrictions on fertilizer and/or PPP	21	18
Buffer strips, landscape features and trees		
Buffer/riparian/forest edge strips/field margins	11	11
Terraces	0	0
Hedges (retain/manage/create)	2	5
Trees (isolated, lines, groups) retain/plant	7	4
High stem orchards (retain/manage/create)	4	6
Agroforestry	0	0
Afforestation (EFA) /tree planting	0	1
Short rotation coppice	0	0
Protected habitats, archaeological/geological	1	3

(Source: own analysis based on extracts from 2014-20 approved RDPs)²⁶

²⁶ The RDP extracts were provided by Commission for this project, in the format of machine translated text extracts from individual RDPs

5.5 EU-28 Synthesis of CAP Measures Supporting Specific Agricultural Management Practices Relevant to Soil Protection

The approach to the EU-28 synthesis of Member State implementation of the CAP instruments reviewed for this study is based on typical soil-relevant land use and management practices required or incentivised by the four GAEC standards, Pillar 1 greening obligations and the RDP agri-environment-climate measure. The aim was a simple qualitative analysis showing which CAP Instruments are used by different Member States in a way that can be expected to protect soil functions.

Information was compiled for individual Member States²⁷, showing which CAP measures are programmed or have already been used in the 2014-20 period to require or support each of the identified management practices. It is important to emphasise that this analysis simply shows if individual management practices are supported (or not) by each of the CAP instruments reviewed, it does not show quantitative information about the number of different agri-environment-climate sub-measures which support a specific practice.

Figure 5.11 to Figure 5.14 show, for each of the 40 different types of soil management practice identified, how many Member States used GAEC standards (4, 5, 6 or 7), Pillar 1 greening obligations for EFAs and/or the agri-environment climate measure (either explicitly or implicitly) for soil-related objectives.

²⁷ The RDP analysis is based on 39 RDPs, of which 21 were for non-federal Member States, 6 were for UK and Belgium (all their regional RDPs), and for each of the other 4 federal Member States (IT, FR DE and ES) three regional RDPs were selected for analysis, chosen to reflect differences in soils and land use. (None of the RDPs for the outermost regions were not reviewed, nor the RDPs for the Åland Islands in Finland and for Malta).

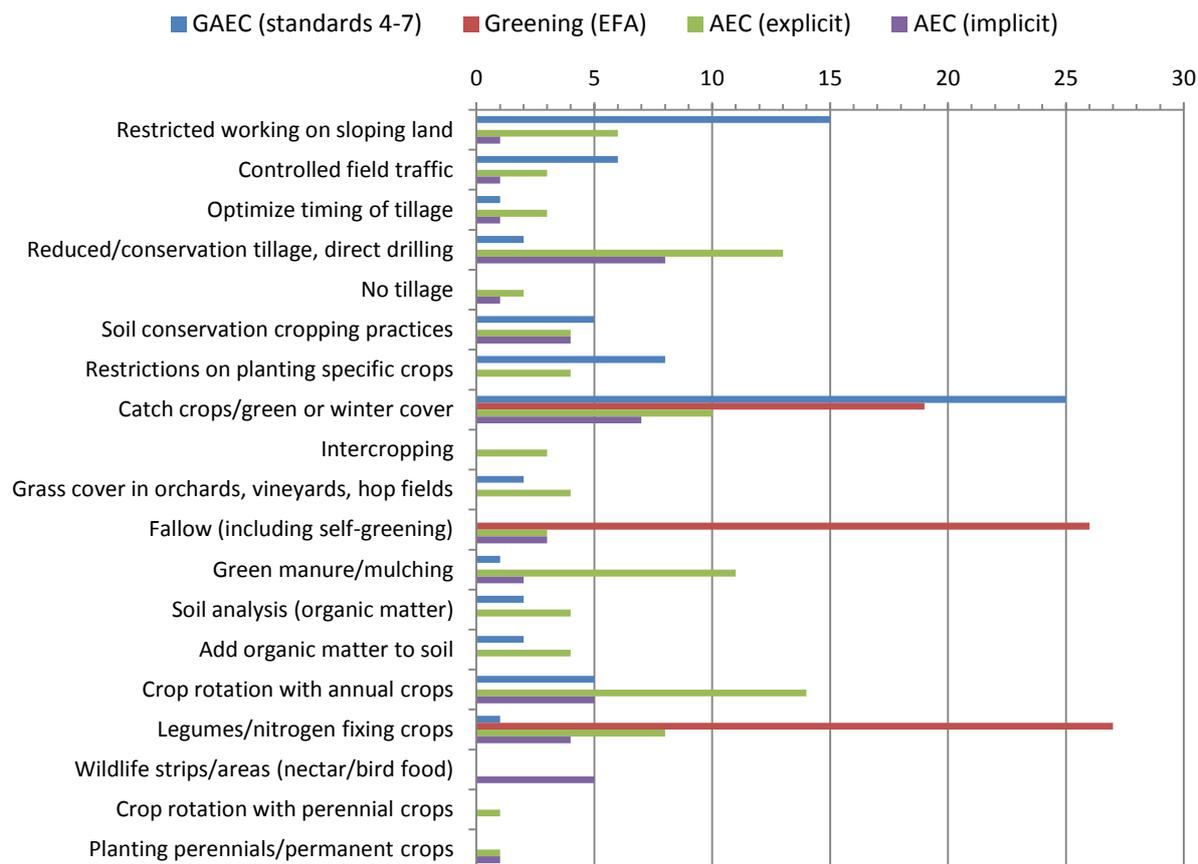


Figure 5.11 Arable and permanent crops - soil management practices by CAP instrument and number of Member States

(Source: own analysis of data presented in JRC, 2015; EC, 2016, and selected data extracted from approved 2014-20 RDPs)

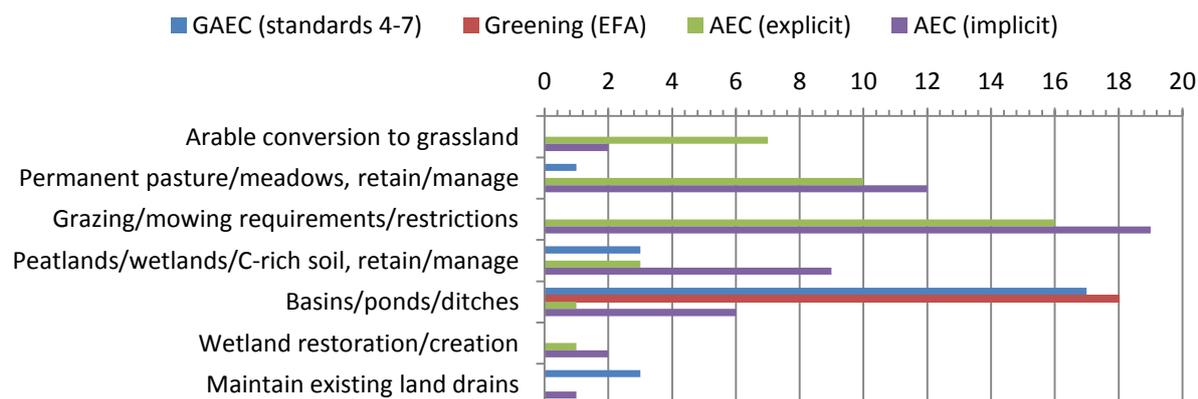


Figure 5.12 Permanent grassland and wetland - soil management practices by CAP instrument and number of Member States

(Source: own analysis of data presented in JRC, 2015; EC, 2016, and selected data extracted from approved 2014-20 RDPs)

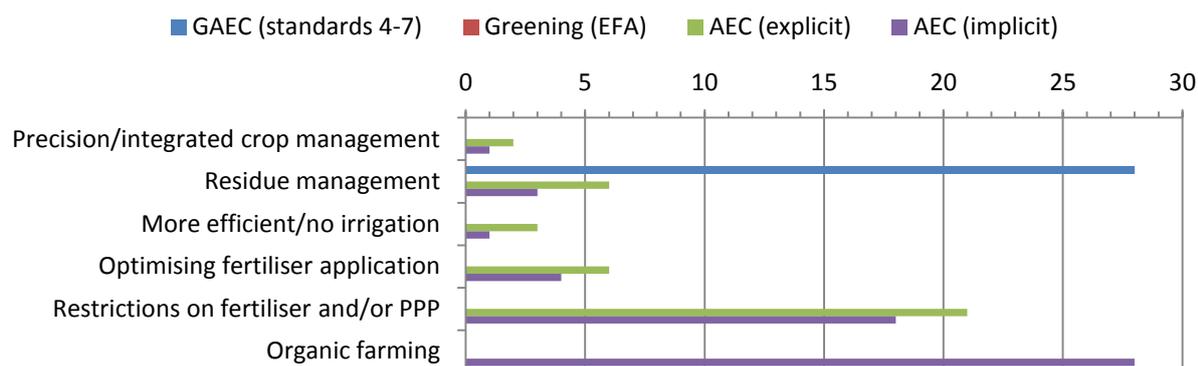


Figure 5.13 Input management practices by CAP instrument and number of Member States

(Source: own analysis of data presented in JRC, 2015; EC, 2016, and selected data extracted from approved 2014-20 RDPs)

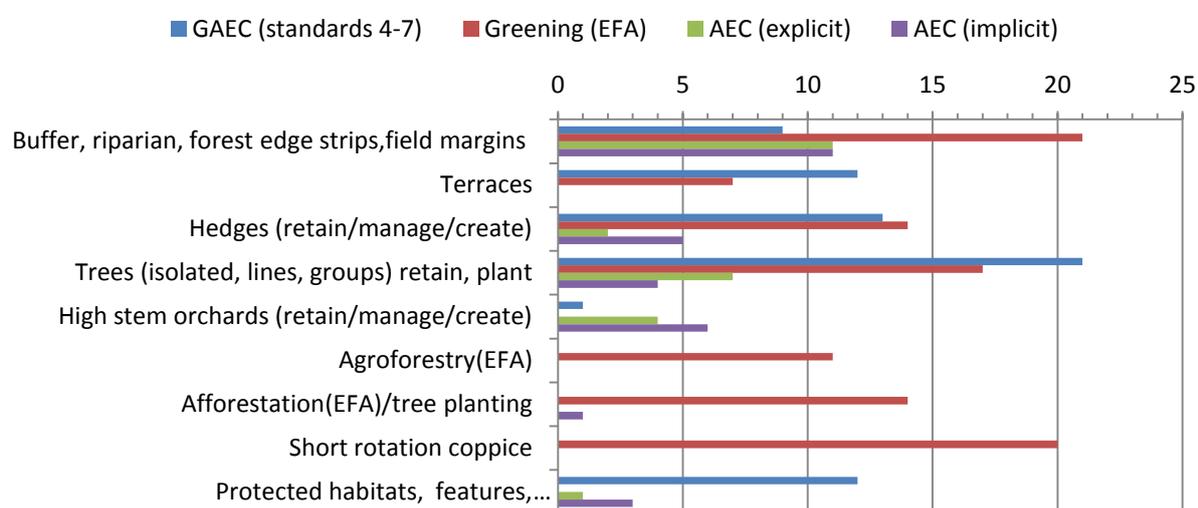


Figure 5.14 Buffer strips, landscape features and trees - soil management practices by CAP instrument and number of Member States

(Source: own analysis of data presented in JRC, 2015; EC, 2016, and selected data extracted from approved 2014-20 RDPs)

The three key CAP measures relevant to influencing land use and management in a way that could potentially benefit soil protection appear to overlap to some extent. However, there is a strict principle of avoiding double funding within the CAP (paying for the same action under two different measures), and therefore the GAEC standards and greening obligations form the baseline for the calculation of RDP agri-environment-climate payments. This does not preclude using different measures in an additional way to provide extra soil benefits, for example using RDP measures to support the creation of wider buffer strips than those required under cross-compliance and greening, planting trees as new landscape features or supporting the restoration and management of existing hedges and terraces. Alternatively, it is equally possible for Member States to use an either/or approach to choosing different CAP measures to support different management practices.

6 Industrial and Point Source Contamination

6.1 Conceptualisation of the Policy Cluster

This cluster is centred around one type of pressure on the environment, i.e. pollution from industrial installations or other point sources, and the impact of this pollution on soil quality and land more broadly. Industrial and point source pollution can also lead to diffuse pollution, when the pollutants are transferred from point source events across broader areas of soil and water bodies. Industrial and point source pollution has consequences for biodiversity within the soil, as well as biodiversity which relies on soils for habitat and nutrients. Pollution events are often linked to specific high risk activities or high risk substances. Monitoring of direct emissions at relevant installations or high risk activities (as well as monitoring of wider soil contamination levels) is the key way to identify ongoing pollution. However, the identification of historic contamination or unregulated contamination sources can be difficult.

The scale of the problem in Europe is significant. According to the EEA estimations 'there may be as many as 2.5 million potentially contaminated sites across Europe, which need to be investigated. Of these, approximately 14 % (340.000 sites) are expected to be contaminated and likely to require remediation (EEA, 2014). Approximately one third of these contaminated sites have already been identified and around 15 % have been remediated. Traditional remediation involves excavating the contaminated soil and disposing of it in another location.

Municipal and industrial waste disposal and treatment causes around a third of Europe's soil contamination problem (EEA, 2014). Metal industries and petrol stations are also common sources of soil contamination. In some countries, mining is an important source. The most frequent soil contaminants are mineral oils and heavy metals.

6.1.1 Policies and Issues Covered in the Cluster

The cluster examines the EU policy instruments which are in place to prevent, limit and remediate industrial and point source contamination. The focus is on emissions to land and soils with two types of target for control:

- Activities generating pollution now and potentially in the future
- Contamination that persists already on land and in soils

Soil contamination is often linked to high risk activities associated with the production, use, storage, transport or disposal of dangerous substances including:

- Raw material extraction, i.e. mining and mining wastes and wastewater
- Industrial pollution activities including smelting, manufacturing and the storage and release
- Road and transport industries i.e. those holding oils or hydrocarbons or during the transportation for potential pollutants
- Waste management, storage, resource reclamation and disposal

Moreover, unregulated activities or those illegal activities that can lead to significant contamination also need to be considered. These are often linked to waste disposal or treatment, or illegal extraction of high value metals or materials.

Nine EU policies have been identified as covering priority measures linked to industrial and point source soil contamination. These entail different types of policy intervention.

Regulatory Instruments:

- Focused on regulating high risk activities or contaminants preventing release, limiting emissions or remediating damage
- Environmental Liability Directive (ELD)
- Industrial Emissions Directive (IED)
- Landfill Directive (LD)
- Waste Framework Directive
- Mercury Regulation
- Focused on ensuring the environmental quality of water
- Water Framework Directive (WFD) and daughter Directives i.e. the groundwater and priority substances Directive that essentially set thresholds under the WFD
- Delivering environmental quality standards for land
- National Emissions Ceiling Directive (NECD)

Funding and Support Instruments – often focused on funding support for remediation of historic contamination where the liable party cannot be held responsible

- Cohesion Fund
- European Regional Development Fund
- State Aid Guidelines

6.1.2 [Links to Other Policy Clusters](#)

There are important links to other clusters, both conceptually and with specific policies. These links are:

- Diffuse contamination – reduction in point source emissions reduces the overall level of contaminants in the environment, including soils, water and air. In addition, monitoring of water or air pollution levels can also lead to the identification of potentially problematic point source emissions.
- Biodiversity, land use planning and soil sealing – protection of biodiversity may encompass the protection of the soil that supports the habitats and biomass. There is a potential link to soil sealing, in that one key way of reducing emissions or preventing emissions can be to seal soils that are a source of contaminants to the wider environment.

6.1.3 Most Relevant Soil Threats and Functions

There is a clear link between the pressure of point source emissions and the threat of industrial and point source contamination. Moreover, reducing point source emissions is also especially relevant to soil biodiversity.

The key soil function of interest in this cluster is providing a platform for human activities. Specifically, the reduction of emissions to soils is commonly justified on the basis of health risks and increasing the potential future opportunities for the use of a particular parcel of land. Remediation of contamination is commonly a precursor for increasing the land's potential utility for human use. In terms of economic growth and sustainable development, soils deliver a basis for human activities and also limit and control emissions to other environmental media. However, when the concentration of contaminants goes beyond threshold levels, the capacity of soils to act as protector diminishes and soils become a source of contaminants to water and organisms.

Beyond the provision of a platform for human activities, the cluster is potentially relevant for all functions since the contamination of soils can lead to the loss of one or all soil functions depending on the level of contaminants (JRC 2014).

6.2 Integrated Assessment of the Key Policies within the Cluster

6.2.1 Coverage of Soil Threats across the Cluster

This cluster interacts with or addresses the different soil threats in the following way:

- **Acidification** is more directly linked to the diffuse pollution cluster, however, limits on the deposition of key acidifying substances under the National Emission Ceilings Directive (NECD) is partly driven by controlling specific point source emissions and as a consequence there is a link to point source contamination – although this will primarily be to air.
- **Contamination – Diffuse.** In the context of local pollution this is indirectly addressed through the control of emissions from installations leading to a reduction in emissions and the transport of contamination both to water and to other land egg via the waste Directives, IED and ELD. Importantly key measures for control of diffuse pollution might be used as markers for identifying point source emissions through land for example a change in the quality status of waters under the WFD or the Groundwater Directive.
- **Contamination – industrial and point source.** The policy measures listed interact with the primary threat for the cluster by: limiting the threat, i.e. controlling potentially polluting installations and activities (IED, waste Directives, ELD), controlling contaminating substances and their availability (Mercury Regulation and other rules preventing access to the market by contaminating substances and in terms of point sources the control of transportation and storage). Conversely, funding at EU level is available for the remediation in particular of urban, Brownfield sites and state aid is also permitted under the guidelines for the remediation of soils where no liable party can be identified or held liable.

- **Loss of soil biodiversity.** This is captured in the cluster in so far that the legislation addresses pollution which is also a threat to soil biodiversity. Thus, there are potential positive effects from several legislative measures included in this cluster, but the effects are indirect as soil biodiversity or soil functionality in general is rarely highlighted.
- **Soil sealing.** Sealing can be used as a measure to prevent pollution (e.g. in industrial installations). The interaction with the policies in this cluster is complex and highly location specific.

The most important for this cluster is the consideration of industrial and point source contamination events. This is covered either on an installation or an activity basis, or based on the control of specific priority substances. The focus of policies in this area is on prevention and avoiding current and future contamination. There is funding made available to deal with historic contamination events, and the State Aid Guidelines make it possible to use national funding to support site remediation where no liable party can be held responsible. However, these are not brought together as a coherent plan of coverage of the key contamination issues nor are their clear rules as to how soil protection and land decontamination activities should be applied to ensure soil function is retained (nor are the latter set out in EU law for reference/as a basis for integration). This also links to the question of soil sealing, and also the wider question of wholesale loss of soils, both can be used as a treatment option to prevent pollution events or to remediate land i.e. by removing the polluted soils.

Reduction and remediation of industrial or point source contamination has the potential to support the reduction of other threats including diffuse pollution and loss of soil biodiversity. Conversely, measures that most directly control and monitor diffuse pollution can provide insights into potential local contamination events – for example contamination of waterways and change in water quality status linked to the WFD and Groundwater Directive.

Table 6.1 below provides a summary of how each instrument identified as relevant to industrial and point source soil contamination contributes to tackling the soil threats identified earlier as relevant to this cluster.

Table 6.1 Summary of Soil Threats addressed by the Industrial and Point Source Contamination Policy Cluster

Threats	Environmental Liability Directive (ELD)	Industrial Emissions Directive (IED)	Landfill Directive (LD)	Waste Framework Directive	Mercury Regulation	Water Framework and daughter Directives (WFD)	Cohesion Fund	European Regional Development Fund	State Aid Guidelines
Acidification		IED controls some acidification sources				Indirect (see diffuse pollution chapter)			
Contamination - Diffuse	The Directive is intended to reduce incidents and also ensure remediation of emissions both to land and water. As a consequence this will support reductions in wider diffuse pollution levels	Diffuse pollution from installations should be managed	Should ensure containment of pollution and thus prevent diffuse pollution	Waste management measures should take account of soil protection	Controls of trade in mercury, compounds and mixtures limits placing of hazardous material on the market and the transfer from the EU to third countries potentially limiting the availability of mercury and reducing the likelihood of pollution events. Diffuse mercury pollution is a significant problem and associated with bioaccumulation in fish particularly.	Key instrument to control diffuse pollution in water (incl. routes to water). Also contributed to by the Groundwater and Priority Substances Directives		There is a potential link made between support to limit urban air pollution and deposition on soils	Increased investment in local contamination reduction will decrease emissions to water courses and migration of contamination to other sites potentially reducing overall contamination levels in soils.
Contamination - point source	The Directive is focused on local emissions of	Emissions from installations	Should ensure containment	Waste management measures	Direct controls on sites holding, storing and	By controlling inputs to water courses	'taking action to improve the urban environment (c,iv)	Formal reference is made to the decontamination	Guidelines permit support explicitly for remediation of

Threats	Environmental Liability Directive (ELD)	Industrial Emissions Directive (IED)	Landfill Directive (LD)	Waste Framework Directive	Mercury Regulation	Water Framework and daughter Directives (WFD)	Cohesion Fund	European Regional Development Fund	State Aid Guidelines
	pollutants that change the status of land, water and biodiversity. Hence highly relevant to both increasing caution around questions of emissions to land and also addressing emissions/securing remediation when a change does occur	should be managed, with installations operating to BAT	of pollution and so prevent emissions to local soils	should take account of soil protection	disposing of mercury requiring certain management activities to limit contamination of land/soils	potentially point sources would be addressed, although these are more strongly the focus of other measures	which includes decontaminating brownfield sites potentially reducing localised soil contamination and associated problems. Annex I of the Regulation sets out common output indicators for the Cohesion Fund including land rehabilitation which measures the hectares of surface area rehabilitated	of Brownfield sites linked to urban regeneration	contaminated sites only when the polluter — i.e. the person liable under the law applicable in each Member State without prejudice to the ELD and other relevant Union rules in this matter — is not identified or cannot be held legally liable for financing the remediation in accordance with the ‘polluter pays’ principle
Loss of soil biodiversity	The Directive is linked to emissions to land and also protection of biodiversity linked to the nature Directives. As a consequence there might be a contribution to protection of soil biodiversity. However, the extent to which this is the	Emissions and pollution from installations should be managed under IED. Might contribute to soil biodiversity protection	Should ensure containment of pollution and so may contribute to soil biodiversity protection	Waste management measures should take account of soil protection and so may contribute to soil biodiversity protection		Key instrument to control diffuse pollution in water and so may contribute to soil biodiversity protection			

Threats	Environmental Liability Directive (ELD)	Industrial Emissions Directive (IED)	Landfill Directive (LD)	Waste Framework Directive	Mercury Regulation	Water Framework and daughter Directives (WFD)	Cohesion Fund	European Regional Development Fund	State Aid Guidelines
	case will depend on the approach to remediation adopted.								
Soil sealing		Sealing might be used by installations to prevent input of toxic substances to soils as required by IED	Sealing is effectively a result of containment of landfill sites required by the LD			Where sealed land affects inputs of pollutants to water bodies affecting status, the WFD would seek to address this.			

6.2.2 Coverage of Soil Functions across the Cluster

Point source emissions of contaminants will negatively impact on a range of soil functions. However, whether the function is affected and the extent to which it is affected varies depending on the type of pollution and its location. Importantly reduction in point source pollution events will lead to reduction in diffuse levels of pollution either transferred to water courses or to other land, this will have an impact on the water function, however this is not the focus of this analysis (see diffuse pollution cluster assessment). The functions most relevant to this cluster are:

- Platform for Human Activities. The policies set out are intended to do several things in relation to the usability of soil and land.
- To facilitate human activities without damaging the utility of soils and land (and the wider environment) through regulating specific high risk activities (i.e. waste management – landfill and Waste Framework Directives) and also through promoting preventative action rather than merely responding to a pollution event i.e. waste legislation, IED and ELD.
- To ensure that human activities that pose a risk do not leave a permanent legacy on the land or soils i.e. requirements to remediate land under IED and ELD.
- To facilitate the increasing of soil's utility as a basis for human activities i.e. through promoting remediation of contaminated sites (particularly urban sites/Brownfield sites) i.e. through the various funding routes at EU level, and promoting remediation support at national level through the State Aid Guidelines
- Biomass production. Soil contamination can have an indirect effect on biomass production. In so far that the instruments in this cluster tackle (directly or indirectly) pollution and diffuse pollution causing such contamination, they may contribute to maintaining this soil function. In addition, policies that lead to a reduction in the use of key polluting substances, such as the Mercury Regulation, will improve the quality of this function.
- Hosting biodiversity. Soil contamination can have an indirect effect on hosting soil biodiversity or as per the growth of biomass generally. Reductions in emissions of pollutants will potentially benefit biodiversity primarily through reduction in diffuse levels of pollutant or by directly limiting emissions in the local of specific biodiversity at risk. There is also a link to biodiversity as provisions for example under ELD are specifically targeting biodiversity and protecting a specific habitat from damage can often involve protecting the local soils of importance.

The most relevant soil functions are the platform for human activities and hosting biodiversity. The actions under this cluster are intended to promote both functions by limiting contamination events that would reduce the ability to deliver their functions. The tools used to do this are primarily in terms of limiting the pollution sources by either requiring preventative action (IED, ELD, waste Directives), requiring remediation of land after the event (ELD, IED) and facilitating the reduction in the risk posed by historic contamination.

Table 6.2 below provides a summary of how each instrument identified as relevant to local soil contamination contributes to supporting the soil functions identified earlier as relevant to this cluster.

Table 6.2 Summary of Soil Functions addressed by the Industrial and Point Source Contamination Policy Cluster

Policy	National Emission Ceilings Directive (NECD)	Environmental Liability Directive (ELD)	Industrial Emissions Directive (IED)	Landfill Directive (LD)	Waste Framework Directive	Mercury Regulation	Water Framework daughter Directives (WFD)	Cohesion Fund	European Regional Development Fund	State Aid Guidelines
Platform for Human Activities		The Directive is intended to reduce incidents of environmental pollution and the definition of damage is linked to protection of human health	Controls pollutant inputs from installations to soils and so can contribute to maintain quality for different human activities. Particular emphasis in restoring site after use	Should prevent inputs of pollutants in contained landfills and so can contribute to maintain quality for different human activities.	Controls pollutant inputs from waste management activities to soils and so can contribute to maintain quality for different human activities.	Mercury is an element toxic to the nervous system and kidneys, by reducing both point source and diffuse availability and is known to bio accumulate up the food chain i.e. with higher predators, especially fish, at risk.	Meeting WFD objectives may address pollution which affects soil quality and so affects the human activities supported			
Biomass production	Tackling pollution from acidifying substances will contribute to biomass production	Controls pollution and therefore may contribute to this primarily through reduction in diffuse pollution	Controls pollution and therefore may contribute to this primarily through reduction in diffuse pollution	Controls pollution and therefore may contribute to this primarily through reduction in diffuse pollution	Controls pollution and therefore may contribute to this primarily through reduction in diffuse pollution	See above	Controls pollution in water and so may contribute to biomass production			
Hosting biodiversity	Tackling diffuse pollution from	The measure directly seeks to promote biodiversity protection and	Controlling pollution from installations might	Should ensure containment of pollution and so may	Waste management measures should take	See above	Controls pollution in water and so may	The policy specifically supports actions to	The policy specifically supports actions to	The policy specifically supports actions to

Policy	National Emission Ceilings Directive (NECD)	Environmental Liability Directive (ELD)	Industrial Emissions Directive (IED)	Landfill Directive (LD)	Waste Framework Directive	Mercury Regulation	Water Framework daughter Directives (WFD)	Cohesion Fund	European Regional Development Fund	State Aid Guidelines
	acidifying substances will contribute to soil biodiversity protection	provisions are stronger in relation to biodiversity that for water and soil i.e. enabling a second tier of liability to apply to now Annex III installations. Moreover protecting land outside of protected areas via the land protection clauses is also important in securing biodiversity across the wider landscape.	contribute to soil biodiversity protection	contribute to soil biodiversity protection	account of soil protection and so may contribute to soil biodiversity protection		contribute to soil biodiversity protection	promote biodiversity and links soil, biodiversity and delivery of ecosystem services	promote biodiversity and links soil, biodiversity and delivery of ecosystem services	promote biodiversity and links soil, biodiversity and delivery of ecosystem services

6.2.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection - Understanding the Relevance and Limits of Policies within the Cluster

The following Table 6.3 provides an assessment of the strengths, weaknesses, opportunities and threats of the individual policies in so far as they address the local pollution threat affecting soils. These are collated in an integrated way in section 6.3.

Each instrument has its own strengths, weaknesses, opportunities and threats in relation to the specific objectives and scope of that instrument, but the strengths, weaknesses, opportunities and threats of that instrument in relation to soil protection may be different. A measure may be delivering its core goal i.e. regulation of an installation but contain weaknesses such as known inconsistencies in implementation under the LD and ELD. Or weaknesses might include limits to the overall coverage of the policy for example for soil contamination a limitation within the ELD (and other installation specific policies such the waste Directives) is that they only cover emissions after the date of their implementation.

Legislation such as IED, waste management law, etc., includes specific soil protection objectives. However, it is not clear how well these are taken forward on the ground. While these, therefore, are 'strengths', in some cases they remain 'opportunities'. And there are implementation challenges that have been identified, which also offer opportunities for improvement into the future. Overall, however, a key strength of the policies in place is the relatively strong provisions around controlling specific high risk activities and substances, both preventing their emission to land and also for requiring remediation following contamination – flexibility afforded through regulation through permitting to enable flexibility to the circumstances. Reliance on robust permitting, monitoring and reporting regimes at national and regional levels.

There is a clear link to water protection, which is a potential strength i.e. the policies might reinforce each other and are an opportunity. However, relying on key elements of water policy to protect soils is also a weakness. At present it is often water policies and related indicators that are being relied upon to identify problems in terms of soil contamination rather than a direct review of soil risk factors. There is a clear link, but without defining parameters for how to treat soils within the overlapping measures, or a basis for integrating soil issues (i.e. a central dossier setting these out at EU level) there is no way to systematically take these into account. As a consequence, for example, contamination that does not impact on water quality is not required to be addressed. In addition, where a problem noted to be impacting on a water course there is a risk it could be remediated in way that might protect the water course but not necessarily fully take the soil protection needs into account – for example by simply preventing entry to the water course.

Funding is important for the remediation of land where a liable party cannot be held responsible. There are clear opportunities within the EU policy to make use of state and EU funds to promote soil remediation. This is particularly of importance in urban areas and on Brownfield sites. A clear threat identified across a number of policies is the lack of dedicated framework setting out the priorities and conceptualizing soil issues at EU level. The Thematic Strategy made a start on this. However, there remains a lack of clarity around key issues and no clear basis for integrating and hence prioritising soil issues.

Table 6.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection: Industrial and Point Source Contamination Policy Cluster

- **Strengths** - what does the policy cover well in relation to soil protection?
- **Weaknesses** - are there aspects limiting the protection afforded?
- **Opportunities** - are there any potential opportunities linked to the legislation which could benefit soil protection (in the context of this study, opportunities are understood as arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?
- **Threats** - are there any potential elements within the policy that might put at risk the protection of soils?

Policy	Strengths	Weaknesses	Opportunities	Threats
Water Framework Directive (WFD) and daughter Directives	<ul style="list-style-type: none"> • Encompasses all diffuse pollution which could affect water body status • Requires adoption of measures necessary to tackle that pollution • Strong monitoring, assessment and reporting provisions • Cyclical adaptive management process • Comprehensive in geographic scope • Groundwater and priority substances Directives set additional substance standards to support WFD – clear and precise • Easier to determine MS compliance 	<ul style="list-style-type: none"> • The objective of the WFD is water protection defined by water body status – soil protection is indirect • MS implementation to date is not strong – so delivering water protection is proving difficult (let alone wider issues such as soil protection) • Only a limited number of substances in the Groundwater Directive and Priority Substances Directive are of interest in soil protection 	<ul style="list-style-type: none"> • Encourages integrated catchment management – so opportunity to bring in wider environmental thinking • Encourages active stakeholder participation – useful for working with farmers and including soil protection • The WFD 2018 review could provide an opportunity to address soil ‘thinking’ within water protection approaches 	<ul style="list-style-type: none"> • Poor implementation by MS • The WFD 2018 review might present a risk to the level of protection afforded by the WFD
Industrial Emissions Directive (IED)	<ul style="list-style-type: none"> • Covers diffuse as well as point source pollutants from industry/combustion plant/waste installations • Covers all environmental impacts, including soils • Requires full environmental assessment • Requires operation to BAT • Establishes clear enforcement procedures • Provisions for return of site condition after use • The provisions of Article 22 of IED on 	<ul style="list-style-type: none"> • BAT is harder for operators to define for many diffuse sources and so regulators find it hard to set out some permit conditions • Monitoring of diffuse emissions sources can be more problematic and less precise, it is therefore, potentially, easier for operators to hide non-compliance/pollution incidents, etc. 	<ul style="list-style-type: none"> • As BREFs develop further, consideration to diffuse pollution and soil protection may become more evident • IMPEL and other exchange platforms begin to examine wider issues 	<ul style="list-style-type: none"> • There is not a threat to the provisions themselves – just a risk that in the absence of clear links to soil protection legislation soil protection may be less coordinated or consistent

Policy	Strengths	Weaknesses	Opportunities	Threats
	<p>site closure resulted in Member States having to develop a system of background reports that highlighted the state of soils and understanding the nature of contamination.</p> <ul style="list-style-type: none"> • Is flexible in allowing MS to add in additional elements (some include some soil spreading activities) 			
Landfill Directive (LD)	<ul style="list-style-type: none"> • Provisions for containment protect soils • Relatively easy to determine compliance for regulated landfills 	<ul style="list-style-type: none"> • Considerable non-compliance in some MS – soils remain at significant risk • Containment is, itself, a form of sealing 	<ul style="list-style-type: none"> • Further emphasis on enforcement is likely 	<ul style="list-style-type: none"> • None – the provisions are extremely unlikely ever to be watered down
Waste Framework Directive	<ul style="list-style-type: none"> • Contains clear provision for waste management facilities to operate taking account of soil protection • Standards may be set to ensure soil protection 	<ul style="list-style-type: none"> • It is unclear if the soil protection provisions have been taken into account in regulatory decisions at MS level 	<ul style="list-style-type: none"> • The provisions could be used to develop guidance (or similar) at EU level to drive soil protection 	<ul style="list-style-type: none"> • None? The current legislative review in the circular economy package does not affect the soil protection provisions
National Emission Ceilings Directive (NECD)	<ul style="list-style-type: none"> • Sets national limits on emissions based on degree of impact on receiving soils • Overall compliance is reasonable and limited non-compliance remains • Covers all key acidifying and eutrophying substances affecting soil functions 	<ul style="list-style-type: none"> • Some remaining non-compliance • Further reductions in NOx needed. • Significant problems in tackling ammonia emissions 	<ul style="list-style-type: none"> • New Directive offers the opportunity to monitor Mercury emissions and adopt limits in future depending on scale and risks of reported emissions 	<ul style="list-style-type: none"> • Adoption of new directive has led to provisions being shifted with particular concerns regarding the level of Ammonia emission reduction demanded
Environmental Liability Directive (ELD)	<ul style="list-style-type: none"> • sets out a clear framework for the protection of land, and as a consequence soils, specifically from installations listed in Annex III • clear binding requirements requiring polluters to address emissions to land • clauses to protect biodiversity and on water will also benefit soil protection • has raised expectations in terms of preventative action, reducing incidence of emissions as well as promoting remediation 	<ul style="list-style-type: none"> • Issues with consistency of implementation esp. the thresholds applied to trigger preventative and remedial action. • Applies only to pollution events post April 2007 	<ul style="list-style-type: none"> • There is a proposal for an action plan in relation to the ELD (Multi-Annual Work Programme 2017 – 2020) • There are opportunities to share experience and understanding of implementation to secure improvement. 	<ul style="list-style-type: none"> • Focus on land protection not soils quality or function in a given local environment • 2016 review identified about half of cases were linked to pollution of land

Policy	Strengths	Weaknesses	Opportunities	Threats
Mercury Regulation	<ul style="list-style-type: none"> deals with the question of the management of facilities managing, storing and disposing of mercury in the EU it also currently prohibits the export of mercury outside the EU. deals relatively robustly with the question of potential isolated emissions of mercury at the facility level and makes close links to other EU policy. Seeks limit mercury on the market, hence acting as a limit on likely incidents of pollution. 	<ul style="list-style-type: none"> Significant sources of mercury emissions i.e. diffuse contamination linked to stake emissions is not addressed within the policy, nor within the EU acquis at present 	<ul style="list-style-type: none"> clear opportunity in line with the implementation of the Minamata Convention and the adoption of a revised and renewed Regulation on Mercury. Monitoring of mercury emissions under Directive 2016/2284 on NEC offers an opportunity for understanding the impact of mercury emission and bringing forward legislation if deemed necessary. The Commission will also organise by 2021 an exchange of information with the Member States regarding the measures taken at national level to identify and assess sites contaminated by mercury or mercury compounds and will make this information, including an inventory, publicly available on the internet 	<ul style="list-style-type: none"> Arguably the greater threat to soil functionality i.e. in terms of biomass production, hosting biodiversity etc comes from diffuse sources of mercury pollution, broader functionality of Europe's soils is not the focus of current action.
Cohesion Fund	<ul style="list-style-type: none"> The policy provides a potential opportunity to provide funding to improve soil status both through addressing contamination and through 'promoting protecting and restoring biodiversity and soil and promoting ecosystem services 	<ul style="list-style-type: none"> policy only applies to certain Member States while soil in particular contamination restoration is highlighted, in the absence of a clear policy or political driver it is likely that other demands on funding may be prioritised. 	<ul style="list-style-type: none"> This is an opportunity to provide funding for positive change in soil status. 	<ul style="list-style-type: none"> The there might in infrastructure promoted that might damage soils further
ERDF	<ul style="list-style-type: none"> provides a potential opportunity to provide funding to improve soil status both through addressing contamination and through 'promoting protecting and restoring biodiversity and soil and promoting ecosystem services It also promotes urban brownfield decontamination and other actions 	<ul style="list-style-type: none"> soil protection projects are competing for funding against a large number of other priorities 	<ul style="list-style-type: none"> opportunity to provide funding for positive change in soil status in particular linked to provision of ecosystem services. clear opportunities for addressing some urban contamination 	<ul style="list-style-type: none"> The lack of a clear soil priority at EU level means soil issues may be overlooked or soil solutions may be framed to deliver other policy priorities.

Policy	Strengths	Weaknesses	Opportunities	Threats
	<p>that may reduce soil contamination specifically in urban areas.</p> <ul style="list-style-type: none"> The fund is available across all MS, although focus more on less developed regions 			
State Aid Guidelines	<ul style="list-style-type: none"> The guidelines permit action to remediate contaminated land, in particularly problematic cases i.e. where the liable party cannot be identified or held liable. The level of state aid permitted by MSs is high for remediation i.e. 100% eligible costs 	<ul style="list-style-type: none"> State aid guidelines only permit support but don't attach money to support the change or dictate priorities to MS re spending. 	<ul style="list-style-type: none"> opportunity to understand and elaborate further how soils can contribute to resource efficiency delivery to ensure wider actions to protect and improve soil quality and understood to qualify for state aid 	<ul style="list-style-type: none"> The lack of a policy defining targets or applying pressure in the field of soil protection may mean that MSs overlook investment in favour of delivering other priorities – for which EU targets exist

6.3 Integrated Assessment of the Industrial and Point Source Contamination Policy Cluster

EU legislation covers the key sectors deemed to pose a significant risk of pollution and emissions to land and soils: for example, waste disposal (LD), waste management, storage and transport (Waste Framework Directive); industrial pollution both in terms of ongoing activities (IED) and enforcement of liability for emissions from certain activities to land (ELD). For the sectors covered by these measures their emphasis is primarily on reducing future contamination – from the time of entry into force. The IED and the LD set out a system whereby the said activities are permitted and then soil (and other environmental parameters) are monitored and damage prevented, and, in the cases of a problem, identified and rectified. These are well established mechanisms that have proved successful in addressing registered activities (IPPC was in place from 1996 and landfill Directive from 1999).

Illegal activities are known to still pose an issue in these sectors, particularly in the case of waste management i.e. illegal landfilling or processing and fly tipping of wastes and are known to be a source of ongoing contamination. However, this is more an issue of implementation rather than the scope of the laws themselves.

ELD takes a different approach i.e. ensuring liability for pollution to land that is associated with industrial emissions or waste management but also any activities linked to dangerous substances and preparations (as set out in EU law). IED focuses on land protection, as soil functionality is not enshrined in EU law (as this was to be included in the soil framework Directive and requirements on soil threat minimization are non-binding under the Soil Thematic Strategy) there is a potential that land protection might not always equate to soil protection. For example remediation and protection of land might conceivably cover removing the pollution from the land through removal and landfilling of the contaminated material. The contamination is removed from the land but the soil is disrupted and of soil functions and local qualities might be lost. In addition sealing can be a preventative technique used to avoid emissions to the wider environment for example as required under preventative actions under ELD or within permits under IED.

It should be noted that ELD (and to an extent IED) offers additional protection to water based on the clauses in the WFD i.e. cross referencing to the other relevant legislation to reinforce rules preventing any discharges that are not in line with permits under the Groundwater and WFD. This link potentially strengthens requirements around water in a way not possible for soils – given the lack of specific and strategic binding measure focused on soil protection that might more coherently set out rules on controlled activity.

In addition to activity or installation focused rules, other EU policies set requirements on the control of pollutants, chemicals and priority substances and potentially. These rules limit the use, processing and trade in these substances reducing their presence in the environment and the associated risks as for example set out in the Mercury Regulation and proposed revisions in line with the Minamata Convention. As a consequence they will act to limit the risk of severe pollution events.

As noted above key EU policies address and manage pollution from activities from the date of entry into force. This raises the question of historic sites i.e. there are sites for industrial production that persisted before the introduction of the IPPC Directive in 1996, and the IED

which became binding in 2007 (and, indeed, for historic contaminated sites in Member States that joined the EU and for which EU law came into force more recently). There is no mechanism specifically in EU law for the identification of such sites. However, there are clauses within funding regimes that could offer support for their remediation, i.e. within the European Regional Development Fund and Cohesion Funding. There are also opportunities under State Aid Guidelines that potentially facilitates and enables Member States to support remediation activities - assuming that the liable party cannot be identified or legal held responsible. Within EU funding regimes support is generally linked to urban regeneration and support for brownfield development and the need to remediate potentially contaminated sites. Development and development potential is therefore a key driver for remediation in particular in urban areas or where land is at a premium.

While there is no systematic approach to identifying historic contamination there are clear mechanisms under EU law that might result in their identification as being problematic this includes: WFD and linked daughter Directives. If local pollution is causing an impact (that is notifiable) on the quality of the groundwater, drinking water sources or water courses this should be identified – if the emissions are significant when compared to the perceived quality need. However, these measures would not identify necessarily all point sources of pollution, and depending on thresholds for quality set may not identify low levels of contamination. Moreover, they would not necessarily require remediation to protect the soils for their own sake, as their goal is to prevent emissions reaching the protected waters.

There are clear opportunities for improving enforcement identified in reviews of the ELD and the IED. This would increase the effectiveness of protection afforded and help to progressively reduce the likely occurrence of future contamination events. Also there is a strong reliance on national approaches under permitting regimes and liability regimes, this is already the focus of national exchange for example under groups such as IMPEL. Such exchanges might be strengthened and further supported in particular to develop specific good practice for soil protection.

The lack of strategic policy that prioritises, establishes key concepts i.e. threats and functions and the needs for soil protection potentially limits the ability to integrate soil protection into key existing policy dossiers. For example, for air and water there is clear evidence in policies such as IED and ELD of integration with key policies helping to promote the protection of air, water and biodiversity and also to provide clarity regarding how provisions should be interpreted.

6.4 Comparing EU Level Issues and Gaps to Member State Policy Action

Based on the cluster analysis a number of issues and challenges associated with the delivery of soil protection based on EU policy requirements can be identified for the cluster on industrial and point source contamination. These are summarised below in Box 6.1. As for the cluster on overarching policies, EU policy does not act in isolation to regulate Europe's environment. This section examines the extent to which nationally initiated policies set out in the inventory appear to address the gaps and issues that remain at the EU level and whether comparable approaches apply across the Member States. Remain issues and questions that remain for protecting Europe's soils are then set out.

Box 6.1 Key Issues and Potential Gaps in EU Policy for Further Investigation

The analysis of EU level policy identified that there are in place strong and well established mechanisms at EU level that have proved successful in protecting Europe's soils; for example, the Industrial Emissions Directive and the Landfill Directive. There are measures in place within the EU acquis that both address specific installations and limit the presence of dangerous substances in the environment. Moreover, key measures address not only removal of contamination once it occurs but also the adoption of preventative action to limit the likelihood and consequences of any event.

Despite these successes there remain certain questions around both the coverage and implementation of EU law. Key issues relate to the following issues.

- No EU policy sets out to strategically address the issue of soil contamination, in the way for example the Water Framework Directive seeks to for water issues. The water acquis does offer indirect protection for soils but only in so far as contamination is causing a failure to meet EU legal requirements for water bodies. In such circumstances remediation solutions will be aimed at addressing the water contamination, not necessarily addressing the underlying soil threat. For example, soil might be sealed to avoid contamination reaching a water course.
- Historic contamination i.e. that which predates key EU laws such as the Environmental Liability Directive is not addressed within EU law specifically – although in some instances EU funds can be used for remediation and state aid guidelines do permit use of Member State funding for remediation where no liable party can be found. Contamination originating before the entry into force of a given policy is, therefore, less comprehensively addressed than current or future incidents. Linked the question of historic contamination is the question of orphan sites i.e. where no liable party can be identified or held liable for a historically contaminated sites.
- There are issues around the definitions of land versus soil within the EU aquis. In some measures the term land is used implicitly to imply soil protection, however, this fails to recognise the intrinsic value of soil in particular in light of the lack of an overarching policy at EU with clear definitions. For example, remediation can take a number of forms and commonly the least cost solution is the removal of contaminated soils and replacement that will protect the land but not the soil in situ.
- The absence of a instrument framing the needs, issues and targets for soil protection means that soil issues are less prominent in key measures. For example, water laws can be integrated, cross referred to and reinforced in measures such as IED or ELD. This is not possible for soils and nor are their clear rules as to the end point to be achieved for soils. This risks the deprioritisation of soil issues due to a lack of a clear, consistent position at EU level.

6.4.1 Review of Key Issues and Potential Gaps

Within the review of nationally initiated policy instruments adopted by Member States²⁸ in relation to soil protection the following issues were identified as of interest. These are examined systematically in the sections below to understand the approach pursued by Member States.

- Whether a policy is in place that systematically addresses soil contamination and specifically point source contamination?
- Whether a register is in place to set out and record contaminated sites and whether this is linked formally to systematic remediation of contamination?
- Whether Member States have considered and put in place mechanisms to deal with historic contamination and specifically orphan sites where no liable party can be identified?

Policy addressing soil contamination

Following a similar pattern to the overarching policies cluster, a limited number of Member States have policies in place that explicitly deal with the question of land contamination and appear to do so holistically i.e. addressing questions of identification and remediation. For example, in Austria the Law on the Remediation of Contaminated Sites requires the prioritization of polluted sites according to the severity of risks. Priority classes indicate the urgency of implementing and a possible funding of remediation measures, as well as a limiting maximum rate of funding. The Law aims to ensure funding for the remediation measures and covers historically contaminated sites. In Germany the Federal Soil Protection Act deals with contaminated sites explicitly with the aim to protect and restore soil functions. In the Netherlands the Soil Protection Act has been in place since 1987 and focuses on the remediation of contaminated sites and sets out a programme of actions from research on standard and target values to setting out funding support and a knowledge program focused on understanding remediation techniques.

As indicated in the study by Ernst and Young (2013) within the soil contamination policies adopted at Member State level there are a number of different approaches applied in order to organise and prioritise use and remediation of contaminated sites. Commonly, some form of prioritisation based on risk posed by a given site – either linked to human health, potential for environmental damage or impact on flora and fauna – is applied. In some Member States the impetus to survey, and identify remediation need is also linked to development pressure i.e. through prioritisation of brownfield development sites and also directly triggered by planned changes in use. For example, under Denmark's national binding Act on Soil Contamination in order to receive a permit for a land use change that land should be surveyed to identify potential contamination.

In several Member States there are no apparent binding, policy instruments in place (based on policies in the inventory and previous analysis for the Commission) that go beyond EU requirements on waste and industrial installations. For example, in the case of Slovakia,

²⁸ This review was completed based on the inventory and supported by inputs from the expert group and use of historic studies when necessary ie where no contemporary data was available.

entries in the inventory focus more explicitly on agricultural land (although some contamination issues may be addressed in this context). In Ireland no binding instrument requiring action on contamination is in place that covers all land, although there is a requirement for the identification, risk assessment and remediation of historic mining waste sites. In Ireland non-binding guidance has been adopted setting out the recommended approach to the treatment of contaminated land - Guidance on the Management of Contaminated Land and Groundwater. This sets the strategic direction and outlining best practice for risk based assessment and remediation but is not linked to binding requirements except. Finally, it should be noted that for some Member States while no specific soil contamination law exists requirements are integrated into wider environmental protection requirements. For example, in Hungary rules on contamination are set out in the Act on the General Rules of Environmental Protection.

The identification, prioritisation and remediation of contaminated land is an area of policy making that is undergoing ongoing evolution. In several Member States key policy instruments have been recently revised or are under revision and/or development. In Poland important changes to soil contamination legislation have been finalised repealing the Regulation on Soil Quality Standards and adopting a new Regulation on Assessment of Land Contamination. The latter is a broad instrument that defines the stages of contaminated sites assessment, the type of activities considered to pose a risk to soil quality and reference methods for testing soil and ground contamination. In Portugal legislation is anticipated with a Proposal on a Contamination Prevention and Soil Remediation having been adopted. The policy aims to prevent harmful effects of soil contamination.

Finally, some Member States have been evolving the focus of their soil policies generally (see Chapter 4 on overarching policies). In line with this overarching shift there have been changes in the specific coverage and emphasis on soil contamination. For example the Covenant on Soil and Subsurface in the Netherlands has the 'objective to identify all sites that represent a risk to ecosystems or where there is a defined risk of diffusion/spreading of that contamination. Under this approach all Dutch competent authorities are asked to provide a list describing the sites, state actions taken to manage or mitigate the risks.

Register of contaminated sites and linked actions

Approximately fifty per cent of Member States appear to have in place a register of contaminated sites of some description, based on the information in the inventory and other linked sources²⁹. It should, however, be noted that the inventory only provides an indication of whether a register exists legally. It does not set out in detail the specifics of what precisely is covered, whether approaches are consistent, whether the inventory is fully populated and whether the focus is on proven contaminated sites or potentially contaminated sites. This information would be important in taking analysis and understanding forward in terms of the state of surveying and understanding of site contamination at Member State level. During discussions with Member State experts it was noted that the existence of a register cannot automatically be linked to proactive action on soil protection.

²⁹ During the analysis information from Ernst and Young (2013) was updated in collaboration with the Expert Group on Soil Protection to provide better understanding of the instruments in place.

For the Member State where no registers of contaminated sites could be identified it is often not the case that no action has been undertaken. In these cases, partial coverage by some form of register commonly exists. This may be the result of:

- The nature of the institutions in place tasked with undertaking the register. For example, in certain Member States where a decentralized approach has been adopted to the development and population of registers of contaminated sites information is noted to be partial or of differing levels of detail. This is the case in Spain where the Law on Waste and Polluted Soils sets out a requirement for an inventory but this is required to be populated by the Autonomous Communities.
- The emphasis on specific types of site within binding legislation. For example, in Ireland the coverage of contaminated site registration is partial due to a legal emphasis on the identification of historic sites contaminated by mining activities, binding requirements only require the identification of these sites and not other potentially/contaminated sites.
- Policy in this area being under development. For example in Portugal the Proposal on Contamination Prevention and Soil Remediation Legal Regime foresees the development of an Atlas of Soil Quality with information on contaminated and remediated sites.

In several Member States a complete register does not exist as a consequence of a clear decision process to follow a different approach to organizing and focusing on soil contamination. In the Netherlands an approach to an inventory of potentially contaminated sites was put in place but amended by the soil protection act in 2006 to emphasise a more risk based approach as the implementation of the inventory proved problematic.

Approach to historic contamination and orphan sites

Historic contamination is essentially contamination that predates laws requiring the clean-up of emissions to soil i.e. contamination that happened before the law was put in place. In some Member States this extends to a much earlier date than for the EU as a whole, for example in Austria legal obligations setting out state of the art mechanisms for preventing contamination were put in place in July 1989. An orphan site is essentially a site that has been contaminated, commonly historically (although it is possible if for some reason a current land holder or actor could not be held liable a new orphan site might be generated), where the liable party cannot be identified.

When trying to understand the approach to historic and orphan sites there are number of aspects that must be understood in terms of a regulatory regime:

- How is possible contamination identified? Hence the emphasis on registers of potentially contaminated sites, or lists of potentially contaminating activities.
- If contamination has been identified is there a legal obligation to remediate the site and based on what risk parameters or to what contamination threshold?
- How is liability for contamination on a site applied? I.e. who legally can be held responsible and to what extent?
- If no liable party can be found but contamination has been identified as is required to be remediated, how is this action funded?

Historic contamination and the treatment of orphan sites is, therefore, closely linked to the wider policy framework and conceptualization of risk linked to contaminated land and liability for contamination. It is also connected to the question of funding and available money to restore sites. Some Member States have chosen to deal with these issues by relying strongly on the link to development both urban regeneration and preferential planning rights applied to the use of potentially contaminated brownfield sites. This addresses the question of identification i.e. this is based on land use change and when a party wishes to bring a site back into use, and funding i.e. that funding may be provided by the state but this will also be linked to the added value gained by the developer. This is the case in Member States such as UK, Netherlands. The promotion of brownfield site and orphan site development is often linked to a de-prioritisation of greenfield development. The most clear example of this is in Germany's 2002 sustainable development strategy where focus on contaminated sites and orphan sites is linked to a goal to reduce the consumption of new land by 2020.

There are different examples of legal regimes in place for dealing with contamination and funding models. For example in Austria remediation is legally required once a site is identified. If a site owner or operator can prove they are not responsible for historic contamination they can receive funding support in part or wholly from the federal government. The funding available is linked to income from the application of a levy. Slovakia too has in place a system where by an Envirofund is provided for using penalties from linked to violations of environmental laws. 10 per cent of this fund is allocated to remediation activities primarily orphan sites. In Germany the concept of liability has been extended to the land owner, not just the liable part for the pollution. However, there still exist challenges in particular linked to funding remediation of historic contamination by the state in particular linked to state owned industries. In most Member States or municipality lead funding of some form is available. However, this may be limited to certain types of contaminated site, for example in Lithuania it is focused on orphan waste sites.

6.5 Comparing Coverage of EU and National Policies – Outstanding Questions and Conclusions on Policy Coverage

Table 6.4 below summarises the key issues identified at EU level, the national policies in place and the outstanding issues that remain. Importantly, there is an apparent issue around coordination and integration of soil protection issues. While this is addressed within some Member States this is not addressed consistently. Moreover, there is a need for integration at EU level and also integration of EU measures and national implementation of EU policies.

Importantly, addressing key gaps identified at the EU level is not as simple as having a policy in place for example to address historic contamination. As demonstrated by Member State approaches effective policy in this area is about having in place a coherent set of rules defining the role of soil, liability and responsibilities for remediation, monitoring and thresholds. Without this wider policy infrastructure it is difficult to address the gaps identified, i.e. orphan sites and historic contamination.

Finally, an important point to note is that policy at the national level remains dynamic in this area. Evolutions in thinking around the role of soils and the services they provide to society should be examined further. Remediation activities are closely linked to availability of state funding and the broader development needs of growing economies. Further investigation is

needed to understand how these issues can be brought together in the context of future European and national priorities and the availability of funding to achieve such ends.

Table 6.4 Comparing EU Gaps to Coverage by Member States

EU Level Issue/Gap	Summary of National Approaches	Outstanding Issues
No overarching rules or principles that cover the identification, risk assessment and remediation of contaminated sites.	Member State approaches are mixed. Some Member States have apparently clear and holistic policies covering both aspects of identification, prioritisation of remediation and setting thresholds for contaminants. In other Member States coverage is partial. This is an evolving area of policy focus and different approaches to targeting policy are under development in a number of Member States.	There is no coordinated approach setting out the baselines and acceptable conceptualization of the approach to soil contamination.
No clear targets or priorities on soil contamination limiting the ability to integrate soil contamination concerns into wider policy.	Some Member States have policies in place that appear to address the question of soil contamination in a holistic way. However, not all have these measures, and not all have legally binding requirements.	No consistent rules on integration of soil issues. Further investigation is needed into national soil policies and the prioritisation of soil issues to understand how to ensure integration.
No clear approach to the identification of contaminated sites including historic contamination	Approximately fifty per cent of Member States have in place some form of register of contaminated sites, or potentially contaminated sites. However, further investigation is needed to understand if these provide a basis for identifying historic contamination. In some Member States identification of historic sites is linked to land use change and development of sites. It should be noted that this approach has been abandoned in some Member States as it proved problematic	There is no systematic basis for identification of historic pollution issues. However, some Member States have found the register approach to prove a challenge. In addition presence of a register does not ensure quality or that it is updated regularly. Therefore a need for more detailed investigation into the benefits and limits.
No clear rule on the issue of orphan sites and how these can be dealt with, although state aid guidelines would suggest that implicitly national governments can intervene when no liable party can be identified.	Orphan sites are linked closely to the question of liability and who legally must pay for remediation. In Member States liability for land contamination is defined differently. In addition, in many Member States there is also an issue of contamination of historic, state owned sites.	There appears to different approaches to liability and funding in Europe. This is strongly linked to resolving the question of both identification of historic contamination and then who can be held liable. Any future approach to addressing this question would need to resolve what funding can be made available and how this should be prioritised against other environmental needs.

7 Diffuse Contamination and Water Management

7.1 Conceptualisation of the Policy Cluster

This cluster is centred around pressures on the environment, i.e. pollution and impacts for water quality and quantity, which are a consequence of land and soil management and the combination of soil threats. As a result the relationship to the threats facing soils and the functions of soils needs to be interpreted based on the consequential relationship the relevant pressures. Clearly there is a direct relationship with soil contamination, but this is not clear-cut and there are further interactions.

Diffuse pollution is effectively defined as pollution that is not point-source (which is easier to be precise about). Therefore, it includes pollution linked to some agricultural practices (such as fertilizer application and pesticides), much urban pollution (inputs from roads, etc) and pollutant deposition from the atmosphere. It can also include pollution from specific sites, such as input of pollutants from uncontained landfills or poorly managed industrial sites (or during industrial accidents).

7.1.1 Policies and Issues Covered in the Cluster

Diffuse pollution is controlled or managed by a range of policies. Some seek to avoid the pollution occurring, some to reduce the level of that pollution and some to reduce the harmfulness of the pollution in the environment.

It is important to stress that some policy measures are adopted to control diffuse pollution to the environment, but several are adopted to control diffuse pollution to water. For the former, soil protection is, therefore, included in the scope of the instrument. For the latter, soil protection may be an additional outcome derived from protecting water.

There are policies directly aimed at activities interacting with soils. These include: the Sewage Sludge Directive, IED, Seveso III, Landfill Directive. Several of these aim to prevent or minimize soil (and water) contamination. The Sewage Sludge Directive includes quality criteria for specified contaminants. However, the other instruments are wider-ranging in scope and ought to capture common as well as locally important contaminants. The Waste Framework Directive sets objectives for management of waste, including regulatory frameworks for waste management sites. With regard to waste disposal Art. 13 requires that Member States shall take the necessary measures to ensure waste management is undertaken, inter alia, without risk to soils. The directive allows for minimum standards (Art 27) to be adopted to deliver this objective and permits (Art 23) for waste management sites should address this issue also.

There are policies aimed at reducing soil contamination from more distant sources of pollution. This is most notably seen with the NECD (and supported by other directives controlling air pollution). The NECD has particular objectives to reduce soil acidification and eutrophication.

Measures aimed at water protection may help to protect soils in so far that pollutants causing soil contamination are directly or indirectly captured by water protection measures. There is not a guarantee that this is the case. Further once water protection is achieved, the policies would not deliver any additional protection if needed for soils.

Note that the Drinking Water Directive was originally 'linked' to this cluster, but is not now included.

This is a product quality directive, setting levels of quality for consumers. Protection of drinking water sources (linked to diffuse pollutants such as nitrates and pesticides) is afforded by other measures, such as the Water Framework Directive which specifically includes protection of drinking water zones. The links to soils are best addressed through the analysis of these instruments i.e. the Water Framework Directive.

7.1.2 Links to Other Key Clusters

There are important links to other clusters, both conceptually and with specific policies. These are:

- Industry cluster: industry is one source of diffuse pollution and specific policies (IED, Seveso III) director at industry include provisions to address diffuse pollution and its impacts on soils.
- CAP: agricultural activity is an important source of diffuse pollution. Several policies considered in this cluster are directed at the agricultural sector. Further, agricultural policies may make direct cross-links with policies aimed at controlling diffuse pollution (e.g. cross-compliance provisions under the CAP regarding the Nitrates Directive).

7.1.3 Most Relevant Soil Threats and Functions

Threats

Of the threats identified, the following are most relevant to this cluster (summarized in the table below):

- Contamination – diffuse
- Erosion - water
- Acidification
- Soil sealing

The first threat is the subject of this cluster, so its relevance is obvious and further discussion here is redundant. The relationship of the others to the cluster varies in character. Acidification is one type of diffuse pollution and, therefore, it is effectively a sub-set of the cluster. Viewed in terms of sources of pollutant, it is a mixture of point and diffuse pollution.

Soils eroded by water are diffuse pollutants to water, where they are direct pollutants (sediments) and indirect pollutants as they may contain bound chemicals, such as nutrients and pesticides, which cause water contamination. Instruments adopted to address diffuse water pollution may, therefore, help prevent such erosion. Thus the link with the cluster is

that these same instruments may address other forms of diffuse pollution which may contribute (indirectly) to reducing soil contamination.

Soil sealing affects the way that water is transported across surfaces. Where sealed surfaces are fully sealed, further diffuse contamination of the sealed soils is prevented. However, changed water movements may affect contamination patterns of surface waters. Therefore, measures to address these (to meet water objectives) may affect the degree of sealing.

It is also important to note that two further threats interact with the instruments included in this cluster and should be mentioned. These are flooding and loss of soil biodiversity. The latter is relevant as it is affected by diffuse pollution, so is indirectly affected by measures that directly or indirectly address diffuse pollution. Flooding is the subject of the Floods Directive (and Water Framework Directive), but these interactions are not generally interactions with measures addressing diffuse pollution itself. Therefore, these two threats are not included in the table below, but are included later in this cluster analysis as individual instruments are highlighted in order to ensure all key issues are covered

Functions

Diffuse pollution can impact on a variety of soil functions (see table below). The extent and type of impact depends on the severity of the diffuse pollution and its type. For the purposes of this overview, three types of pollution can be distinguished:

- Acidifying substances.
- Excess nutrients leaching into soil and water courses.
- Toxic substances (including pesticides, heavy metals, organic toxins, etc.)

Each of these may come from different sources.

The primary potential impacts of acidification are on the carbon pool, biological functions (such as hosting biodiversity) and nutrient dynamics. Soil pH is critical to these functions and diffuse pollution from acidifying substances affects the pH of soils with little or no acid neutralizing capacity.

Nutrients are not a contaminant per se, however, when mobilized or over application in one local can become leached and inappropriately transferred to other soils or water courses. Nutrients arise from inputs of fertilisers, sludge, etc., as well as deposited nitrogen in acid deposition. Adding nutrients to soils disrupts natural nutrient dynamics as well as functions depending on this, such as biomass production and hosting biodiversity.

Pollution by toxic substances has a variety of potential impacts. Most notably it will impact on biomass production and hosting biodiversity, in ways that are likely to be selective depending on the individual toxic substances present. Soil contamination is also a major constraint on human activities. Even low level contamination can restrict the applicability of soils for agricultural use. Soils contamination is also a significant constraint on housing development in particular, unless costly remediation measures are undertaken.

Diffuse pollution, therefore, can cause widespread disruption to soil functions. Low level diffuse pollution can subtly alter a function, while high levels of pollution can disrupt a function completely. It is important to recognize the sliding scale of impact diffuse pollution

can have in interpreting policies affecting this pressure. As noted above (and below) EU policies relating to diffuse pollution impacts on soil may be indirect in their effect. Therefore, while they might contribute to tackling a problem, they might not eliminate it altogether. Thus the policies may contribute to protecting soil functions to differing degrees.

7.2 Integrated Assessment of the Key Policies within the Cluster

7.2.1 Coverage of Soil Threats across the Cluster

Table 7.1 below summarises the ways in which the different instruments addressed in this cluster interact/address specific threats to soils. The threats included are:

- Acidification from atmospheric deposition. NECD specifically targets this threat and IED is a supporting instrument (though in this case see the industry cluster).
- Contamination – Diffuse. This threat to soils is directly addressed by IED and waste management law. It is indirectly addressed by much EU water law which seeks to address different aspects of diffuse pollution to water and, therefore, has an indirect consequence for protection of soils.
- Erosion – water. This is only indirectly encompassed by the legislation included in this cluster, notably the Water Framework and Floods Directives, where measures can lead to reductions in sedimentation to water and knock-on benefits for soil erosion.
- Flooding/landslides. This is most notably captured by the Floods Directive and taken into account by the WFD.
- Loss of soil biodiversity. This is captured by the legislation covered in so far that the legislation addressed diffuse pollution and that this diffuse pollution is a threat to soil biodiversity. Thus there are potential positive effects from much of the legislation included in this cluster, but the effects are indirect.
- Soil sealing. Sealing is sometimes a measure to prevent diffuse pollution (e.g. in industrial installations) and it is also an issue in urban areas affecting water movement and consequences for diffuse pollution to water. Therefore, the interaction with the policies in this cluster is complex and highly location specific.

In conclusion, the threats to soils addressed by the instruments in this cluster and usually, at best, addressed in a limited way by those instruments. Only soil acidification is addressed by EU law in a widespread way. Other threats are either addressed only in localized situations (e.g. an industrial site) or are indirectly addressed (e.g. as a knock-on benefit to water protection).

The table below provides a summary of how each instrument identified as relevant to diffuse soil contamination contributes to tackling the soil threats identified earlier as relevant to this cluster.

Table 7.1 Summary of Soil Threats addressed by the Diffuse Contamination and Water Management Policy Cluster

Policy	Water Framework Directive	Floods Directive	Ground-water Directive	Nitrates Directive	Priority Substances Directive	Pesticides Framework Directive	Sewage Sludge Directive	Industrial Emissions Directive	Seveso III Directive	Landfill Directive	Waste Fr. Directive	NECD
Acidification	Addressed by WFD	N/A	N/A	N/A	N/A	N/A	N/A	IED controls some acidification sources	N/A	N/A	N/A	The principle instrument directly aimed at the pressure
Contamination - Diffuse	Key instrument to control diffuse pollution in water (including routes to water)	Some measures may interact with diffuse pollution routes	Contributing instrument to WFD	Key instrument tackling nitrogen pollution from agriculture applied directly to soils	Contributing instrument to WFD	Key instrument tackling pesticide pollution from agriculture	Key instrument tackling pollution from sludge use in agriculture applied directly to soils	Diffuse pollution from installations should be managed but is more challenging to address	Aims to prevent accidents and manage pollution if accidents occur	Should ensure containment of pollution and so prevent diffuse pollution	Waste management measures should take account of soil protection	A key instrument to tackle diffuse pollution from acidifying substances
Erosion - water	WFD treats sediments as a pollutant and so, if these affect water body status, they should be controlled, helping to reduce erosion	Promotion of natural water retention measures and good management of flood waters can reduce loss of soils	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Policy	Water Framework Directive	Floods Directive	Ground-water Directive	Nitrates Directive	Priority Substances Directive	Pesticides Framework Directive	Sewage Sludge Directive	Industrial Emissions Directive	Seveso III Directive	Landfill Directive	Waste Fr. Directive	NECD
Flooding/ landslides	WFD seeks to integrate flood management within wider river basin management	Key instrument to manage floods, including promotion of natural water retention measures consistent with some soil protection objectives	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Loss of soil biodiversity	Key instrument to control diffuse pollution in water and so may contribute to soil biodiversity protection	Promotion of natural water retention measures may contribute to soil biodiversity	Contributing instrument to WFD	Key instrument tackling nitrogen pollution and so may contribute to soil biodiversity protection	Contributing instrument to WFD	Key instrument tackling pesticide pollution and so may contribute to soil biodiversity protection	Key instrument tackling pollution from sludge use and so may contribute to soil biodiversity protection	Diffuse pollution from installations should be managed under IED but is more challenging to address. Hence potential interactions with soil biodiversity.	N/A	Should ensure containment of pollution and so may contribute to soil biodiversity protection	Waste management measures should take account of soil protection and so may contribute to soil biodiversity protection	A key instrument to tackle diffuse pollution from acidifying substances and so may contribute to soil biodiversity protection
Soil sealing	Where sealed land affects inputs of pollutants to	Sealing is a major contributor to flood	N/A	N/A	N/A	N/A	N/A	Sealing might be used by installations to prevent input	Sealing might be used by facilities	Sealing is effectively a result of contain-	N/A	N/A

Policy	Water Framework Directive	Floods Directive	Ground-water Directive	Nitrates Directive	Priority Substances Directive	Pesticides Framework Directive	Sewage Sludge Directive	Industrial Emissions Directive	Seveso III Directive	Landfill Directive	Waste Fr. Directive	NECD
	water bodies affecting status, the WFD would seek to address this.	impacts and the FD encourages these to be addressed						of toxic substances to soils as required by IED	as part of a strategy to manage accidents required by the directive	ment of landfill sites required by the LD		

7.2.2 Coverage of Soil Functions across the Cluster

Diffuse pollution contamination in soils negatively affects a range of soil functions. However, whether the function is affected and the extent to which it is affected varies depending on the type of pollution and its location. As noted in the previous section, the instruments covered in this cluster are often indirect in their effects on tackling diffuse pollution to soil or are localized in their effects (the exception being controls to tackle acidification). As a result, the interaction between these instruments and particular soil functions is indirect. The functions relevant to this cluster are:

- Carbon Pool. Soil carbon may be negatively affected by diffuse pollution and, therefore, measures tackling this threat, such as NECD, are relevant.
- Platform for Human Activities. Human activities may be inhibited by soil contamination. These activities range from agricultural production to housing and other construction activities. How these human activities are affected depends on the nature (type) and extent of contamination. Diffuse pollution is an important source of such pollution and instruments controlling (directly or indirectly) such pollution provide the basis for protection of this soil function.
- Biomass production. Soil contamination can have an indirect effect on biomass production. In so far that the instruments in this cluster tackle (directly or indirectly) diffuse pollution causing such contamination, they may contribute to maintaining this soil function.
- Hosting biodiversity. Soil contamination can have an indirect effect on hosting soil biodiversity. In so far that the instruments in this cluster tackle (directly or indirectly) diffuse pollution causing such contamination, they may contribute to maintaining this soil function.
- Storing, filtering and transforming nutrients and water. The principle interaction of the instruments in this cluster with this soil function is with nutrients. Nutrients are one type of diffuse pollution and are significant diffuse pollutants threatening water bodies (and hence the focus of several instruments).

In conclusion, the interaction between the instruments in this cluster and these soil functions are largely indirect and the degree to which particular functions are safeguarded is hard to determine. The exception (in specific cases) is the function of soils being a platform for human activities as instruments such as the Sewage Sludge Directive or IED have specific objectives to maintain soil quality for human activities.

Table 7.2 below provides a summary of how each instrument identified as relevant to diffuse soil contamination contributes to supporting the soil functions identified earlier as relevant to this cluster.

Table 7.2 Summary of Soil Functions addressed by the Diffuse Contamination and Water Management Policy Cluster

Policy	Water Framework Directive	Floods Directive	Groundwater Directive	Nitrates Directive	Priority Substances Directive	Pesticides Framework Directive	Sewage Sludge Directive	Industrial Emissions Directive	Seveso III Directive	Landfill Directive	Waste Framework Directive	NECD
Carbon Pool	Meeting WFD objectives may address pollution affecting soil carbon	Controlling floods affects soil oxygen and so affects soil carbon	N/A	N/A	N/A	N/A	Sludge is a source of some carbon in agricultural soils, so directive can contribute to this	A key instrument controlling emissions which may negatively affect soil carbon	N/A	N/A	N/A	The key instrument controlling emissions which may negatively affect soil carbon
Platform for Human Activities	Meeting WFD objectives may address pollution which affects soil quality and so affects the human activities supported	May contribute to soil quality by managing water movement and so affects the human activities supported	A supporting instrument to the WFD	N/A	A supporting instrument to the WFD	Controls biocide inputs to soils and so can contribute to maintain quality for different human activities	Controls toxic inputs in sludge to soils and so can contribute to maintain quality for different human activities	Controls pollutant inputs from installations to soils and so can contribute to maintain quality for different human activities. Particular emphasis in restoring site after use.	Manages pollutant inputs from accidents to soils and so can contribute to maintain quality for different human activities.	Should prevent inputs of pollutants in contained landfills and so can contribute to maintain quality for different human activities.	Controls pollutant inputs from waste management activities to soils and so can contribute to maintain quality for different human activities.	N/A
Biomass production	Controls diffuse pollution in water and	Promotes natural water retention	Contributing instrument to WFD	Tackles nitrogen pollution and so may	Contributing instrument to WFD	Tackles pesticide pollution and so may	Tackles pollution from sludge use and so	N/A	N/A	N/A	N/A	Tackling diffuse pollution from

Policy	Water Framework Directive	Floods Directive	Groundwater Directive	Nitrates Directive	Priority Substances Directive	Pesticides Framework Directive	Sewage Sludge Directive	Industrial Emissions Directive	Seveso III Directive	Landfill Directive	Waste Framework Directive	NECD
	so may contribute to biomass production	measures may contribute to biomass production		contribute to biomass production		contribute to biomass production	may contribute to biomass production					acidifying substances will contribute to biomass production
Hosting biodiversity	Controls diffuse pollution in water and so may contribute to soil biodiversity protection	Promotes natural water retention measures may contribute to soil biodiversity	Contributing instrument to WFD	Tackles nitrogen pollution and so may contribute to soil biodiversity protection	Contributing instrument to WFD	Tackles pesticide pollution and so may contribute to soil biodiversity protection	Tackles pollution from sludge use and so may contribute to soil biodiversity protection	Controlling diffuse pollution from installations might contribute to soil biodiversity protection	N/A	Should ensure containment of pollution and so may contribute to soil biodiversity protection	Waste management measures should take account of soil protection and so may contribute to soil biodiversity protection	Tackling diffuse pollution from acidifying substances will contribute to soil biodiversity protection

7.2.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection - Understanding the Relevance and Limits of Policy within the Cluster

The following Table 7.3 provides an assessment of the strengths, weaknesses, opportunities and threats of the individual policies in so far as they address the diffuse pollution threat affecting soils. Each instrument has its own strengths, weaknesses, opportunities and threats in relation to the specific objectives and scope of that instrument, but the strengths, weaknesses, opportunities and threats of that instrument in relation to soil protection may be different. This is most evidently the case where the instrument is not aimed at soil protection.

Overall, while there is a wide range of instruments contributing to protecting soils from diffuse pollution, the strongest instruments are either aimed at protecting water. Alternatively, where strong instruments include soil protection, this aspect is often overshadowed by another aspect of the environment or the instrument focuses on very defined activities.

The water acquis includes a range of instruments, but centres around the Water Framework Directive. This is very broad in scope and contains extensive provisions for tackling diffuse pollution to water. The weakness of the water acquis is, however, poor implementation by Member States. Further, a forthcoming review in 2018-19 may present a threat to the provisions as the prospect of future infringement looms larger. Further, at the end of the day, if measures protect water, that is sufficient. Objectives for water bodies are based on water status. The relationship between good chemical status and levels of soil contamination is not clear and, in particular, relation to any specific soil objectives. Soil protection is a bonus, not an objective.

Legislation such as IED, waste management law, etc., includes specific soil protection objectives. However, it is not clear how well these are taken forward on the ground. While these, therefore, are 'strengths', in some cases they remain 'opportunities'.

A key question to consider is whether there are important diffuse pollution issues affecting soils not addressed by the policies considered here. Perhaps the most important threats that are poorly addressed are the historic and the future. Historical contamination is a serious problem in many Member States. EU law has tended to avoid setting requirements in relation to this, not least because of the cost. Where it is included, this is largely as a reason for an exemption to provisions. There is also concern about emerging pollutants. Some legislation includes assessment of new pollutions (e.g. the watch list in water law), but some may prove hard to regulate and many are diffuse in character.

Essentially a framework for understanding diffuse pollution pressures and their risks to soil functions is missing, along with an assessment of what measures would be needed to address these pressures. If these were to be identified, it would be possible to determine how far measures adopted for water protection are, or are not, sufficient for soil protection and also to provide concrete input into the design of measures to include with IED permitting, waste management permits, etc. However, such a framework of assessment is akin to the WFD, but for soils, and this would be hard to obtain approval for from Member States.

Table 7.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection: Diffuse Contamination and Water Management Policy Cluster

- **Strengths** - what does the policy cover well in relation to soil protection?
- **Weaknesses** - are there aspects limiting the protection afforded?
- **Opportunities** - are there any potential opportunities linked to the legislation which could benefit soil protection (in the context of this study, opportunities are understood as arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?
- **Threats** - are there any potential elements within the policy that might put at risk the protection of soils?

Policy	Strengths	Weaknesses	Opportunities	Threats
Water Framework Directive	<ul style="list-style-type: none"> • Encompasses all diffuse pollution which could affect water body status • Requires adoption of measures necessary to tackle that pollution • Strong monitoring, assessment and reporting provisions • Cyclical adaptive management process • Comprehensive in geographic scope 	<ul style="list-style-type: none"> • The objective of the WFD is water protection defined by water body status – soil protection is indirect • MS implementation to date is not strong – so delivering water protection is proving difficult (let alone wider issues such as soil protection) 	<ul style="list-style-type: none"> • Encourages integrated catchment management – so opportunity to bring in wider environmental thinking • Encourages active stakeholder participation – useful for working with farmers and including soil protection • The WFD 2018 review could provide an opportunity to address soil ‘thinking’ within water protection approaches 	<ul style="list-style-type: none"> • Poor implementation by MS • The WFD 2018 review might present a risk to the level of protection afforded by the WFD
Floods Directive	<ul style="list-style-type: none"> • Encourages integrated flood management planning • Encourages use of natural water retention measures which are supportive of some soil functions • MS implementation is relatively positive 	<ul style="list-style-type: none"> • Does not require a particular level of flood protection • Does not direct specific protection measures on the ground 	<ul style="list-style-type: none"> • Will be included in 2018 review and likely to include consideration of links to other policy fields 	<ul style="list-style-type: none"> • None?
Groundwater Directive	<ul style="list-style-type: none"> • Sets additional substance standards to support WFD – clear and precise • Easier to determine MS compliance 	<ul style="list-style-type: none"> • Some issues with MS compliance • Only limited number of substances directly of interest to soil protection 	<ul style="list-style-type: none"> • Will be part of WFD review, but unlikely to be much change 	<ul style="list-style-type: none"> • None?
Nitrates	<ul style="list-style-type: none"> • Clear provisions on control nitrogen application in 	<ul style="list-style-type: none"> • Controls only apply where waters are at specified risks – so not necessarily 	<ul style="list-style-type: none"> • Implementation of ND may not be sufficient to meet WFD objectives – 	<ul style="list-style-type: none"> • ND remains unpopular with some MS/farmers, so could be at risk if

Policy	Strengths	Weaknesses	Opportunities	Threats
Directive	<ul style="list-style-type: none"> agriculture Accounting measures to support enforcement Extensive exchange of experience, e.g. on action plans Direct links to CAP provisions (cross compliance) Some activities addressed may contribute to other soil problems such as erosion 	<ul style="list-style-type: none"> delivering soil protection Extensive use of derogations for some MS 	<ul style="list-style-type: none"> so additional measures may be required ND requires its effectiveness to be assessed – may help inform its improvement 	<ul style="list-style-type: none"> opened for review WFD review might raise questions on the ND.
Priority Substances Directive	<ul style="list-style-type: none"> Sets additional substance standards to support WFD – clear and precise Easier to determine MS compliance 	<ul style="list-style-type: none"> Some issues with MS compliance Only limited number of substances directly of interest to soil protection 	<ul style="list-style-type: none"> Watch List may lead to subsequent extension of list of substances covered Will be part of WFD review, but unlikely to be much change 	<ul style="list-style-type: none"> None?
Pesticides Framework Directive	<ul style="list-style-type: none"> Provides clear regulatory framework for pesticides – marketing and use Emphasis is on health and environmental protection including soils Direct links to CAP provisions (cross compliance and RD) 	<ul style="list-style-type: none"> Enforcement is difficult as users can avoid provisions and this can be difficult to detect 	<ul style="list-style-type: none"> Strong lobby from water companies keeps pressure on (due to costs to these companies) WFD review might increase emphasis on addressing pesticides 	<ul style="list-style-type: none"> Strong industry lobby supporting pesticide use
Sewage Sludge Directive	<ul style="list-style-type: none"> The directive sets clear standards for quality of sludge applied to soils Standards are achievable 	<ul style="list-style-type: none"> The directive is old and revision has stalled 	<ul style="list-style-type: none"> The directive is overdue for revision – so could be revised to update standards and address additional soil protection measures if needed 	<ul style="list-style-type: none"> There has been consideration to repeal the directive. It is not clear what would replace the level of protection to soils it provides
Industrial Emissions Directive	<ul style="list-style-type: none"> Covers diffuse as well as point source pollutants from industry Covers all environmental impacts, including soils Requires full environmental assessment Requires operation to BAT Establishes clear enforcement 	<ul style="list-style-type: none"> Most regulators focus on point source emissions – diffuse sources harder to identify BAT is harder to define for many diffuse sources and so regulators find it hard to set out some permit conditions Monitoring is difficult and it is easier for operators to hide non- 	<ul style="list-style-type: none"> If soil protection is identified in the BREF process as a Key Environmental Issue, as BREFs develop further, consideration of diffuse pollution and soil protection may become more evident IMPEL and other exchange platforms begin to examine wider issues 	<ul style="list-style-type: none"> There is not a threat to the provisions themselves – just a threat that full accounting for diffuse pollution in permitting and enforcement might take some time to filter through

Policy	Strengths	Weaknesses	Opportunities	Threats
	<p>procedures</p> <ul style="list-style-type: none"> Provisions for return of site condition after use Is flexible in allowing MS to add in additional elements (some include some soil spreading activities) 	<p>compliance/pollution incidents, etc.</p>		
Seveso III Directive	<ul style="list-style-type: none"> Emphasis on accident planning and management Focus on release of most dangerous substances All environmental impacts, including soils, covered 	<ul style="list-style-type: none"> Accidents still happen, but otherwise there are no obvious weaknesses 	<ul style="list-style-type: none"> None? 	<ul style="list-style-type: none"> None?
Landfill Directive	<ul style="list-style-type: none"> Provisions for containment protect soils Relatively easy to determine compliance for regulated landfills 	<ul style="list-style-type: none"> Considerable non-compliance in some MS – soils remain at significant risk Containment is, itself, a form of sealing 	<ul style="list-style-type: none"> Further emphasis on enforcement is likely 	<ul style="list-style-type: none"> None – the provisions are extremely unlikely ever to be watered down
Waste Framework Directive	<ul style="list-style-type: none"> Contains clear provision for waste management facilities to operate taking account of soil protection Standards may be set to ensure soil protection 	<ul style="list-style-type: none"> It is unclear if the soil protection provisions have been taken into account in regulatory decisions at MS level 	<ul style="list-style-type: none"> The provisions could be used to develop guidance (or similar) at EU level to drive soil protection 	<ul style="list-style-type: none"> None? The current legislative review in the circular economy package does not affect the soil protection provisions
NECD	<ul style="list-style-type: none"> Sets national limits on emissions based on degree of impact on receiving soils Overall compliance is reasonable and limited non-compliance remains Covers all key acidifying and eutrophying substances affecting soil functions 	<ul style="list-style-type: none"> Some remaining non-compliance Further reductions in NO_x needed. Significant problems in tackling ammonia emissions 	<ul style="list-style-type: none"> New Directive offers the opportunity to monitor Mercury emissions and adopt limits in future depending on scale and risks of reported emissions 	<ul style="list-style-type: none"> Adoption of new directive has led to provisions being shifted with particular concerns regarding the level of Ammonia emission reduction demanded

7.3 Integrated Assessment of the Diffuse Pollution and Water Management Policy Cluster

Diffuse soil pollution encompasses several issues such as acidification, contamination, erosion, flooding, loss of soil biodiversity and soil sealing. As a result it is a significant threat to several soil functions, including carbon pool, platform for human activities, biomass production, hosting biodiversity and storing, filtering and transforming nutrients and water.

While there are diverse instruments contributing to protecting soils from diffuse pollution, the strongest instruments are either aimed at protecting water, or, where strong provisions do include soil protection, this aspect is often over-shadowed by another aspect of the environment. While many different aspects of diffuse pollution to soil are potentially addressed by the range of instruments in this cluster, a framework for understanding and addressing diffuse pollution pressures and their risks to soil functions is missing, along with an assessment of what measures would be needed to address these pressures.

With regard to the extent of coherence across the cluster, it is important to note that coherence is largely lacking if one examines coherence by the extent to which instruments aim to address diffuse pollution to soils and the measures to be adopted under those instruments. Only selected instruments are actually aimed at addressing soil diffuse pollution. Apart from NECD, these are focused on individual activities (industry, waste management, sludge, pesticides) rather than limiting broader environmental emissions. These instruments have general objectives for soil protection, but 'precise' soil objectives/measures are limited and concern issues such as site restoration under IED and quality under the Sewage Sludge Directive. The water legislation is largely coherent in itself, but is not aimed at soil protection. The statement of limited coherence of the instruments in relation to soil protection should not, however, be interpreted as incoherence, i.e. that there are contradictory or problematic/conflicting interactions between the instruments. It is more a case of there being a lack of coordination and coherence to address questions of diffuse pollution related to soil rather than existing measures conflicting with this goal.

As a result, it is clear that there are major gaps in the coverage that the instruments in the cluster provide to address soil diffuse pollution. Where legislation includes specific objectives for soils, these provisions are often stated in very general terms. Further, for broad policies such as IED it is not clear how seriously soil protection is taken in regulatory decisions compared to other more high profile environmental issues i.e. whether provisions are prioritised during implementation. Clearly, water legislation does not provide sufficient coverage of soil protection. Indeed if water protection can be achieved without protecting soils, this would be consistent with those instruments. Pesticides and sludge legislation does deliver some protection.

However, there is no policy framework that assesses the extent of soil diffuse pollution as a problem, which soil functions are most at risk and what measures would need to be taken. The different types of diffuse pollution, its sources, the effects it has and possible measures to be taken can be viewed as pieces of a jigsaw puzzle. Current instruments provide some pieces of that puzzle, but many pieces are not included by EU level instruments and no instrument requires the pieces to be put together to deliver protection of soils from diffuse pollution.

There are limited future opportunities to address this deficiency. The challenges associated with the current revision process for the NECD illustrate the difficulties of delivering increased protection. The most important future opportunity will be the review of the Water Framework Directive and related water law in 2018. However, there would need to be an intensive push and political will to get issues taken seriously beyond those directly related to water management i.e. protecting soil for its own functionality and value. Individual policy reviews (pesticides, waste, etc.) will offer opportunities to address individual substances, etc., but there is no obvious opportunities within existing policy processes to address the overarching deficiency in policy coverage to address diffuse pollution to soils.

7.4 Comparing EU Level Issues and Gaps to Member State Policy Action

Based on the cluster analysis a number of issues and challenges associated with the delivery of soil protection based on EU policy requirements can be identified for the cluster on industrial and point source contamination. These are summarised below Box 7.1. As for the cluster on overarching policies, EU policy does not act in isolation to regulate Europe's environment. This section examines the extent to which nationally initiated policies set out in the inventory appear to address the gaps and issues that remain at the EU level and whether comparable approaches apply across the Member States. Remain issues and questions that remain for protecting Europe's soils are then set out.

Box 7.1 Key Issues and Potential Gaps in EU Policy for Further Investigation

The analysis of EU policy identified that a number of instruments contribute to protecting soils from diffuse pollution at EU. However, a number of potential issues emerge. These are as follows:

- The strongest instruments are either aimed at protecting water. If water protection can be achieved without protecting soils, this would be consistent with the goals of these instruments.
- A framework for understanding, prioritising and addressing diffuse pollution pressures and risks to soil functionality is missing. There appears a lack of coordination and coherence between instruments examined in the cluster and the extent to which instruments aim to address diffuse pollution of soils.
- When policies do contain soil focused objectives these are stated in very general terms and during implementation these may be over-shadowed by other aspects of environmental protection with more specific targets and goals.

7.4.1 Review of Key Issues and Potential Gaps

In the Inventory there are more limited entries into the Wiki on nationally initiated actions on diffuse pollution. This is in part because some key tools for control of diffuse pollution fall within the implementation of EU laws. Many Member States flag the importance of addressing inputs from agriculture and point source emissions from waste, industrial sites and additions to land as a means of addressing diffuse pollution. This would be captured by EU laws for the most part – see cluster analysis in Chapters 4, 5 and 6. It was also noted by one

Member State that, while national measures are in place in part to address diffuse pollution, measures implementing EU law provide a higher level of environmental protection.

Where an overarching soil strategy or act is in place within a given Member State this commonly references diffuse pollution. As noted for Germany, for example, the coverage of such measures again tends to be the management of known contaminated sites and the spread of pollution. There is less emphasis on preventative action or limit inputs to soils. In the Netherlands diffuse issues are covered under national legislation but the emphasis is on EU led policies specifically linked to agricultural inputs to soil and their impacts on water quality.

Within some Member States the issue of diffuse contamination is highlighted within strategies focused on sustainable development, for example in Cyprus. In Sweden it is highlighted in the draft Strategy for Sustainable Land Use. However, no specific linked targets for addressing diffuse pollution could be identified based on the information in the Inventory.

There appears to be some national action in relation to nutrient and contaminant emissions to soils under specific circumstances. For example, Italy has binding measures linked the reuse of treated waste water in relation to crops contamination and soil salinisation and a Decree setting technical rules for agricultural use of manure and agricultural use of digestates. In Poland soil monitoring provisions were highlighted as important in addressing diffuse pollution in the form of the monitoring of arable soils' chemistry under the State Environmental Monitoring (a non-binding monitoring instrument of the chemistry of arable soils) which allows to assess the state of soils, to track changes and to identify the possible threats to agricultural soils.

As for other areas of soil protection policy the discussion on the way in which policy should deal with soil protection is ongoing. Several Member States (for example Denmark, Sweden) are undertaking debates on land use (Sweden) and in Denmark in particular a debate on inputs by farmers with further measures anticipated in relation to manure use in 2017.

7.5 Comparing Coverage of EU and National Policies – Outstanding Questions and Conclusions on Policy Coverage

At EU level both the lack of a strategic policy setting out needs or diffuse pollution management acting as basis for integrating concerns into wider policies and the emphasis on diffuse pollution delivery through policies where soil is not the priority were highlighted. At Member State level, while in some Member States there are high level references to diffuse pollution, i.e. in sustainable development strategies or environmental acts, specific policies focused on addressing diffuse pollution of soil are limited. It is flagged a number of times that the implementation of the EU acquis for agriculture, water protection and addressing point source contamination are the key tools for addressing diffuse pollution at national level.

In light of the emphasis on EU law at the national level when addressing diffuse pollution, the gap in terms of a clear framework for setting out soil issues and their integration into wider policy is important to highlight. Only at EU level, therefore, can the emphasis on the diffuse impacts and the soil component of wider policies for diffuse pollution be addressed, as it is EU instruments that are the primary vehicles at the national level.

8 Nature Protection, Land Use Planning and Soil Sealing

8.1 Conceptualisation of the Policy Cluster

This cluster is centred on a number of pressures on the natural environment and their impacts on soil through changes in land use. Within the policies addressed there are some dedicated aspects related to soil protection (e.g. soil sealing or flooding); however, the emphasis is likely to be much more fluid, depending on alternative priorities and the relative importance given to soil issues compared to other environmental issues.

8.1.1 Policies and Issues Covered in the Cluster

The cluster seeks to examine EU policy and legislation in place to prevent, limit, mitigate or compensate pressures on the natural environment and land and its impacts on soil. In terms of the activities causing impacts on soil protection, these include:

- Activities, plans or programmes linked to development operations;
- Changes in land use linked to agricultural, forestry, transport etc activities.

Within the scope of this projects, a list of seven EU policies was identified as covering priority measures linked to pressure on nature and land use. These cover several types of policy intervention.

Regulatory and non-regulatory instruments – Focused on ensuring nature protection in the form of species and habitats

- Habitats Directive (2007/60/EC)
- Birds Directive (2009/147/EC)
- EU Biodiversity Strategy 2020 (COM(2011) 244)

Regulatory instruments – Focused on determining whether projects or plans/programmes have environmental implications on soil

- Environmental Impact Assessment Directive (2001/42/EC)
- Strategic Environmental Assessment Directive (92/43/EEC)

Regulatory instruments – Focused on providing a framework approach to flood risk management

- EU Floods Directive (2007/60/EC)

Guidelines – Focused on preventing, limiting and remediating the effects of soil sealing

- Soil Sealing Guidelines (SWD(2012) 101)

8.1.2 Links to Other Key Clusters

There are important links to other clusters, which are:

- Overarching – Nature conservation (as relates to the Birds and Habitats Directives) is among the objectives of the 2014 – 2020 LIFE programme and the Soil Sealing Guidelines reference to the Thematic Strategy for Soil Protection and the Roadmap for Resource Efficient Europe;
- Local pollution and soil contamination – The reduction of point source contamination including the rehabilitation of industrial sites through Cohesion funds (Soil Sealing Guidelines);
- Diffuse pollution / water management – There are several interaction with water, especially in the context of protecting soil from erosion and flooding risks. The EU Floods Directive is strictly related to the provisions of the WFD (Article 3);
- CAP and complementary measures on agriculture and forest land – Agricultural practices may have an impact on biodiversity, including soil biodiversity. Therefore appropriate agricultural practices support protection of soil biodiversity. The Biodiversity Strategy also calls for mainstreaming and integration of soil-related issues into other policy areas, such as agriculture and forestry.

As cross-sectoral pieces of legislation, the IEA and SEA Directive reference to a wide number of areas including agriculture, forestry, industrial pollution, water, waste, energy and climate.

8.1.3 Most Relevant Soil Threats and Functions

Threats

Given the scope of the cluster, the relevance of the types of threats varies between the policy instruments. The selection of the most relevant soil threats in this section presents those that are most explicitly addressed by the cluster or are most closely related to the core goals of the policies:

- Loss of soil biodiversity – This is most directly linked to the Habitats and Birds Directive provisions and the Biodiversity Strategy, which set out conservation measures that indirectly have a positive impact on this soil threat. In addition, the Soil Sealing Guidelines recognize that urban sprawl and soil sealing are threats to biodiversity. Best practices to compensate loss of soil biodiversity include eco-accounts and compensation systems. Finally, information on the risks to soil caused by development operations, as required by the IEA and SEA Directives, may also contribute to address this soil threat;
- Flooding/landslides – The EU Floods Directive explicitly sets out requirements with the purpose of reducing flooding risks. Effective national planning and measures mitigation floods (such as the use of green infrastructure), as set out in the Soil Sealing Guidelines may contribute to address this soil threat. Information on the risks to soil caused by development operations, as required by the IEA and SEA Directives, may also contribute to address this soil threat;
- Soil sealing – It is one of the most directly linked threats to this cluster. It explicitly targeted as a soil threat by the Soil Sealing Guidelines, potentially mitigating by the use of green infrastructure, as set out in the EU Floods Directive, and potentially subject to an IEA or an SEA.

Nonetheless, all other threats recognized at EU level are covered, mostly indirectly, by the policies included in the cluster.

Functions

The cluster addresses all soil functions, although mostly indirectly. The key functions are:

- **Hosting biodiversity** – Development operations or pressures on the environment can have an indirect effect on soil biodiversity. The establishment of conservation areas and related measures will potentially indirectly benefit soil biodiversity mainly through the conservation of ecosystems and animal species at risk (Habitats and Birds Directives, Biodiversity Strategy). There are also potential links to soil biodiversity in relation to the EIA and SEA Directives in that they require a description of the environmental impacts that development projects or plans might have, including on soil and biodiversity. In addition, the Soil Sealing Guidelines explicitly recognize that sealing affects both aboveground and belowground biodiversity;
- **Platform for human activities** – To ensure that human activities do not pose a risk on soil, the Soil Sealing Guidelines explicitly set out best practices and measures to mitigate the impacts of sealing effects in urban areas and therefore support soil quality for different human activities. There is also a potential link to soil as a platform for human activity in the EIA and SEA Directives, in that they require a description of the environmental impacts that development projects or plans might have, including on soil.

8.2 Integrated Assessment of the Key Policies within the Cluster

8.2.1 Coverage of Soil Threats across the Cluster

The table below summarises the ways in which the different instruments addresses in this cluster interact/address specific threats to soils. The main threats included are the following:

- **Loss of soil biodiversity** – This is most directly linked to the Habitats and Birds Directive provisions and the Biodiversity Strategy, which set out conservation measures that indirectly have a positive impact on this soil threat. In addition, the Soil Sealing Guidelines recognize that urban sprawl and soil sealing are threats to biodiversity. Best practices to compensate loss of soil biodiversity include eco-accounts and compensation systems. Finally, information on the risks to soil caused by development operations, as required by the IEA and SEA Directives, may also contribute to address this soil threat.
- **Flooding/landslides** – The EU Floods Directive explicitly sets out requirements with the purpose of reducing flooding risks. Effective national planning and measures to mitigate floods (such as the use of green infrastructure), as set out in the Soil Sealing Guidelines, may contribute to address this soil threat. Information on the risks to soil caused by development operations, as required by the IEA and SEA Directives, may also contribute to address this soil threat.

- **Soil sealing** – It is one of the most directly linked threats to this cluster. It explicitly targeted as a soil threat by the Soil Sealing Guidelines, potentially mitigating by the use of green infrastructure, as set out in the EU Floods Directive, and potentially subject to an IEA or an SEA. **Compaction** – It is indirectly addresses by all policies within the cluster either by setting out conservation measures for certain habitat types and species protected at the EU level (Habitats and Birds Directive and Biodiversity Strategy), by setting out best practices including cultivation practices on soil to avoid compaction (Soil Sealing Guidelines), or by identifying the polluting factors for soil when undertaking a development operation (IEA and SEA Directives). Potential positive effects from the EU Floods Directive requirements are due to the promotion of natural water retention measures (NWR) with the aim to increase retention capacity and avoid compaction of rural landscapes.
- **Contamination – industrial and point source** – In the context of this cluster, this is indirectly addressed by almost all policies by setting out conservation measures for certain natural areas or animal species at risk (Habitats and Birds Directive and Biodiversity Strategy), by setting out best practices including the rehabilitation of industrial sites through Cohesion funds (Soil Sealing Guidelines) or by identifying the polluting factors for soil when undertaking a development operation (IEA and SEA Directives).
- **Erosion – Water** – This soil threat is addressed indirectly by almost all policies in the cluster and the potential positive effects on soil erosion come from measures alike to local soil contamination. On top, according to the Soil Sealing Guidelines, sealing and permeable materials/surfaces may be used to reduce water erosion on soil. Potential positive effects from the EU Floods Directive requirements are due to the promotion of natural water retention measures (NWR) with the aim to increase retention capacity of rural landscapes and reduce flood risk downstream.
- **Erosion – Wind** – This soil threats is indirectly addressed by setting out conservation measures for certain natural areas or animal species at risk (Habitats and Birds Directive and Biodiversity Strategy), or by identifying the factors producing soil erosion when undertaking a development operation (IEA and SEA Directives).

The most relevant soil threats addressed by the cluster are loss of soil biodiversity, indirectly address by the EU nature legislation (the Birds and Habitats Directives), flooding which is indirectly dealt with the broader EU Floods Directive, and soil sealing for which dedicated guidance has been produced. On top of the threats identified above, other threats may are also covered indirectly by the policies within the cluster, although to a much lesser extent. These are acidification, contamination – diffuse, desertification and salinisation.

Table 8.1 below provides a summary of how each instrument identified as relevant to the cluster contributes to tackling the soil threats identifies earlier as relevant to this cluster.

Table 8.1 Summary of Soil Threats addressed by the Nature Protection, Land Use Planning and Soil Sealing Policy Cluster

Threats	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
Acidification	N/A	N/A	1 – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit soil acidification	N/A	N/A	1 – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	1 – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Compaction	1 – through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network. This might contribute to reduce soil compaction.	1 – Through Member States designation of SPAs and carrying out of conservation measures to protect bird populations or achieve a secure bird population status . This might contribute to reducing compaction.	1 – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit soil compaction	1 – The Guidelines recognize the need to avoid unnecessary damage to soils that are not directly affected by construction activities. The soil that is removed should be re-used and taken care of to prevent damage, i.e. cultivation measures to avoid compaction.	1 – Floods Directive requirements may lead to the promotion of natural water retention measures (NWR) with the aim to increase retention capacity of rural landscape and educe flood risk downstream	1 – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	1 – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Contamination - Diffuse	1 – through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive	1 – Through Member States designation of SPAs and carrying out of conservation measures by	N/A	?	N/A	?	1 – The SEA Directive requires a description of the likely significantly

Threats	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
	farming) to achieve favourable status of species and habitats or habitat restoration. This might contribute to reduce diffuse soil contamination.	avoiding damaging activities and pollution of habitats, and by restoring degraded habitats. This might contribute to reduce soil pollution.					impacts on the environment, including soil.
Contamination – industrial and point source	I – through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network. This might contribute to reduce local soil contamination.	I – Through Member States designation of SPAs and carrying out of conservation measures by avoiding damaging activities and pollution of habitats and by restoring degraded habitats. This might contribute to reduce soil pollution.	I – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit diffuse soil contamination	I – The Guidelines propose re-using topsoil from a contaminate site to create a favorable environment for seed germination and plant establishment. Best practices to limit contamination caused by sealing include rehabilitation of industrial sites through Cohesion policy funding.	N/A	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Desertification	restoration of damaged habitats as above	restoration of damaged habitats as above	N/A ?	N/A	N/A	?	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Erosion - water	I – through Member States designation of	I – Through Member States	I – Actions and conservation	I – Best practices to mitigate the effects of soil	I – Floods Directive requirements may lead to the	I – The EIA Directive	I – The SEA Directive

Threats	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
	SCIs and SACs and carrying out of conservation measures (such as extensive farming) or habitat restoration. This might contribute to reduce erosion.	designation of SPAs and carrying out of conservation measures to achieve a secure status of bird populations. This might contribute to reducing soil erosion.	measures under Targets 1, 2, 3 and 6 should contribute to limit soil erosion by water	sealing include the use of permeable materials and surfaces that may reduce water erosion on soil.	promotion of natural water retention measures (NWR) with the aim to increase retention capacity of rural landscape and reduce flood risk downstream.	requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	requires a description of the likely significantly impacts on the environment, including soil.
Erosion - wind	I – through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) to achieve favourable status of species and habitats or habitat restoration. This might contribute to reduce erosion.	I – Through Member States designation of SPAs and carrying out of conservation measures to achieve a good status of bird populations. This might contribute to reducing soil erosion.	I – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit soil erosion by wind	N/A	N/A	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Flooding/ landslides	Habitats Directive protects quite a lot of forest and mountain grassland habitat...	A lot of SPAs contain forest cover.	I – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit flooding/landslides	I – The Guidelines recognize that urban sprawl and soil sealing increase the risk of flooding. Best practices related to effective national planning policies and by local authorities (at development and planning application levels) may significantly reduce flood risks. Examples to	E – Floods Directive requirements have the explicit purpose of reducing risks of flooding. In particular, through the implementation of the Directive’s requirements in relation to undertaking and producing: preliminary flood risk assessments; flood hazard maps; flood risk maps; and flood risk management plans.	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 –	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.

Threats	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
				practices mitigating floods risks are green infrastructure and natural water harvesting systems.		Annex IV)	
Loss of soil biodiversity	I – through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network. This might contribute to reduce loss of soil biodiversity	I – Through Member States designation of SPAs and carrying out of conservation measures to achieve favorable status of habitats and species (Article 1). This might contribute to reducing soil biodiversity.	I – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit loss of soil biodiversity	I – The Guidelines recognize that urban sprawl and soil sealing are recognized to threaten biodiversity. Best practices to compensate loss of soil biodiversity include eco-accounts and compensation systems.	N/A	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil and biodiversity (Article 3 – Annex IV)	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Loss of soil organic matter	I – through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network. This might contribute to reduce loss of soil organic matter	I – Through Member States designation of SPAs and carrying out of conservation measures to achieve favorable status of habitats and species (Article 1). This might contribute to reducing loss of soil organic matter.	I – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit loss of soil organic matter	I – The Guidelines recognize that activities of soil sealing in relation to buildings are responsible for stripping off topsoil that contains high organic carbon concentrations.	N/A	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.
Salinisation	N/A	N/A	N/A	I – The Guidelines indirectly recognize salinisation as a soil threat, with particular reference	N/A	I – The EIA Directive requires a description of	I – The SEA Directive requires a description of

Threats	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
				to the sealing of agricultural fertile areas.		the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	the likely significantly impacts on the environment, including soil.
Soil sealing	Protection of Natura 2000 sites from development prevents soil sealing in Natura 2000 sites at least.	N/A	I – Actions and conservation measures under Targets 1, 2, 3 and 6 should contribute to limit soil sealing	E – The Guidelines explicitly focus on limiting, mitigating and compensating for the effects of soil sealing. A wide number of best practices are proposed.	I – Floods Directive requirements may lead to the promotion of land use planning rules and of green infrastructure to control run-off, pluvial flooding and over-topping of urban drainage network. They may also lead to the protection of soil by preventing the urbanization of floodplain and riparian land exposed to flooding.	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil (Article 3 – Annex IV)	I – The SEA Directive requires a description of the likely significantly impacts on the environment, including soil.

8.3 Coverage of Soil Functions across the Cluster

Development pressures and change in land use may have an impact on a wide range of soil functions. However, whether the function is affected and the extent to which it is varies among the cluster examined. Given the overarching scope of certain pieces of legislation – such as the EIA and the SEA Directives – all soil functions may be indirectly addressed by the cluster. The most relevant functions are:

- **Hosting biodiversity** – Development operations or pressures on the environment can have an indirect effect on soil biodiversity. The establishment of conservation areas and related measures will potentially indirectly benefit soil biodiversity mainly through the conservation of ecosystems and animal species at risk (Habitats and Birds Directives, Biodiversity Strategy). There are also potential links to soil biodiversity in relation to the EIA and SEA Directives in that they require a description of the environmental impacts that development projects or plans might have, including on soil and biodiversity. In addition, the Soil Sealing Guidelines explicitly recognize that sealing affects both aboveground and belowground biodiversity.
- **Platform for human activities** – To ensure that human activities do not pose a risk on soil, the Soil Sealing Guidelines explicitly set out best practices and measures to mitigate the impacts of sealing effects in urban areas and therefore support soil quality for different human activities. There is also a potential link to soil as a platform for human activity in the EIA and SEA Directives, in that they require a description of the environmental impacts that development projects or plans might have, including on soil.
- **Providing raw materials** – The Soil Sealing Guidelines recognize that soil sealing affects most fertile areas by influencing soil security and its function of raw material provider. In addition, there is also a potential link to soil as a platform for human activity in the EIA and SEA Directives, in that they require a description of the environmental impacts that development projects or plans might have, including on soil. Indirectly the targets under the Biodiversity Strategy sets out a number of actions that may contribute to maintaining this soil function.
- **Storing, filtering and transforming nutrients and water** – Development operations and land use changes may affect the capacity of soil to filter nutrients and water. The promotion of land use planning rules and of green infrastructure to control run-off, as well as preventing urbanization in sensitive areas, will improve the capacity of soil to undertake this function (EU Floods Directive). The provisions of the Soil Sealing Guidelines have the aim to prevent and limit the removal of the upper layer of topsoil when development operations take place, as this may prevent the infiltration of rainwater and cause pressure on water resources and changes in the environmental state of the catchments affecting ecosystems and water-related services. Finally, there is also a potential link to soil as a platform for human activity in the EIA and SEA Directives, in that they require a description of the environmental impacts that development projects or plans might have, including on soil.

- A number of other functions are also addresses by the cluster – carbon pool, biomass production and storing geological and archeological heritage – although to a lesser extent.

Table 8.2 below provides a summary of how each instrument identified as relevant to the cluster contributes to supporting the soil functions relevant to this cluster.

Table 8.2 Summary of Soil Functions addressed by the Nature Protection, Land Use Planning and Soil Sealing Policy Cluster

Functions	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
Carbon Pool	protect and restore habitats that contain a lot of carbon notably peatlands and other wetlands e.g. saltmarsh	ditto	I – Member States implementation of underpinning actions and conservation measures under Targets 1, 2, 3 and 6 may contribute to soil carbon protection.	E – The Guidelines recognize that soils sealing affects soil carbon sequestration and storage	N/A	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil as a carbon pool.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil as a carbon pool.
Platform for Human Activities	some urban green spaces are also Natura 2000 sites but only a tenuous link as this is not the purpose of the directives	ditto	I – Member States implementation of underpinning actions and conservation measures under Targets 1, 2, 3 and 6 may contribute to protect soil as a platform for human activity	E – The Guidelines suggest the construction of green infrastructure to mitigate the impacts of sealing effects in urban areas and therefore support soil quality for different human activities.	?	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil as a platform for human activities.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil as a platform for human activities.
Biomass production	lots of productive forest in Natura 2000 producing biomass	ditto	I – Member States implementation of underpinning actions and conservation measures under Targets 1, 2, 3 and 6 may contribute to biomass production from soil	?	?	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil for biomass production.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil for biomass production.

Functions	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
Hosting biodiversity	I – Member States designation of SCIs and SACs and carrying out of related conservation measures (such as extensive farming), as well as achieving the coherence of the Natura 2000 network, may contribute to soil biodiversity protection through protection of the soil biodiversity typical of the protected natural and semi-natural habitats.	I – Member States designation of SPAs and carrying out of related conservation measures (Art. 1) may contribute to supporting the conservation of soil biodiversity.	I – Member States implementation of underpinning actions and conservation measures under Targets 1, 2, 3 and 6 may contribute to soil as hosting biodiversity	E – The Guidelines recognize that soil sealing affects both aboveground and belowground biodiversity	N/A	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil to host biodiversity.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil to host biodiversity.
Providing raw materials	some Natura 2000 sites include functioning quarrying and materials extraction, so long as the species and habitats are not adversely affected and there is restoration – see EU guidance http://www.euromines.org/publications/guidance-document-non-energy-mineral-extraction-and-natura-2000	ditto	I – Member States implementation of underpinning actions and conservation measures under Targets 1, 2, 3 and 6 may contribute to soil as provider of raw materials	E – The Guidelines recognize that soil sealing affects most fertile areas by influencing soil security	?	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil as provider of raw materials.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil as provider raw materials.

Functions	Habitats Directive	Birds Directive	Biodiversity Strategy	Soil Sealing Guidelines	EU Floods Directive	EIA Directive	SEA Directive
Storing, filtering and transforming nutrients and water	N/A	N/A	I – Member States implementation of underpinning actions and conservation measures under Targets 1, 2, 3 and 6 may contribute to the function of soil as storing, filtering and transforming nutrients and water.	<p>E – The Guidelines recognize that the removal of the upper layer of topsoil may prevent the infiltration of rainwater and cause pressure on water resources and changes in the environmental state of the catchments affecting ecosystems and water-related services.</p> <p>They suggest that the construction of natural water harvesting systems and the use permeable materials and surfaces may mitigate the impacts on this soil function.</p>	I – Floods Directive requirements may lead to the promotion of land use planning rules and of green infrastructure to control run-off, pluvial flooding and over-topping of urban drainage network. They may also lead to the protection of soil by preventing the urbanization of floodplain and riparian land exposed to flooding. These may contribute to the capacity of soil to store, filter and transform nutrients and water.	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil and its ability to store and filter nutrients and water.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil and its ability to store and filter nutrients and water.
Storing geological and archeological heritage	N/A	N/A	N/A ?	E – The Guidelines recognize that an ‘overly intensive degree of soil sealing, without open	?	I – The EIA Directive requires a description of the factors likely to be significantly affected by projects including likely impacts on soil and its storing capacity.	I – The SEA Directive requires a description of the likely significantly impacts on the environment that may contribute to the protection of soil and its storing capacity.

8.3.1 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection - Understanding the Relevance and Limits of Policy within the Cluster

The following table provides an assessment of the strengths, weaknesses, opportunities and threats of the individual policies in so far as they address the threats affecting soils. There are collated in an integrated way in section 8.3.

Each instrument has its own strengths, weaknesses, opportunities and threats in relation to the specific objectives and scope of that instrument, but the strengths, weaknesses, opportunities and threats of that instrument in relation to soil protection may vary.

The Soil Sealing Guidelines set of best practices to limit, mitigate and compensate for the effects of sealing on soil. Legislation such the Habitats and Birds Directive establish long-term frameworks for the protection of nature, with may indirectly contribute not only to halting soil biodiversity loss but also addressing several other soil threats and functions. In addition, overarching legislation such as the IEA and SEA Directives may as well indirectly contribute to soil protection. However important these strengths are, there remains a question as to what implications they will have on the ground depending on the implementation efforts put in place by Member States.

The most relevant weakness in the policy cluster is the lack of mandatory requirements related to soil. This can be explained by the fact that none of the legislative instruments' core goals deal primarily with soil protection, such as is the case with the Habitats or Birds Directives. Where the instrument is primarily focused on soil – such as in the case of the Soil Sealing Guidelines –it is non-binding by nature. Where an instrument has direct implications on certain aspects of soil protection – such the EU Floods Directive – it does not set any specific soil-related requirements. This brings us back to the question mentioned above with regard to the implementation challenge. The approaches and level of ambition of soil-relevant measures is mainly dependent on Member States willingness to implement sectoral legislation or beyond EU requirements in national law.

On the other hand, although there is a question in relation to how the policy requirements are translated on the ground, many policies within the cluster provide Member States with the opportunity to select the most suitable measures and put them in place at the most appropriate level of governance (i.e. the Soil Sealing Guidelines) to pursue certain goals, with potential for high soil protection outcomes. At more strategic level, opportunities also come from the mainstreaming and integration of soil-related issues into other policy areas, such as agriculture and forestry, as highlighted in the Biodiversity Strategy.

A clear threat identified across a number of policies is the lack of a dedicated framework setting out the priorities and conceptualising soil issues at EU level. As mentioned above, the outcome of each policy with regard to soil protection is therefore dependent on the implementation process put in place by Member States and /or the level of ambition in going beyond EU requirements (see Table 8.3).

Table 8.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection: Nature Protection, Land Use Planning and Soil Sealing Policy Cluster

- **Strengths** - what does the policy cover well in relation to soil protection?
- **Weaknesses** - are there aspects limiting the protection afforded?
- **Opportunities** - are there opportunities for soil protection moving forward, e.g. through MS implementation, new proposals or improved use of existing legislation?
- **Threats** - are there any potential elements within the policy that might put at risk the protection of soils?

Policy Measure	Strengths	Weaknesses	Opportunities	Threats
Habitats Directive	<ul style="list-style-type: none"> • The Habitats Directive establishes a framework for the protection of biodiversity in the whole EU, which may be indirectly contribute to addressing a number of soil threats through the protection and restoration of semi-natural and natural habitats – loss of soil organic matter, contamination, erosion, compaction and soil biodiversity. 	<ul style="list-style-type: none"> • The Habitats Directive does not set explicitly soil-relevant mandatory requirements 	<ul style="list-style-type: none"> • In defining the conservation measures for each SAC, Member States are left free to select the most suitable measures to ensure nature conservation, including potential positive impacts on soil. Member States have a wide range of actions among which they can choose, i.e. reduced intensity of agriculture (in particular, reduced areas of monoculture) reduced input of chemical fertilisers and plant protection products (PPP) and reduced habitat fragmentation, which may contribute to soil protection. 	<ul style="list-style-type: none"> • Not in the Directive itself, but from the non-implementation by Member States of conservation measures relevant to soil protection.
Birds Directive	<ul style="list-style-type: none"> • The Birds Directive establishes a framework for the conservation of all species of naturally occurring birds in the wild state in the EU, which may indirectly contribute to addressing a number of soil threats through protecting and restoring bird habitats – loss of soil organic matter, contamination, erosion, compaction and soil biodiversity. 	<ul style="list-style-type: none"> • The Birds Directive does not set explicitly soil-relevant mandatory requirements 	<ul style="list-style-type: none"> • In defining the conservation measures for each SPA, Member States are left free to select the most suitable measures to ensure their conservation, including measures having potential positive impacts on soil. 	<ul style="list-style-type: none"> • Not in the Directive itself, but from the non-implementation by Member States of conservation measures relevant to soil protection
Biodiversity Strategy	<ul style="list-style-type: none"> • The Strategy sets a long-term vision by 2050 and a 2020 heading target for maintaining biodiversity within the EU beyond 2010 – including positive implication for a wide number of soil threats and functions. 	<ul style="list-style-type: none"> • No mandatory targets nor explicitly soil-focused voluntary actions included in the Strategy 	<ul style="list-style-type: none"> • Through the upscaling of biodiversity conservation measures in the EU’s Natura 2000 network, as well as at international level in the context of the CBD and Nagoya protocol; • Through further integration of biodiversity and ecosystems services concerns into non-nature policy areas, such as agriculture and forestry, as well as their correct implementation by Member States. 	<ul style="list-style-type: none"> • Not in the Strategy itself, but from the non-implementations of the actions set by Member States

Policy Measure	Strengths	Weaknesses	Opportunities	Threats
Soil Sealing Guidelines	<ul style="list-style-type: none"> The Guidelines provide a detailed set of best practices and examples to limit, mitigate and compensate for soil sealing effects in the EU by insisting on the fact that it is through the implementation of regional and local spatial planning that the principles of sustainable land use can be implemented on the ground. 	<ul style="list-style-type: none"> The Guidelines set no mandatory requirements. 	<ul style="list-style-type: none"> In putting in place the measures to limit, mitigate or compensate for soil sealing, Member States have a degree of flexibility in the implementation of certain types of measures and at the appropriate level of governance. 	<ul style="list-style-type: none"> Not in the Guidelines themselves, but from the non-implementation of best practices.
EU Floods Directive	<ul style="list-style-type: none"> The EU Floods Directive established an approach to flood risk management at EU level, with benefits for soil protection if implemented 	<ul style="list-style-type: none"> No soil-focused mandatory requirements are established by the Directive 	<ul style="list-style-type: none"> Member States may choose to go beyond the Directive's requirements and put in place a suite of voluntary or mandatory actions aiming to support soil protection through limiting flooding 	<ul style="list-style-type: none"> Not in the policy itself, but from the non-implementation of measures addressing soil threats by Member States.
Environmental Impact Assessment Directive	<ul style="list-style-type: none"> The EIA Directive establishes a framework for determining whether a project (likely to have environmental impacts) shall undertake an environmental impact assessment prior to development consent is granted, including information on the likely impacts on soil and alternative practices. 	<ul style="list-style-type: none"> The EIA Directive does not explicitly set soil-relevant mandatory outcomes or targets. 	<ul style="list-style-type: none"> In defining less harmful alternatives in case a project is likely to affect soil quality, project developers are free to select the most suitable measures to ensure high level of soil protection; On top of the requirements set by the Directive, guidance or best practice examples, beneficial to soil protection, may be provided to project developers to encourage higher levels of soil protection. 	<ul style="list-style-type: none"> Not in the Directive itself, but from the non-implementation of its requirements by Member States.
Strategic Environment Assessment Directive	<ul style="list-style-type: none"> The SEA Directive establishes a legislative framework to assess environmental effects of selected plans and programmes undertaken by Member States. The related report must contain information about the likely significant effects, among others, on soil. 	<ul style="list-style-type: none"> The SEA Directive does not explicitly set soil-relevant mandatory requirements or outcomes. There is no mechanism set by the Directive to impede further degradation of soil due to certain plans or programmes, beyond monitoring. 	<ul style="list-style-type: none"> Member States can decide to select appropriate remedial actions to protection soil, in response to any likely significant effects on the environment of implementing a plan or a programme. 	<ul style="list-style-type: none"> Not in the Directive itself, but from the non-implementation of its requirements by Member States.

8.4 Integrated Assessment of the Nature Protection, Land Use Planning and Soil Sealing Policy Cluster

The EU laws, strategies and guidelines included in this policy cluster address, to a different extent, a wide number of soil threats linked to development operations and changes in land use. Loss of soil biodiversity, flooding and soil sealing are the most prominent. While a number of instruments may potentially address soil threats across the board, i.e. the IEA and the SEA Directives, other instruments offer support to specific threats, i.e. Soil Sealing Guidelines, the Habitats and Birds Directives, and the EU Floods Directive. There is no overarching instrument in EU law that directly supports or formally references the remediation of soil threats, a role which the withdrawn Soil Framework Directive was envisaged to fulfill.

The provisions of the Habitats and Birds Directive, alongside those of the Biodiversity Strategy, provide the basis for establishing sites of importance from an ecosystem and species perspective and related conservation measures. These measures would not explicitly target soil biodiversity or other soil threats, but may nonetheless contribute to their protection, as well as to the soil function of hosting biodiversity. Sealing, as a soil threat, is explicitly dealt with by the Soil Sealing Guidelines, which provide examples of supporting best practices, while flooding is explicitly addressed by the EU Floods Directive. It should also be noted that the EIA and SEA Directive potentially offer additional information on the status of specific soil threats and functions affected by development operations, although they do not explicitly address any threats or functions.

With regard to the extent of coherence across the cluster, there is a general degree of overlap among the policies in relation to coverage of threats and functions, although none of the instruments sets out mandatory requirements. In most cases, Member States have the flexibility to decide on the nature of any conservation measure (Habitats and Birds Directives), best practice (Soil Sealing Directives) or remediation measure they may want to adopt, which has a positive impact on soil. The extent to which an overall vision and objectives are integrated in the policy instruments within the cluster is rather limited. This is further complicated by the question as to what implication these policies may have on the ground, which is strictly dependent on the implementation efforts put in place by Member States. Nonetheless, the policy cluster is not generally incoherent per se, e.g. the scope and objectives of the instruments do not conflict with each other.

As a result, a number of issues and limitations stand out in relation to the extent to which the policy cluster address soil threats and support soil functions:

- While soil sealing and floods are explicitly address by EU instruments, loss of soil biodiversity is only addressed indirectly be the Habitats and Birds Directive or the Biodiversity Strategy. All the remaining threats are also addresses indirectly by the policies included in the cluster;
- No instruments explicitly support, defines or sets out requirements for the protection of soil functions;
- No mandatory requirement is set with the aim to deal with soil-related impacts due to development operations or land use changes.

There are, however, opportunities stemming from the policies included in the cluster in relation to selecting the most suitable measures to ensure soil protection and putting them in practice at the most appropriate governance level by Member States. In addition, opportunities also come from the mainstreaming and integration of soil-related issues into other policy areas, such as agriculture, forestry, water, climate, etc.

The lack of strategic policy that prioritises, establishes key concepts, i.e. threats and functions, and the needs for soil protection potentially limits the ability to integrate soil protection into key existing policy dossiers. Moreover, land use planning is essentially a national competence and while it appears strongly in the Soil Wiki, it needs further investigation to understand whether soil protection is being prioritised.

8.5 Comparing EU Level Issues and Gaps to Member State Policy Action

A number of issues and challenges associated with the delivery of soil protection based on EU policy requirements can be identified for the cluster on nature protection, land use planning and soil sealing. These are summarised below in Box 8.1. As for the cluster on overarching policies, EU policy does not act in isolation to regulate Europe's environment. This section examines the extent to which nationally initiated policies set out in the inventory appear to address the gaps and issues that remain at the EU level and whether comparable approaches apply across the Member States. Open issues and questions that remain for protecting Europe's soils are then set out.

Box 8.1 Key Issues and Potential Gaps in EU Policy for Further Investigation

There are opportunities for the protection of soil biodiversity and addressing soil sealing linked to EU laws. However, at present these are potentially limited by:

- A lack of a strategic vision for the protection of soils at EU level that properly takes into account and elaborates on soil functionality and sets a basis for integrating action in particular on soil sealing and soil biodiversity protection into wider policies.
- Soil biodiversity is only implicitly, not explicitly covered by binding EU policy measures for nature conservation. Moreover, actions that might contribute to soil biodiversity are spread across different elements of the EU acquis including nature conservation (through the protection of semi natural habitats); actions for promoting soil organic matter content that might sit under the CAP or within upcoming climate measures. Integration is problematic because an approach to the consideration of soil biodiversity at EU level is not set out.
- Soil sealing is only explicitly covered by non-binding guidelines and through linkages to the Floods Directive. However, there are areas where soil sealing may occur through other policy priorities from infrastructure development to remediation of contamination and avoidance of water pollution. Better understanding of integration of soil sealing issues at EU level would be helpful as part of wider messaging on soil protection.

8.5.1 Review of Key Issues and Potential Gaps

The review of nationally initiated policies for this cluster focuses on three elements:

- Whether Member States have a strategic policy setting out a basis for integrating soil issues into wider policy making;
- Whether Member States have adopted actions on soil biodiversity;
- Whether Member States have adopted binding actions focused on avoidance of soil sealing.

The question of the presence of an overarching strategic policy to address soil issues is examined in Chapter 4.3.1. This examined nationally initiated overarching policies on soil protection. It identified that while a limited number of Member States have in place binding Acts or Decrees setting out soil protection as a legal priority, the coverage in the majority of Member States remained partial based on the information presented in the inventory.

Within the inventory, beyond strategic documents and laws, few entries focus on the protection of soil biodiversity. This is likely to be linked to biodiversity issues primarily being dealt with through EU level policies. In comparison the inventory was largely focusing on nationally initiated policies and measures implementing the biodiversity Directives were not commonly cited. There are some innovations ongoing, for example, policies on land use and land utility under development in Sweden and Denmark. One of the limitations of the study is that the inventory content had to be focused and cannot cover the full range of policies. However, there may be scope for further investigation based on the entries in the Inventory.

In relation to this cluster, the issue most addressed by entries in the Wiki is that of soil sealing. A number of different approaches are adopted by Member States to address the question of sealing. Soil sealing is closely linked to development planning and the locating of new development. Policies recorded in the Inventory generally focus on land use planning aspects linked to soil sealing. Key types of policy action identified in relation to soil sealing and national level are:

- Strategic goals within Strategies for Sustainable Development – for example, within the Austrian federal Strategy on Sustainable Development soil sealing is flagged as a concern, but action will remain at the level of guidelines; in Germany the National Sustainability Strategy contains a non-binding target to reduce land take by 2020.
- Strategic policies on planning and sustainable planning to address questions around the locating of future development – for example in Denmark and Poland, with new proposals due in the latter on urban sprawl.
- Policies aimed at protecting agricultural soils from loss and development – for example, the Act on Cultivated Soils in Hungary sets out land purchase rules and seeks to protect cultivated lands and applies a fee if cultivated land is used for purposes other than agriculture. Poland and Portugal also have laws seeking to protect agricultural land and soils that explicitly reference soil sealing.

8.6 Comparing Coverage of EU and National Policies – Outstanding Questions and Conclusions on Policy Coverage

The key issue identified in the EU level analysis, and potential gap in EU level policy, is the lack of a policy setting the strategic direction for policy action on soils. This was highlighted as an issue in relation to integration of soil issues generally and specifically in terms of the emphasis on soil biodiversity. This issue is examined in more detail in Chapter 4 and conclusions are drawn on coverage in Chapter 4.4 of the report. It is concluded that when national initiatives focused on soil protection are taken into account there remains gaps and issues in relation to strategic policies on soil protection in Europe. This, therefore, remains an area for further investigation. In particular, further analysis is needed on the combinations of laws that Member States have put in place. This is important for understanding links on soil biodiversity covered in the nature, land use planning and soil sealing cluster. Biodiversity policy in Europe is led by the EU acquis in this area, while Member States have to implement the Directive's independently, the scope of issues covered and priorities are determined at EU level. Hence EU level integration of soil issues is important.

The question of soil sealing is addressed in part by entries to the Inventory. Policy measures within the inventory focus on different aspects of sustainable land use planning and the control of development in particular on agricultural land. The question of soil sealing relates closely to the development pressures within each given Member State, and given links to land use planning (that remains a national/regional competence) opportunities at EU level for action are more limited. However, soil sealing issues are raised within other cluster of the analysis, not least in relation to soil sealing as a tool for contamination management and water contamination risk. This aspect of the EU acquis role on soil sealing could be further investigated.

9 Climate Change and Energy

9.1 Conceptualisation of the Policy Cluster

This cluster is centred on policies addressing climate change and the contribution that soil and land management action can make to help mitigate climate change and support climate adaptation activities. The focus of this cluster is to review relevant policies at EU level that have as primary focus climate change mitigation and adaptation. The cluster does not include an integrated assessment of how all EU level policies work together to address climate needs. It does not examine all elements of EU policies with implications for GHG emissions associated with soil management. Specifically, it does not examine CAP or other policy instruments which have influence on the extent or nature of tillage regimes, fertilizer/manure/soil improver applications and the changing of land use, all practices with implications for GHG emissions associated with land use. The CAP as well as policies linked to reducing diffuse pollution of water courses with nutrients such as the Drinking Water and Nitrates Directives are addressed separately under Chapters 5 and 7.

A key function provided by soil is the storage and release of organic matter and carbon. Soil organic matter is essential for biomass production and for sustaining biodiversity. Soils can offset other greenhouse gas emissions by capturing and storing carbon (albeit reversibly) and they can help to adapt to climate change (e.g. via flood regulation owing to the structuring effect of soil organic matter). Soil organic carbon (SOC) stocks in the EU-27³⁰ have been estimated at 75–79 billion tonnes (EEA, 2015b). Soil is a major factor in the EU's response to tackling climate change as it is the second largest carbon pool after the oceans. Whereas the current carbon stocks in EU soils represent a critical carbon store and a vast source of potential emissions, the additional sequestration potential for soils is relatively modest. However, current estimates of changes in soil carbon stocks have high uncertainties.

Soil carbon sequestration could play an important role in climate mitigation in the short term together with other measures.

While soil carbon fluxes are one important element of soil's relationship with GHG management and mitigation; soil management decisions within the agricultural and forestry sectors have an important bearing on emissions of other GHGs from these sectors. The main agricultural sources of greenhouse gas emissions are:

- enteric fermentation by ruminant animals producing methane (CH₄) emissions;
- soil nitrification and denitrification, which leads to nitrous oxide production emissions and is strongly linked to fertilisation of land and the types of techniques used;
- manure decomposition, which produces methane and nitrous oxide emissions.

Agricultural activities in the EU-28 generated 470.6 million tonnes of CO₂ equivalent in 2012, corresponding to about 10 % of total greenhouse gas emissions. Approximately half of these

³⁰ Applied before the accession of Croatia.

emissions were linked to agricultural soils and approximately one sixth to manure management (Eurostat, 2015).

9.1.1 Policies and Issues Covered in the Cluster

The cluster examines the coverage of soils within policies at the EU level specifically focused on climate change mitigation and adaptation. In this area of policy making there is significant evolution ongoing given the recent and ongoing publication of proposals for the period post 2020. This analysis, therefore, takes account of both the current coverage of policy focused on the period to 2020 and the opportunities up to 2030. This is of importance as there are significant evolutions in the consideration of emissions from Land Use and Land Use Change (LULUCF) across the two periods; which are closely linked to soil management and soil carbon.

Within the scope of this project four EU policies dealing with climate change mitigation and adaption have been identified as relevant. In all cases soil protection and management are not the ultimate goal of the policy, however, soil management actions and the quality of soil protection will impact on the ability to deliver the policy goal. The policies covered within this cluster are:

- Effort Sharing Decision (Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the EU greenhouse gas emission reduction commitments up to 2020) - sets out the targets for GHG emission reductions for each Member State from sectors outside the EU Emissions Trading Scheme (transport, agriculture, buildings, small industry and services sectors). It links to soil protection given the connection between soil management and GHG emissions associated with agriculture. An Effort Sharing Regulation will set out binding emission reductions from non EU ETS sectors from 2021 to 2030, a proposal for which was published in July 2016 (COM/2016/482). Importantly under the proposals some transfer would be possible between emission reductions from the LULUCF sector and emission reductions from the non ETS sectors.
- Decision on accounting rules for GHG emissions and removals relating to land use, land-use change and forestry (LULUCF Decision No 529/2013/EU) – sets out an obligation for Member States to provide information on their LULUCF actions to limit or reduce emissions and maintain or increase removals, with reporting and accounting only required for certain categories of emissions. However, at present LULUCF emissions and removals do not contribute to the EU's 2020 emission reduction target. A new proposal has been adopted by the Commission for the post 2020 period (Proposal for a Regulation on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry into the 2030 climate and energy framework, amending Regulation No 525/2013 - COM(2016) 479 final). This proposes that for the period from 2021 to 2025 and from 2026 to 2030 each Member State shall ensure that emissions associated with LULUCF do not exceed removals. Moreover, LULUCF emission reductions could count towards the EU emission reduction target set out within the proposed effort sharing Regulation.

- EU Adaptation Strategy (COM(2013) 216 final) - provides an overarching framework with the aim to increase adaptation through different voluntary mechanisms that enhance the preparedness and capacity to respond at different levels to climate change effects.
- The Directive on the promotion of the use of energy from renewable sources (2009/28/EC, RED Directive) - All renewable energy expansion, if it implies land take or change in land management, has a potential impact on soil protection. However, the RED is most relevant to soil in the context of the expansion in bioenergy and biofuel use associated with the delivery of the targets. The RED contains sustainability criteria that relate to protecting certain valued land areas based on high carbon or high biodiversity value that would potentially link to soil protection goals. Moreover, it contains specific provisions to support use of degraded land for biofuel feedstock cultivation.

9.1.2 Links to Other Key Clusters

The policies considered here in relation to climate change mitigation are closely linked to the management of agricultural soils. More specifically there is a link to the policy instruments and measures employed to manage nutrient inputs in relation to the addition of nitrogen based fertilisers, manure and the management regimes employed to support soil organic matter and carbon retention. As a consequence, the climate cluster and the actions undertaken relate closely to: a) the cluster on the CAP and linked policies for agriculture and forest management; and b) the cluster on diffuse pollution, as this deals in particular with the impact of nutrient additions on water bodies.

Actions under the CAP promoted both under Pillar I and Pillar II have the potential to contribute to soil organic matter management and the reduction in fertiliser inputs. Actions under Nitrates Directive and the Water Framework Directive link closely to the management of inorganic nitrogen based fertilisers and the level of additions deemed appropriate in a given location.

9.1.3 Most Relevant Soil Threats and Functions

Climate change mitigation and adaptation are linked to and potentially exacerbated by certain soil threats. The soil threat most clearly linked to climate mitigation is loss of soil organic matter, which will lead directly to atmospheric carbon emissions. However, there is a connection between soil organic matter and other threats including compaction, erosion of soils (both in terms of susceptibility and erosion leading to losses) and as well as flooding (linked to infiltration rates and changes in soil structure). Moreover, changes in practices around the addition of nitrogen fertilisers will also impact upon acidification rates in soils. Finally, climate mitigation goals might have the potential to lead to improved overall soil management for soil carbon retention as well as more holistic soil management due to a required decline in nitrogen fertiliser use. There is, however, no obligation on Member States to deliver the climate targets through such actions and there are a wider range of alternative strategies for emission reduction in the wider economy.

The all-encompassing threat posed by climate change has the potential to impact on all soil functions. However, action specifically aimed at climate change mitigation will impact directly the functions of soil as a carbon pool, biomass production and storing, filtering and transforming nutrients. The intertwined nature of action to mitigate GHG emissions and the connection to soil organic matter and the approach to nutrient management means that these three functions are closely linked.

9.2 Integrated Assessment of the Key Policies within the Cluster

9.2.1 Coverage of Soil Threats Across the Cluster

Table 9.1 summarises the ways in which the different policy instruments reviewed in this cluster address specific threats to soils. The only explicit link to soils of the policies examined relate to soil organic matter decline and the maintenance and promotion of carbon and organic matter within soils. However, there are also strong implicit links to issues of acidification, compaction, diffuse pollution and erosion. The relationship between the policy instruments and soil threats relates primarily to whether and how choices aimed at retaining soil carbon and organic matter lead to changes to soil management and in particular nutrient management regimes. In practice the relevant soil management practices, while helping to deliver the goals of the climate policies, are likely to be driven more directly by targets, funding and rules set out under the CAP or within measures to limit the nutrient enrichment of water bodies under the Nitrates Directive and Water Framework Directive policies that sit within. These policies are examined in Chapters 5 and 7.

It is important to highlight that, in the climate cluster, certain aspects of the policy instruments, such as the treatment of agricultural emissions within the EU's GHG 'effort sharing' policies and Land Use and Land Use Change and Forestry, are currently under review. Their importance as drivers of land management is likely to increase over time. Moreover, actions under LULUCF requiring Member States to report on changes in emissions relating to soil organic matter should also increase the evidence base and understanding of action to protect soils.

The RED explicitly deals with the issue of contaminated land through the provisions on biomass cultivation for biofuel feedstocks and offering a 'bonus' in terms of policy delivery if severely contaminated sites are used. However, implementation of this provision has been limited, not least due to difficulties in defining the degradation level. This approach to considering use of degraded land in the RED does, however, point to opportunities for exploring more the integration of soil protection issues into climate policies. This is important as they continue to expand and promote alternative development pathways in Europe.

In relation to adaptation, the Adaptation Strategy sets out a series of voluntary actions that could address key soil threats. However, actions under the Adaptation Strategy remain voluntary and they are often reliant on action under other instruments to deliver policy goals – in particular funding under the LIFE programme, funded under the CAP and through the Floods Directive. Table 9.1 below provides a summary of how each instrument identified as relevant to local soil contamination contributes to tackling the soil threats identified earlier as relevant to this cluster.

Table 9.1 Summary of Soil Threats addressed by the Climate Change and Energy Policy Cluster

Threats	Adaptation Strategy	Renewable Energy Directive	Effort Sharing Decision	Land Use and Land Use Change Decision
Acidification			Implicit link related to changing practices in terms of nutrient management	Implicit link related to potential changing practices in terms of nutrient management. However it should be noted that Member States are not obliged to adopt any action on this.
Compaction	Implicit link based on the adoption of certain actions under Member States of Rural Development Programmes (RDPs) within the CAP	Implicit link - Change in intensity and approach to land management potentially impacting on compaction.		Implicit link - Increased SOM has potential benefits for soil structure
Contamination - Diffuse			Implicit link related to changing practices in terms of nutrient management	Implicit link - Potential link related to changing practices in terms of more holistic land management as a consequence of changes in approaches to tillage etc.
Contamination - point source		Explicit link to use of contaminated sites for biomass production for energy specifically biofuels		
Erosion - water	There is an explicit link through: <ul style="list-style-type: none"> • selecting LIFE programme' projects prioritising adaptation action; • by mainstreaming adaptation measures into EU forestry policy and Member States legislation 	Implicit link - Change in intensity and approach to land management potentially impacting on erosion susceptibility.		Implicit link - Increased SOM has potential benefits for soil structure
Erosion - wind	There is an explicit link through: <ul style="list-style-type: none"> • selecting LIFE programme' projects prioritising adaptation action; • by mainstreaming adaptation measures into EU forestry policy and Member States legislation 			

Threats	Adaptation Strategy	Renewable Energy Directive	Effort Sharing Decision	Land Use and Land Use Change Decision
Flooding/ landslides	There is an explicit link through support for Member States' action in relation to planning and flood risk management			
Loss of soil biodiversity	Implicitly addressed by selecting LIFE programme' projects prioritising adaptation action; and by mainstreaming adaptation measures into EU biodiversity policy and Member States legislation	Implicit link - Change in intensity and approach to land management potentially impacting on soil biodiversity.		
Loss of soil organic matter	Implicitly addressed through adaptation actions by Member States in relation to planning and management by identifying resources (e.g. soil) that are vulnerable to climate change.	Explicitly addressed in terms of avoidance of high carbon stock lands for biofuels. Although wider potential consequences linked to changing levels of SOM under different management and cropping regimes.	Implicit link related to changing practices in terms of nutrient management. Link becomes clearer once LULUCF emissions are formally linked to reductions under effort sharing post 2020.	Explicit link - Potential impact on the emphasis of retaining soil carbon and monitoring of SOM
Soil sealing	Implicitly addressed through adaptation actions by Member States in relation to planning and management by identifying resources (e.g. soil) that are vulnerable to climate change.			

9.2.2 Coverage of Soil Functions across the Cluster

All four policies analysed in this cluster (see Table 9.2 below) were linked to soil carbon and biomass production functions. The only soil function that is explicitly linked to the policies analysed within the climate change cluster is the maintenance of the soil carbon pool. This link is made in the RED as a result of clauses focused on the avoidance of high carbon areas of land for biofuel production. For the LULUCF Decision this link relates to the explicit focus on maintaining and also monitoring soil organic matter and carbon content in order to ensure that impact of land use change and management on climate is minimised.

The ESD and Adaptation Strategy are only implicitly linked to soil carbon maintenance. In the case of ESD, this sets high level targets for GHG emission reductions for the non EU ETS sectors, including agriculture. It does not state explicitly how this will be achieved and it is therefore up to Member States to determine how to deliver the target and what actions will be undertaken in which sector. They may choose to take no action in relation to agriculture. The Adaptation Strategy is focused on adapting to climate impacts. Soil carbon can offer benefits in terms of the resilience of the soils and for biomass production, soil structure and water infiltration.

All four policies are implicitly linked to the soil function of 'biomass production'. In the case of the Adaptation Strategy, ESD and LULUCF Decision this is a consequence of the potential benefits to biomass production of improved soil carbon and management of soils for long term productivity. There is the potential for actions under the ESD, LULUCF and the Adaptation Strategy to promote different approaches to biomass production and specifically the management of soils within biomass production systems. Approaches to reducing GHG emissions in agriculture often encompass changing the way inorganic, nitrogen rich fertilisers are used. In addition, managing soil organic carbon and promoting accumulation also often implies a shift in fertiliser use and wider changes in terms of the management of the land under production including tillage systems, use of cover crops and rotations. To this end all three measures are also implicitly linked to the function of storing, filtering and transforming nutrients.

The RED is related to the function of biomass production, but the linkage differs to that of the other policies. The relationship is implicit and as a consequence of potential shifts in demand for biomass generated by the implementation of the RED. While the RED at no point specifies the use of biomass to deliver renewable energy targets, Member States have projected a significant increase in the use of biomass for energy in order to meet the targets. This implies potential shifts in the demand for biomass and the way in which biomass production is managed.

The Adaptation Strategy is a wider ranging strategic document. The potential climate change impacts and needs mean that the strategy implicitly addresses all the soil functions identified. However, the Strategy itself sets out only voluntary actions to address adaptation.

The Table 9.2 below provides a summary of how each instrument identified as relevant to climate change cluster contributes to supporting soil functions.

Table 9.2 Summary of Soil Functions addressed by the Climate Change and Energy Policy Cluster

Functions	Adaptation Strategy	Renewable Energy Directive	Effort Sharing Decision	Land Use and Land Use Change Decision
Carbon Pool	Implicit link by selecting LIFE programme' projects prioritising adaptation action	The RED is explicitly aimed at GHG emission reduction. Moreover, there are specific provisions in place aimed at limiting the consequences of biofuel use at least for high carbon stock land.	Implicit link to changing patterns of nutrient management, more clearly linked post 2020 when LULUCF is formally linked to effort sharing in non ETS sectors.	Explicit link - Maintaining carbon pool in the soils and sequestration
Platform for Human Activities	Implicit link through the implementation by of Rural Development Programmes			
Biomass production	Implicit link through implementation of Rural Development Programmes and by mainstreaming adaptation measures into EU forestry policy and Member States legislation	Implicit link - The link between renewable energy and biomass production is strong under the existing RED. The reliance on both solid and liquid forms of biomass is high in many MS.	Implicit link to the manner in which biomass is produced, assuming changes in agricultural practice are adopted to limit emissions from the agricultural sector as part of wider actions under ESD.	Implicit link - Maintaining the carbon pool and SOM increase will potentially impact on the way biomass is produced but also in theory the long term health of the soils for biomass production.
Hosting biodiversity	Implicit link through mainstreaming adaptation measures into EU biodiversity policy and Member States legislation			
Providing raw materials	Implicit link through implementation by Member States of Rural Development Programmes (RDPs) under Pillar 2 of the CAP	Implicit link - The link between renewable energy and biomass production is strong under the existing RED. The reliance on both solid and liquid forms of biomass is high in many MS.		
Storing, filtering and transforming nutrients and water	Implicit link by supporting Member States' action in relation to planning and flood risk management		Implicit link to changes in nutrient management practices.	Implicit link - Improvement in SOM should improve soil structure, assuming wider management improvements, therefore impacting on soil infiltration rates.

9.2.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection - Understanding the Relevance and Limits of Policy within the Cluster

The following Table 9.3 provides an assessment of the strengths, weaknesses, opportunities and threats of the individual policies in so far as they address soil protection. The policies examined within this cluster are focused on delivering climate change mitigation and adaptation goals. None of the policies has the explicit goal of soil protection, however, actions to deliver their goals potentially encompass questions of soil management. A key strength of the policies examined, in the context of this study, is that they offer the opportunity to promote soil health more holistically. Nonetheless, it should be noted that such actions are one of a number that could be adopted to meet the targets set. The question of soil organic matter content and improved nutrient management, which are closely linked to climate mitigation and adaptation goals, commonly deliver wider benefits for soil health. These include improving soil structure and reducing susceptibility to compaction and erosion. A key strength for soil protection of an increasing emphasis on improved soil management to deliver climate related goals is that improved soil carbon, changes to nutrient management and improvements in soil organic matter often address multiple pressures and threats experienced by soils. As a consequence, there are potential ancillary benefits if action is adopted appropriately and takes into account these wider societal and environmental benefits.

As pressure increases to better address GHG emissions from agriculture, manage the emissions associated with land use change and build resilience to adapt to climate change, there is a clear opportunity to actively drive more sustainable soil management. However, the weakness of the measures in place is twofold, in terms of soil protection:

- the policies set a high-level framework for emission reductions (for example within the Effort Sharing Decision, there are many different potential alternative approaches to securing the targets for climate) and there is no guarantee that more holistic soil management is required to be part of this; and
- specific action to address soil is absent (specific potential management actions are set out in the LULUCF Decision, but are removed in the proposal for a Regulation post 2020).

There are potential, significant opportunities for better protection of soils and better monitoring of soils linked to the climate change mitigation and adaptation policies examined here. The impetus for this will only increase as targets become more stringent. However, there is a great deal of scope for Member States and land managers in terms of the choices available to them to meet their goal. More holistic soil management practices have been proven to be effective for example where the Nitrates Directive has pushed certain regions to reduce inputs significantly, causing a major shift in the way that soils are managed and practices adopted in regions of the Netherlands (ISQAPER, Case Study exchange 2016). However, this is an example of a policy that was measurable, i.e. concentrations in water can be defined and had a very clear end goal (reducing Nitrates in water). The challenge for soil protection is that the goal is often less clear and the monitoring to identify if the change has been delivered complex. Different parameters apply to different soils in terms of what a soil

should be, the level of SOM and soil carbon it should/can encompass and the way to monitor whether this is achieved.

The implementation of soil actions to deliver climate goals requires integration of concepts of soil protection need, soil functions and the services soils should provide. This implies that a framework is necessary for understanding how soils can deliver and how change should be monitored. There are potential risks that holistic soil management approaches may be neglected or opportunities for maximizing gains and synergies missed in the absence of clear guidance on what is appropriate and what the recognised benefits are.

Delivering soil management goals through the climate instruments examined will rely on the integration of appropriate management into other policy fields. It is often more specific policies in other areas of environmental protection and land management that are directly driving behavior change: for example, through funding and requirements under the CAP, through requirements to manage soil inputs to protect water courses. Moreover, in the absence of defined EU level goals and needs for soil protection, there is a risk that actions on soil protection may be over looked.

Table 9.3 Strengths, Weaknesses, Opportunities and Threats in relation to Soil Protection: The Climate Change and Policy Energy Cluster

- **Strengths** - what does the policy cover well in relation to soil protection?
- **Weaknesses** - are there aspects limiting the protection afforded?
- **Opportunities** - are there any potential opportunities linked to the legislation which could benefit soil protection (in the context of this study, opportunities are understood as arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?
- **Threats** - are there any potential elements within the policy that might put at risk the protection of soils?

Policy	Strengths	Weaknesses	Opportunities	Threats
Adaptation Strategy	The Strategy provides an overarching framework to increase adaptation through different voluntary mechanisms that enhance the preparedness and capacity to respond at different levels to climate change effects, including on soil, develop a coherent approach and improve coordination	There are no explicit soil-focused mandatory requirements	A wide number of voluntary instruments are provided to Member States (guidelines, reports, monitor, financing, develop indicators for measuring resilience preparedness, promote awareness-raising) with the aim to increase the number of national adaptation strategies, which may have direct or indirect positive impacts on soil protection	Not in the Adaptation Strategy itself, but from the non-action by Member States
Renewable Energy Directive	Does in theory offer some protection of particularly vulnerable and carbon rich soils linked to sustainability both on high carbon stock lands and land with high biodiversity. However, this protection is only offered in terms of expansion for biofuel feedstocks linked to the EU RES target. Not to the wider expansion of the sector per se.	The protection linked to the RED is only linked to feedstocks for liquid biofuels not wider bioenergy, moreover there are no specific requirements linked to the NREAP process that requires land use/land protection for other RES development	Opportunities for soil management linked to the RED in particular the potential changes in crop patterns to more perennial crops – assuming this is linked to wider improvements in management. There are also potential opportunities linked to intercrops/catch crop use. Finally, the criteria on use of degraded land is a potential opportunity, however, one that has been little taken up to date.	There are potential threats to soil protection linked to the expanded use of biomass for energy linked to both the increased intensity of land management, expansion in certain types of land use and the potential change in cropping patterns and management practices. The nature of the threat is linked strongly to the types of feedstocks being promoted for renewable energy use and the scale of this use.
Effort Sharing Decision	Offers a basis for addressing wider emissions of GHGs linked to soil management in particular Nitrogen based nutrient management. Brings agricultural emissions into the context of wider GHG emission management.	Currently doesn't cover emissions linked to land use, although these will be integrated post 2020 based on current new proposals for action on LULUCF (see linked fiche) and the proposed opportunity to link additional net removals from the land	The tightening of targets for 2030 offers an opportunity to increase focus on emission reduction. In some MSs agricultural emissions make up a significant proportion of non ETS emissions, making this a potentially a significant driver for action. A key element of action is managing animal wastes, manure and	There are many alternative strategies that can be employed to deliver emission reductions within the non ETS sectors. Without a policy structuring the importance of action on soils and clearly establishing consistently the GHG benefits of action it is difficult to see how this might be

Policy	Strengths	Weaknesses	Opportunities	Threats
		<p>use sector to the wider GHG emission reduction profiles.</p> <p>The current Decision is very open in terms of the actions a MS can take to deliver reductions and no one sector has to deliver reductions to a specific level. Therefore, actions to address soil management and relevant aspects of agricultural emissions will vary between Member States.</p>	<p>in-organic fertilisers better. This potentially has benefits for soil management if alternative more holistic management strategies are employed to enable declining levels of nutrient additions. The addition and linkage of the LULUCF sector into the ESD offers an opportunity as soil management strategies are key to delivering and maintaining removals within the LULUCF sector.</p>	<p>coordinated going forward. Moreover, additional flexibilities afforded to meeting non ETS targets post 2020 including links to ETS sectors, links to LULUCF etc risks lessening the emphasis on emission reductions in the core sectors.</p>
Land Use and Land Use Change Decision	<p>Offers an opportunity to improve the monitoring and understanding of soils, sets out/promotes the adoption of specific ‘measures’ and management practices</p>	<p>Emission reductions are not required as part of the EU emission reduction framework up to 2020. Therefore, while MS must report on LULUCF up to 2022 there is no requirement to better manage and improve activities. There are no clear rules set out on how reporting should be completed e.g. on what basis SOM should be determined.</p>	<p>The proposal for a regulation for the 2020 to 2030 period potentially offers an opportunity to drive better management and promote land use management given the inclusion of LULUCF within the accounting period for GHG emission reductions. However, the opportunity will relate to how MS choose to take forward action under LULUCF and whether they use this as an opportunity to holistically improve soil protection and management practices.</p>	<p>Within the newly proposed LULUCF Regulation some of the detail included in the Decision has been lost – in particular on soil management practices.</p>

9.3 Integrated Assessment of the Climate Change and Energy Cluster

Climate change has the potential to exacerbate soil threats. However, improved soil management has the potential to help both mitigate GHG emissions and build resilience to the consequences of climate change, i.e. support adaptation. To this end key elements of the EU climate acquis were examined to understand their relevance for soil protection.

Now, and potentially more so into the future, there are opportunities for promoting soil protection and improvements in soil management linked to the emphasis on emission reductions. Specifically, there is a potential opportunity associated with the reduction in emissions from agriculture which is one route to delivering the EU's current effort sharing Decision and under the newly proposed Regulation to 2030. It should be noted that such reductions is indeed one route and the extent to which such opportunities are taken up will depend on the approach to emission reduction adopted by a given Member State. The growing emphasis on reporting and accounting for land use, land use change and forestry GHG emissions and associated monitoring of soil organic matter and soil management offers a parallel impetus that could be anticipated to grow in importance post 2020.

The climate policies examined for both mitigation (ESD, LULUCF Decision and Renewable Energy Directive) and for adaptation (the Adaptation Strategy) all set out strategic high level goals. In reality action on soil protection will still be delivered, via other policies that more directly impact on land managers' behavior; for example, the provisions of the CAP or requirements under the Nitrates and Water Framework Directive. Joining up and integrating soil goals into these measures is, therefore, important in terms of maximising the benefit of the climate measures examined here.

Climate policies moving forward have the potential to both influence the way in which soils are managed as well as higher level land use decisions. The Renewable Energy Directive sets targets for the delivery of renewable energy as a whole and in transport by 2020. While it makes no specific reference to the delivery of these goals through the use of bioenergy, many Member States anticipate significant expansion in the use of solid biomass for heat and power sectors and liquid biofuels for transport sector. The chosen emphasis on biomass implies a potential change in the management of land in terms of the crops grown and intensity of production (both in agriculture and forestry). The shift offers potential opportunities for soil protection and presents some threats. For example, the emphasis on potential perennial crops may support increase in soil organic matter on degraded lands, but only if appropriately sited and managed; conversely increases in forest and agricultural intensity of extraction may imply less positive changes in soil carbon and nutrient management regimes.

The renewable energy Directive sets out sustainability criteria to divert biofuel feedstock production from certain land of high carbon stock and from highly biodiverse grasslands. This implies the protection of certain key soils, although the protection is limited to biofuel feedstock cultivation. Moreover, there are opportunities to promote the use of degraded land for biofuel feedstock production within the RED. This demonstrates the potential opportunities of integrating climate and soil management issues.

The EU climate acquis offers opportunities for integrating and promoting soil protection, in particular better management of soil organic matter and management of nitrogen nutrient inputs. However, the emphasis is on emission reduction rather than more holistic soil management or the adoption of improved soil management systems. There are many potential alternative routes for achieving the climate outcomes (in particular under the effort sharing Decision). There is a risk that soil protection may be deprioritised or actions undertaken without consideration of the potential wider benefits of soil management alternatives, in the absence of clear goals or priorities for soil. A key challenge is the lack of clarity in relation to a clear, definable end point that might deem a soil to be in a good state and well managed i.e. to have retained levels of organic matter appropriate to that soil type.

9.4 Comparing EU Level Issues and Gaps to Member State Policy Action

A number of issues and challenges associated with the delivery of soil protection based on EU policy requirements included in this cluster can be identified. These are summarised below in Box 9.1. This section examines the extent to which nationally initiated policies set out in the Soil Wiki appear to address the gaps and issues that remain at the EU level and whether comparable approaches apply across the Member States.

Box 9.1 Key Issues and Potential Gaps in EU Policy for Further Investigation

As noted in section 9.3 the EU climate acquis and its proposed evolution to 2030 (including closer ties to emissions from land use change proposed and more stringent requirements for emission reductions from non EU ETS sectors including agriculture) offer opportunities for promoting and integrating soil protection. This specifically relates to the management and monitoring of soil organic matter and nitrogen based nutrient inputs. However, several limitations exist:

- The climate policies examined for both mitigation (ESD, LULUCF Decision and Renewable Energy Directive) and for adaptation (the Adaptation Strategy) all set out strategic high level goals. Action on soil protection will in reality still most likely be delivered via other policies that more directly impact on land management behaviour.
- While climate change mitigation policy has a potentially important role in future soil management the emphasis is on emission reduction rather than more holistic soil management with the adoption of improved soil management systems. There are many potential alternative routes for achieving the climate outcomes. In the absence of an integrating or overarching policy goals for soil, there is a risk that soil protection may be deprioritised or actions undertaken without consideration of the potential wider benefits of soil management alternatives.
- A specific challenge for integrating soil management in climate policy and the question of soil organic matter and soil carbon is the lack of a clear definition of good soil status, i.e. when soil is deemed to be in a good state and well managed for the purpose of climate goals. This links to wider questions of soil monitoring in Europe.

9.4.1 Review of Key Issues and Potential Gaps

The issues raised in relation to climate protection essentially focus on two aspects of policy making. Policies in the Inventory were reviewed to identify nationally initiated actions relevant to the following questions.

- Whether policy is in place to provide a strategic basis for coordinating the integration and monitoring of soil issues in the context of climate mitigation and adaptation?
- Whether soil protection is being prioritised in the context of delivering climate mitigation and adaptation goals?

The question of whether Member States have in place a strategic and holistic approach to soil protection within their policy was examined in Chapter 4 in relation to the overarching policy cluster. This identified that, when Member State action was taken into account, there remained an apparent gap in terms of strategic policy setting and targets for soil protection. The analysis within the overarching cluster also examined soil monitoring and identified that approaches taken at Member State level were mixed. More work would be needed to examine whether and how the policies in the Soil Wiki are dealing with the question of climate change and integration into climate policy action of soil management needs.

In relation to the protection of soil carbon and preserving soil organic matter a key tool is action under the CAP and in particular provisions utilized under measure 10 (agri-environment-climate measures) within Rural Development Programmes – these activities are discussed in Chapter 5. Detail on Member State actions in relation to soil carbon were examined.

The inventory records a number of policies focused on combating the loss of soil organic matter and/or preserving soil carbon stores that Member States consider to be additional to EU actions. These include the following:

- Strategic policies that explicitly contain a focus on soil protection – for example in Hungary the Second National Climate Change Strategy recommends use of cultivation that requires less soil disturbance and specifically flags soil functions as in need of protection;
- Specific policies focused on the preservation of agricultural land – for example in Lithuania the Law on Land regulates land ownership, management and use; as well as land management and administration and contains specific provisions focused on preserving the fertile soil layer; in Hungary the Act on the Protection of Cultivated Soils places obligations on soil protection authorities and sets out measures to be undertaken on cultivated soils.
- Policies specifically protecting certain soil types - for example in Ireland the National Peatland Strategy specifically aims to conserve the countries peatland. The Strategy is focused on the integration of peatland protection and the prioritization of protection on sites of conservation value and on rehabilitating/rewetting sites.

Further investigation is needed into the extent of the above types of policies at national level. The Soil Wiki contains only a limited number of entries in relation to, climate change

strategies, for example. This reflects that the inventory population is in its first stages and Member States tended to focus on policies more explicitly linked to soil protection or linked to questions of contamination. This is an area for further investigation as it is a complex and emerging topic, i.e. how best to protect Europe's soils and deliver climate goals.

9.5 Comparing Coverage of EU and National Policies – Outstanding Questions and Conclusions on Policy Coverage

The mitigation of and adaptation to climate change offers potential opportunities for soil protection, especially because of the important role of soil carbon and soil organic matter in preserving wider soil functionality and structure. The implementation of climate actions offers choice between different GHG mitigation options and potentially differing solutions to address the issue of GHG emissions. In the absence of a policy that clearly sets out the actions necessarily to protect soil carbon and organic matter and thus provides the basis for integration into wider policies, there is a risk that opportunities from climate change policies will not be realised.

Based on the Soil Wiki a topic for potential further investigation could be to group Member States that have adopted strategic policy approaches and monitoring regimes related to agricultural or cultivated soils. Among these policies, a number appear to go beyond EU requirements and may offer interesting approaches for addressing soil management issues.

Importantly, in the context of protecting soil organic matter and soil carbon, several Member States have in place measures not linked to national or EU level laws, but linked directly to international Conventions. Austria, for example, includes action under the Soil Conservation Protocol of the Alpine Convention; and Portugal cites their National Programme to Combat Desertification (linked to the UN Convention on Combating Desertification). While not referred to in the Soil Wiki, the UN Sustainable Development Goals could provide an impetus for further action on soils via the implementation of the goal 15.3 on land degradation neutrality. The role of international conventions, in the absence of an integrated EU framework, could be investigated further.

10 Key Messages: Policy Coverage of Soil Protection in Europe

10.1 Framing and Scope of the Analysis

The analysis looked at policy instruments in place and their coverage of soil threats and functions. The soil threats most commonly explicitly addressed in policy instruments included in the Wiki (i.e. explicitly referenced in the text of a measure) were loss of soil organic matter and industrial and point source contamination. The functions most commonly addressed by the policy instruments reviewed were biomass production and providing a platform for human activities.

However, within the conclusions of the analysis, less emphasis is placed on the explicit coverage of individual soil threats and functions. The reason for this is that analysing soil threats and functions in isolation fails to capture the importance of soil quality and soil protection as a whole, i.e., as an environmental goal in its own right. The emphasis on a given threat tends to focus in on very specific actions, rather than soil quality or good soil status. Thus, this also fails to consider the interaction among key soil threats, or among management options. Moreover, there may be trade-offs in the delivery of specific soil functions, and some soils will be better suited to delivery of some functions rather than others. In addition, while a function might be better delivered on high quality soils, for example biomass production, its delivery does not necessarily rely on soils being in good environmental condition in a holistic way.

The Wiki was populated using contemporary references as well as inputs from Member State assessors and national Member State experts. The inventory seeks to cover the breadth of soil protection issues and provide a baseline overview of policy coverage on soil protection in Europe. There are some limitations to the inventory in terms of the level of detail that is available (for example, the inventory only captures limited information on the diverse regional activities in Member States), as well as understanding the interaction among the policies and their context, including national and regional governance systems. In particular, within Federal Member States soil protection is often under the purview of regional authorities and some innovative actions undertaken at regional level may have been missed in the inventory.

Based purely on the Wiki and the additional resources that are available at present (see Chapter 11 for examples), it is difficult to provide definitive answers on how Member State policy coverage complements or addresses the gaps in EU level legislation.

The analysis of Member State policy instruments focused on those instruments included in the Wiki which are considered as nationally initiated (i.e. linked partly to EU non-binding instruments or not linked to EU instruments at all). This analysis provides a first introduction and highlights key issues that could be investigated further the national level in particular to understand how Member State policies interact to protect against a given soil threat or preserve a specific function, or more generally soil quality or ecosystem services. In addition, as noted for the Netherlands and some other Member States (for example in Sweden) the structuring of the national laws and policies has now moved away from a focus on specific

threats and functions to a discussion on societal needs and goals and the role that soils play in delivering these. These more nuanced approaches to soil protection are difficult to capture in an overview inventory. However, they offer an interesting basis for understanding potential future policy direction. Policy instruments that contribute to soil protection cut across a wide range of sectors and land uses.

10.2 Conclusions

Soils deliver a multitude of functions and ecosystem services to society and are also subject to various pressures and threats. Given the cross-sectoral nature of soil issues and the diversity of environmental and socio-economic pressures and governance conditions across Europe, it is not surprising that many different policy instruments at EU and Member State level exist that either explicitly reference soil threats or soil functions, or implicitly offer some form of protection for soils.

Within this study, 35 EU level and 671 Member State policy instruments have been identified and examined. At EU level, the instruments range from strategic documents, to directives and regulations as well as funding instruments. At Member State level, three quarters of the instruments included in the Soil Wiki are regulatory instruments, and the majority of these (61% out of 671 instruments) are binding in nature. Nearly half of all Member State instruments included in the Wiki are directly linked to EU policies (45%), i.e., their implementation is mandated by the EU acquis. Another 21% are linked partly to EU binding instruments, which means that they implement the EU binding legislation but also go beyond the acquis in either the degree of ambition that they set for EU requirements or they regulate additional areas that do not derive from the EU acquis. This means that a total of 225 identified instruments (35.5%) are 'nationally initiated' policies, i.e. policies partly linked to EU non-binding policies or not linked to any EU requirements. The number and diversity of the Member State instruments in the Soil Wiki on the one hand reflects the cross-cutting nature of soils. On the other hand, this also underscores the importance and challenge of integration and coordination of policy instruments in order to ensure that soil issues are addressed coherently.

Based on the analysis, soil functions are more likely to be addressed implicitly³¹ in Member State legislation; so too is the soil threat of declining soil biodiversity.

The analysis has shown a number of strengths relating to the coverage of soil threats and functions by existing EU laws. These include:

- Relatively strong EU policies are in place that help mitigate, manage and prevent local contamination events within the scope of policies such as the Industrial Emissions Directive and the Environmental Liability Directive and also a push from water protection rules to address diffuse contamination and erosion;

³¹ Within the study, a soil function or threat is addressed implicitly when the policy document does not explicitly state or make reference to the threat or function nor are these listed as a goal of the policy.

- Strategic EU policies that offer opportunities for protecting soils including priorities in the Seventh Environmental Action Plan (7th EAP) on sustainable land management and sustainable and resource efficient nutrient cycling;
- Funding instruments at EU level, including the Cohesion Fund, European Regional Development Programme, Life+ and Horizon 2020, can be used for the remediation of land where liable parties cannot be identified or held to account, and to support research related to soil protection;
- The CAP is a funding instrument with obligations for Member States to apply defined land management requirements as a condition of Pillar 1 direct payments to farmers (including soil-relevant cross-compliance and greening requirements). Pillar 2 of the CAP offers more subsidiarity and provides Member States and regions with a wide range of measures that they can choose to use in their Rural Development Programmes to promote improved management of both agricultural and forest soils.
- State aid guidelines allow Member States to make use of national funding to support soil remediation where no liable party can be identified and held to account;
- Measures focused on limiting contamination in Europe address both emissions from specific installations and the presence of dangerous substances in the environment at large.

Furthermore, there are opportunities for soil protection that can emerge from improved use of existing legislation or through upcoming EU policy dossiers. In terms of improved usage of existing legislation, there is potential to further build on priorities within the 7th EAP, and promote more holistic soil management as a tool for delivering goals on sustainable land management and more sustainable and resource efficient nutrient cycling. The 7th EAP mandate to the European Commission to pursue a binding legislative proposal remains an opportunity, although at present other priorities appear to dominate.

The climate and energy package for 2020 – 2030 includes potential opportunities for soil protection linked to GHG emission reduction targets through better soil organic matter protection and management, and the more sustainable use of inorganic (especially nitrogen) fertilisers and manure. Specifically, there is some potential for soil protection in the current proposals for a Land Use and Land Use Change and Forestry Regulation (LULUCF) and an Effort Sharing Regulation (ESR) requiring GHG emission reductions from sectors excluded from the EU Emissions Trading Scheme, including agriculture up to 2030.

Whether the strengths and opportunities identified above indeed result in benefits for soil protection depends on how soil issues are integrated and prioritised in these policy instruments. There is no guarantee that, for example, GHG mitigation in the agricultural sector will be prioritised under the ESR since the split of effort among non ETS sectors is determined by each Member State. Moreover, even if Member States were to prioritise agriculture as part of their efforts to maximise reductions in net GHG emissions, there is no requirement that this must encompass sustainable soil management techniques that also deliver other soil functions. Similar to climate change policies, water protection policies are also important existing instruments identified for protecting Europe's soils. Nonetheless, there is also no specific requirement in water quality legislation to remediate or protect the

soil in situ. Instead, the goal of water legislation is to prevent negative impacts on water bodies and this could be delivered in multiple ways.

When looking at the weaknesses of EU level policy instruments in protecting Europe's soils the lack of a coherent, strategic policy framework was highlighted across all policy clusters. This lack of a common and integrated strategic policy frame is an important gap, one that had been intended to be filled by the withdrawn Soil Framework Directive proposal. Therefore, a strategic policy framework is missing that would, in an integrated manner: conceptualise soil issues (including common definitions on good status); set out priorities and targets; define monitoring parameters and desired end points; and define the role of different policy instruments in delivering good soil status. In the absence of a common policy framework, soils are addressed in many policy instruments but there is no EU level political or legislative driver for establishing integration and coherence towards an agreed strategic aim and objectives. Not only does this mean the EU policy frame is limited for soils, it means that existing strengths and opportunities that have been identified cannot be fully explored and exploited.

The analysis of nationally initiated policy instruments (national initiatives) in the EU-28 Member States confirms that the lack of strategic coordination is an important theme. Some Member States have comprehensive policies in place that take account of soil protection. However, many of the policies that require the integration of and strengthening in relation to soil protection needs and objectives are EU level policies. This includes critical measures relating to agricultural land management, pollution prevention, water and biodiversity protection. Member State opportunities to address these EU level policy questions of integration are more limited.

The importance of integration is underlined by the fact that EU, national and regional policies interact with international policies, such as the United Nations Convention to Combat Desertification, the Alpine Convention and the United Nations Framework Convention on Climate Change. Several Member States highlighted both the EU and international policies as important drivers of policy decision making on soil issues. The emphasis being placed on halting and reversing land degradation within the Sustainable Development Goals and work on the conceptualisation and implementation of land degradation neutrality (Goal 15.3) also offer potential opportunities for increasing emphasis on soil protection in Europe.

In addition to the lack of strategic coordination of soil concerns at EU level, other weaknesses in the coverage of EU law identified included:

- That soil protection is an outcome mostly derived from protecting other environmental resources, addressing other environmental threats or delivering other goals or end points;
- Key policies that offer some strategic vision are non-binding, and as such they cannot be used as a clear basis for integrating and reinforcing the protection of soil within existing EU laws in the way that, for example, water protection laws such as the Water Framework Directive can be cross referenced within IED or under Statutory Management Requirements set out in CAP cross-compliance.
- Land protection may not equate to soil protection, in some key EU policies protection from contamination in particular is focused on land protection not explicitly soil protection. These are not necessarily one and the same thing. Land can be protected but important soil functionality can be lost.

- Historic contamination that persisted before the introduction of key EU policies, such as IED (and prior to IED IPPC) and the Environmental Liability Directive is not addressed by EU laws and there are no binding rules in place for detecting or defining contaminated sites.
- There is limited elaboration in EU law of soil functions, what these consist of and the action that their protection implies. Moreover, a question has also emerged during the study regarding the elaboration of the role of ecosystem services provided by soils and the limited representation of these in legal texts. References to protection of soil biodiversity are missing from legal texts such as the main CAP Regulations, yet key soil functions depend on healthy populations of soil microorganisms and fauna and the biological processes they provide, including nitrogen fixation, carbon storage, water filtration and bioremediation.

Limited evidence was identified in this study to suggest that across Europe, at the national level, action has been taken to address the weaknesses in EU law identified. In some Member States there does exist mechanisms in particular to define contaminated sites, coordinate action on historic contaminated sites and the identification of contaminated sites. For the majority of countries, however, it was concluded that coverage of key weaknesses and issues at EU level was partial. In some Member States coordinated action on soil protection or the threats faced appears to be lacking.

Soil protection policy is evolving in Europe, with Member States at different stages in addressing soil threats and emphasising soil functions. Several Member States are in the process of further developing their policy relating to soil protection to shift the way soil issues are represented. This includes increasing emphasis on soil health, soil utility and societal outcomes delivered through soil protection.

The CAP is rather different from other EU policies in its scope and implementation, with a high level of subsidiarity in Pillar 2, which allows Member States the freedom to design and target very specific support for soil protection, if they wish to do so. Pillar 1 direct payments, which are made to farmers on around 90% of agricultural land in the EU, account for around 75% of the CAP budget and are important economic driver of land use and management decisions by individual farmers. Member States have much less flexibility in implementation of Pillar 1, compared to Pillar 2, but they have some choices, for example in defining farm-level requirements for cross-compliance and Pillar 1 greening, within a framework of rules set out in the CAP legal texts. There is potential to tighten some of these EU rules in a way that would strengthen potential soil protection benefits at Member State level. Rural Development Programmes under Pillar 2 of the CAP are one of the most important policy instruments for soil protection on farm and forest land in the EU. Member States have the option to use a wide range of environmental land management, investment and capacity building measures for soil protection. However, these measures can also be used for many other competing rural priorities under their EU Pillar 2 funding (which they have to co-finance, unlike Pillar 1).

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12 Annex 1: Labels in Soil Wiki

The following listing shows the labels used in the online inventory.

Group 1 – EU-wide Policy Instruments:

- 1-7th_environmental_action_programme
- 1-adaptation_strategy
- 1-biocides_directive
- 1-biodiversity_strategy
- 1-circular_economy_package
- 1-cohesion_fund
- 1-common_agricultural_policy-cross_compliance
- 1-common_agricultural_policy-direct_payments
- 1-common_agricultural_policy-rural_development_programme
- 1-construction_products_regulation
- 1-corine_land_cover
- 1-effort_sharing_decision
- 1-environmental_impact_assessment_directive
- 1-environmental_liability_directive
- 1-eu_forest_action_plan_and_strategy
- 1-european_regional_development_fund
- 1-european_social_fund
- 1-eu_sustainability_strategy
- 1-fertilizer_regulation
- 1-floods_directive
- 1-geological_storage_of_co2_directive
- 1-groundwater_directive
- 1-habitats_birds_directive
- 1-industrial_emissions_directive
- 1-inspire-directive
- 1-landfill_directive
- 1-life+_programme
- 1-lulucf_decision
- 1-marine_strategy_directive
- 1-national_emission_ceilings_directive
- 1-nitrates_directive
- 1-pesticides_directive
- 1-renewable_energy_directive
- 1-sewage_sludge_directive
- 1-soil_sealing_guidelines
- 1-soil_thematic_strategy
- 1-strategic_environmental_assessment_directive
- 1-thematic_soil_strategy
- 1-urban_waste_water_treatment_directive

- 1-waste_framework_directive
- 1-waste_management_extractive_industries_directive
- 1-water_framework_directive

Group 2 - Types of MS Instruments:

- 2-economic_instruments-liability_schemes
- 2-economic_instruments-payments
- 2-economic_instruments-pricing
- 2-economic_instruments-subsidies
- 2-economic_instruments-voluntary_agreements
- 2-information_instrument-public_information
- 2-information_instruments-farm_advisory_services
- 2-information_instruments-innovation_groups
- 2-information_instruments-participation
- 2-information_instruments-public
- 2-information_instruments-public_information
- 2-information_instruments-trainings_qualifications
- 2-instrument_with_direct_impact_on_soil
- 2-instrument_with_indirect_impact_on_soil
- 2-monitoring-national_monitoring_systems
- 2-monitoring-private_monitoring_systems
- 2-regulatory_instruments-bans
- 2-regulatory_instruments-binding_instruments
- 2-regulatory_instruments-environmental_impact_assessment
- 2-regulatory_instruments-environmental_impact_assessments
- 2-regulatory_instruments-environmental_law_regulations
- 2-regulatory_instruments-environmental_strategies_action_plans
- 2-regulatory_instruments-guidelines
- 2-regulatory_instruments-non_binding_instruments
- 2-regulatory_instruments-permits_quotas
- 2-regulatory_instruments_planning_zoning
- 2-regulatory_instruments-planning_zoning
- 2-regulatory_instruments-soil_protection_law_regulations
- 2-regulatory_instruments-soil_protection_strategies_action_plans
- 2-regulatory_instruments-standards
- 2-regulatory_instruments-targets
- 2-research_innovation-assessments_soil_status_ecosystem_services
- 2-research_innovation-research_projects

Group 3 – EU Member States:

- 3-austria
- 3-belgium
- 3-bulgaria

- 3-croatia
- 3-cyprus
- 3-czech_republic
- 3-denmark
- 3-estonia
- 3-finland
- 3-france
- 3-germany
- 3-greece
- 3-hungary
- 3-ireland
- 3-italy
- 3-latvia
- 3-lithuania
- 3-luxembourg
- 3-malta
- 3-netherlands
- 3-poland
- 3-portugal
- 3-romania
- 3-slovakia
- 3-slovenia
- 3-spain
- 3-sweden
- 3-united_kingdom

Group 4 – Soil Functions:

- 4-acting_as_carbon_pool-explicitly_addressed
- 4-acting_as_carbon_pool-implicitly_addressed
- 4-biomass_production-explicitly_addressed
- 4-biomass_production-implicitly_addressed
- 4-hosting_biodiversity_pool-explicitly_addressed
- 4-hosting_biodiversity_pool-implicitly_addressed
- 4-platform_for_human_activity-explicitly_addressed
- 4-platform_for_human_activity-implicitly_addressed
- 4-providing_raw_materials-explicitly_addressed
- 4-providing_raw_materials-implicitly_addressed
- 4-source_of_raw_materials_implicitly_addressed
- 4-storing_filtering_transforming_nutrients_water-explicitly_addressed
- 4-storing_filtering_transforming_nutrients_water-implicitly_addressed
- 4-storing_geological_archeological_heritage-explicitly_addressed
- 4-storing_geological_archeological_heritage-implicitly_addressed

Group 5 – Soil Threats:

- 5-acidification-explicitly_addressed
- 5-acidification-implicitly_addressed
- 5-compaction-explicitly_addressed
- 5-compaction-implicitly_addressed
- 5-contamination_diffuse-explicitly_addressed
- 5-contamination_diffuse-implicitly_addressed
- 5-contamination-explicitly_addressed
- 5-contamination-implicitly_addressed
- 5-contamination-industrial_point_source-explicitly_addressed
- 5-contamination-industrial_point_source-implicitly_addressed
- 5-desertification-explicitly_addressed
- 5-desertification-implicitly_addressed
- 5-erosion-explicitly_addressed
- 5-erosion-implicitly_addressed
- 5-erosion_water
- 5-erosion_water-explicitly_addressed
- 5-erosion_water-implicitly_addressed
- 5-erosion_wind-explicitly_addressed
- 5-erosion_wind-implicitly_addressed
- 5-flooding_landslides-explicitly_addressed
- 5-flooding_landslides-implicitly_addressed
- 5-loss_of_soil_biodiversity-explicitly_addressed
- 5-loss_of_soil_biodiversity-implicitly_addressed
- 5-loss_of_soil_organic_matter-explicitly_addressed
- 5-loss_of_soil_organic_matter-implicitly_addressed
- 5-salinisation-explicitly_addressed
- 5-salinisation-implicitly_addressed
- 5-soil_sealing-explicitly_addressed
- 5-soil_sealing-implicitly_addressed

Group 6 – Land cover classes:

- 6-agricultural_areas
- 6-artificial_surfaces
- 6-forests
- 6-semi-natural_areas
- 6-water_bodies
- 6-wetlands

Other labels:

- eu_wide_policy_instruments
- member_state

- national_initiatives
- not_linked_to_eu
- partly_eu_binding
- with_indicators
- with_monitoring

13 Annex 2: Soil Stakeholders' Conference Report

13.1 Executive Summary

This report summarises the Conference “Soil Stakeholders conference” held on 5 December 2016 in Brussels. The aim of the conference was to contribute to the World Soil Day 2016 by raising awareness about the importance of soils and the ecosystem services that they deliver, and to contribute to the implementation of the EU Soil Thematic Strategy. The importance of soil in relation to ecosystem services, current threats to soil health and current international responses were highlighted in the first plenary. This was supplemented with the results from the current project on the ‘Updated Inventory and assessment of soil protection instruments in the EU Member States’. The project developed an inventory of soil related policies at both EU and MS levels in order to provide a comprehensive review on how MS instruments complement and address the identified gaps at EU level.

The second part of the conference focused on gathering the views, ideas and priorities from stakeholders in four parallel working sessions. Each working session identified key issues, actions and priorities on different soil-related topics which were then presented and discussed in plenary. The results of the working sessions provide rich ideas for further work in the area of soil protection - from the need to provide common definitions relevant for soil protection to raising awareness on the role of soil in climate-related policies to concrete actions, such as developing of integrated spatial planning policy and making the most of synergies between public/private partnerships motivating further action. The conference successfully brought together stakeholders from a variety of sectors to discuss the current state of play of soil policy and ways to move forward. This structured dialogue with ‘soil stakeholders’ was highlighted as essential in developing future policy on soil in the EU.

13.2 Introduction

This report summarises the Conference “Soil Stakeholders conference” held on 5 December 2016 in Brussels in the context of facilitating dialogue with stakeholders. The conference was organised under the EU project “Updated inventory and assessment of soil protection policy instruments in EU Member States”³² and brought together around 200 participants from a variety of backgrounds comprising EU and national decision makers, researcher, managing authorities, industry, NGOs and civil society.

This conference report provides an overview of the programme and summarises the main elements of the presentations, subsequent discussions as well as the key messages and stakeholders’ views derived from the four parallel working group sessions.

The aim of the conference was two-fold. First, to contribute to the World Soil Day 2016 by raising awareness about the importance of soils and the ecosystem services that they deliver, and second to contribute to the implementation of the EU Soil Thematic Strategy.

³² This project was carried out by the Ecologic Institute in cooperation with IEEP, Milieu, CEET, BEF Group and KU , for more information see <http://ecologic.eu/13090>

The specific objectives of the conference were to:

- present inventory of soil-related legislation at EU and national level and gap analysis, as well as the first outcomes of the MAES Soil pilot³³;
- discuss challenges and ideas with stakeholders relating to current policy and identify possible improvements

The conference consisted of two plenary sessions and four parallel working sessions. Keynote speakers and panellists were invited to share their views on possible ways forward for EU soil policy. The parallel working sessions were interactive, giving stakeholders the opportunity to discuss challenges and opportunities in more detail. The working sessions were built up around two horizontal and two thematic soil related themes:

- Session I Identifying challenges and opportunities for further policy development;
- Session II Potential of an ecosystem services approach;
- Session III Soil contamination; and
- Session IV Sustainable management of agriculture and forest soils.

In addition, a Lunch session was organised to present the European Soil Partnership in presence of its Chairwoman Ms Elena Havlicek (Switzerland).

The report is structured using the agenda for the conference provided in section 2. Section 3 provides a summary of the presentations and panel discussion in the morning plenary session. Section 4 provides a recap of the lunchtime session “The European Soil Partnership”. Section 5 describes objectives and methods used in the Parallel working sessions. Key messages, actions and priorities, discussion and conclusions of these are presented in section 6.

³³ Mapping and Assessment of Ecosystem Services is part of the EU biodiversity strategy (Action 5) COM(2011)244 – more information on MAES can be found at <http://biodiversity.europa.eu/maes>

13.3 Agenda

9:30 – 12:30 Plenary Session I – State of play of soil policy in the EU to protect soil

Chair: *Claudia Olazaábal (Head of Land use and Management unit, DG Environment, European Commission)*

9:30 – 10:10 Opening session

- Welcome, European Commission, Claudia Olazábal (European Commission, DG Environment)
- Keynote speech, Pr. Olivier De Schutter (University of Louvain-la-Neuve, Belgium, Co-Chair, International Panel of Experts on Sustainable Food Systems - IPES-Food),
- International context and importance of soil sustainable management, Dr Luca Montanarella (European Commission, JRC and Chairman of the International Technical Panel on Soil)

10:10 – 12:30 State of play of soil protection and soil policy in the EU

10:10 – 10:25 Overview of key recent activities at EU level, *Josiane Masson (European Commission, DG Environment)*

10:25 – 11:15 Presentation of the inventory of national and EU legislation pertaining to soil protection and gap analysis, *Ana Frelih-Larsen (Ecologic Institute), Catherine Bowyer and Clunie Keenleyside (Institute for European Environmental Policy)*

11:15 - 11:30 Conclusions on the inventory of legislation on soil protection in the EU and identified gaps, *Josiane Masson (European Commission, DG Environment)*

11:30 – 12:30 Panel and debate on soil policy in the EU - *Co Molenaar (Senior advisor soil and water, Ministry of Infrastructure and Environment, NL), Eric Gall (Policy Manager, IFOAM EU), Pieter de Pous (Policy Director, European Environment Bureau), Liisa Pietola (Chairwoman of Working Party on Environment, COPA-COGECA)*

12:30 – 14:00 *Lunch break*

13:10 – 14:00 Lunchtime session – European Partnership

- Presentation of the European Soil Partnership and call for European partners, *Elena Havlicek, ESP Chair*

14:00 – 16:00 Parallel Working Sessions

14:00 – 14:15 Objectives and organisation of the parallel working sessions, *Robert Pederson (Milieu)*

14:15 – 16:15 Parallel working sessions I, II, III, IV

- Session I: Identifying challenges and opportunities (international agenda, duty of care, comprehensive vs. 'cluster' based approach etc.)
- Session II: Moving from a physico-chemical mind-set towards a soil ecosystem and ecosystem services approach?
- Session III: Identification and remediation of contaminated sites - how much public intervention is needed for historically degraded soils?
- Session IV: How to promote agriculture and forest soil sustainable management?

16:15 – 16:45 *Coffee break*

16:30 – 18:10 Plenary Session II: Wrap up of parallel sessions and conclusions

16:45 – 18:00 Feedback from parallel sessions by the rapporteurs of the parallel sessions and final discussions with stakeholders

18:00 – 18:10 Conclusions, DG ENV

18:10 *End of the conference*

13.4 Plenary Session 1- State of Play of Soil Protection Policies in the EU

Claudia Olazábal (Head of Land use and Management unit, European Commission, DG Environment) opened the conference and welcomed participants. She recalled the context of this conference organised by the European Commission as a contribution to the World Soil Day declared by the United Nations General Assembly on 5th December. The European Commission remains fully committed to soil protection in the EU and has set up a soil expert group with experts mandated by the MS to reflect on 7th EAP commitments on soil.³⁴ At a global level (Sustainable Development Goals (SDGs), Climate Change) the importance of soil is recognised and is moving at a higher speed than EU policy, so there is a need to move forward in Europe.

13.4.1 Opening Session

Towards soil health in the EU, Keynote Speech, Professor Olivier De Schutter

Professor Olivier De Schutter (University of Louvain-la-Neuve, Belgium, Co-Chair, International Panel of Experts on Sustainable Food Systems - IPES-Food) started his key note speech by highlighting six key threats to soil health, including soil erosion, soil organic matter decline, compaction, salinisation, contamination and sealing. At global level 42% of cultivated land is degraded due to unsound agricultural practices and this is exacerbated by climate change. Prof. De Schutter stressed that investing in soil health and soil ecosystem services brings multiple benefits.

Prof. De Schutter outlined 'the vicious cycle of productivism' - intensive use of inputs, intensive irrigation, aggressive process such as tillage resulting in loss of fertility - as the main driver behind soil degradation processes. However it is not irreversible, a transition from this cycle is possible, from a more vicious circle towards virtuous cycles such as agroecology and diversified farming systems. The main barriers to achieving this transition were then presented briefly in terms of the 'eight lock-ins of industrial agriculture' including inter alia compartmentalized thinking, the consumer expectations relating to cheap food, higher demand for biomass production, path dependency and export orientation of our current food system and policies. The narrative of 'feeding the world' is also an obstacle for change and the productivity per ha is still very often seen as a single or dominant target. Market prices are decreasing and farmers do not have other choice than to grow or die.

In summary Prof. De Schutter, emphasised that in order to improve soil health, a new approach is needed that looks at not only production outputs in terms of yield per hectare, but also broader benefits such as consumption outcomes, environmental protection and health. The need for a Common Food Policy was highlighted which would integrate The Common Agricultural Policy (DG AGRI), Environmental policy (DG ENVI), The Health and Food Safety policy (DG SANTE) and The Trade Policy (DG TRADE) to deliver a holistic and more consistent and coherent policy approach beneficial for farmers, environment and EU citizens.

³⁴ "The Union and its Member States should also reflect as soon as possible on how soil quality issues could be addressed using a targeted and proportionate risk-based approach within a binding legal framework. Targets should also be set for sustainable land use and soil."

International Context and importance of sustainable soil management, Dr. Luca Montanarella

Dr Luca Montanarella (European Commission, JRC and Chairman of the International Technical Panel on Soil) stressed the importance of sustainable soil management in the international context and the importance of soil as a cross-cutting issue linking the areas of food security, climate change, biodiversity and desertification. Dr Montanarella gave an overview of the international context, highlighted the role of the Global Soil Partnership initiative set up by UN General Assembly, consisting of the GSP Secretariat, intergovernmental technical panel on soils (ITPS) and its key partners focusing on the current membership of the ITPS as well as the development of regional soil partnerships. There is a growing interest in soil linked to climate change (UNFCCC COP21 and COP22, the 4p1000 initiative), UNCCD Land Degradation Neutrality (SDG 15.3) and on soil biodiversity (in the context of the Convention of Biodiversity and with the publication of the Global Atlas of Soil Biodiversity by the JRC in 2016). He provided a summary of the status and trends of soil threats that have been published in the Global Soil Partnership World Soil Atlas in 2015.

In closing, Dr Montanarella stressed the significance of soils and soil science in the context of the UN Sustainable Development Goals (SDGs), with soils explicitly mentioned in four targets but also required for the achievement of several goals. the SDGs. Dr Montanarella emphasised the need for the dissemination, use and evaluation of the Voluntary Guidelines for Sustainable Soil Management (VGSSM) which provide ten key guidelines for sustainable soil management. This process should be facilitated by national governments, regional and sub-regional soil partnerships and local actors need to be closely involved. . According to Dr Montanarella, looking at difficulties to set up binding instruments at Global and EU level voluntary and partnership approaches are another way to progress.

Following these keynote speeches participants were invited to raise questions relating to the keynote speakers, which were addressed as following:

Is there sufficient evidence for sustainable management practices to communicate those to farmers and promote their uptake? (National Farmers' Union, Wales)

- In general, soil assessment and sampling are quite costly and time consuming, but the EU Land Use/Cover Area Frame Survey (LUCAS) provides a first step in this direction. (Dr Luca Montanarella)

How to cope with the costs of change in practices? (DG Agriculture)

- Economic incentives need also to be aligned with societal benefits. Moreover, an increase in awareness for healthy soils benefiting to society (clean water, biodiversity, etc.) is needed. It is also important that farmers get rewarded and supported to enable a transition toward sustainable farming (for 2-3 years). (Prof. De Schutter)

How can the Sustainable Soil Management (VGSSM) guidelines implemented in practice? (Environment Agency Austria)

- There is low progress towards soil protection, but to date there is also an increasing interest in healthy soils in science, policy and also society/citizens. Overall there is a clear need to work more at local level. (Dr Luca Montanarella)

13.4.2 State of play of soil protection and soil policy in the EU

Overview of key recent activities at EU level

Ms Josiane Masson (DG Environment) provided an overview of the Soil Thematic Strategy from 2006 in relation to its overall objectives and guiding principles and outlined the four key pillars of EU soil policy namely, awareness raising, research, legislation, and integration in other policies.

The main threats to soils were presented and key achievements of the Thematic Strategy were highlighted. Ms Masson explained the structure of the proposed Soil Framework Directive which was withdrawn in 2014 and outlined the interactions of current work on soil health in relation to 7th Environment Action Programme (EAP). In the following, she outlined the key ongoing actions on EU soil policy, including the launch of an EU Expert Group on Soil Protection, the creation of an inventory of soil protection measures at EU and national level and an analysis of gaps in current policy.

In conclusion, Ms Masson gave an overview of the state of soils within the EU highlighting the main soil threats faced by the continent as described by the European environment — state and outlook 2015 (SOER2015) and the report's conclusion that the current EU legal framework is insufficient in relation to soil protection.

Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States

Dr Ana Frelih-Larsen, Ecologic Institute, gave an overview of the project concerning the 'Inventory and assessment of soil protection instruments in the EU Member States'. Dr Frelih-Larsen pointed out that the study aims were three-fold: First, the aim was to develop an inventory of existing and upcoming policy instruments at EU level and in 28 Member States (MS) in a collaborative Wiki web platform. Second, based on this inventory, to identify gaps in EU legislation with respect to soil threats and functions which feed into the third aim, to provide a comprehensive review on how MS instruments complement and address the gaps at EU level.

Dr Frelih-Larsen provided a brief summary of the soil Wiki platform development process as well as structure of its content. The Wiki includes both MS instruments as well as EU level instruments. In relation to MS instruments, it was noted that there is a great diversity across Member States in terms legislation and policy relating to soil. There are 671 national instruments in total recorded in the Wiki, the majority of which (61%) were in the "regulatory binding" category. Dr Frelih-Larsen highlighted that the majority of national-level instruments are directly or partly linked to the EU level instruments (507 in total).

Dr Frelih-Larsen illustrated the situation by MS in relation to number of MS policy instruments per soil threat and soil function and examples for binding instruments (such as for example an overarching Soil Policy Act) in various MS were provided. The Wiki also provides a summary of EU-level instruments, and Dr Frelih-Larsen pointed out that 35 EU policy instruments were analysed for their relevance to soil threats and functions, and highlighted the most frequently tagged EU policy instruments within the national inventory. In conclusion, Dr Frelih-Larsen stressed that the soil inventory creates an overview and a baseline, however the interactions between instruments are more difficult to capture and analysis would need to go beyond the inventory in order to capture these.

Inventory and Assessment of Soil Protection Policy Instruments in EU Member States – Methodology for EU gap analysis and MS review

Ms Catherine Bowyer, Institute for European Environmental Protection (IEEP) gave an overview of the second element of the study, the gap analysis. In particular, Ms Bowyer explained how the methodology was used for the gap analysis and MS review. First, Ms Bowyer explained the aims and objectives of the task at hand i.e. carrying out the preliminary gap analysis by contrasting soil threats and soil functions and how these are covered by the policy instruments, and assessing how well the policy cover soil protection issues. She pointed out that the analysis provided an assessment of existing policies contribution to preventing soil threats and/or recovering soil functions. Based on this, MS summaries were created according to soil threat and soil function.

Consequently, Ms Bowyer explained in greater detail how the gap analysis was performed at both MS and EU-level. EU policies were reviewed and feeding into the gap analysis at national level, and helped to identify whether MS policies consistently address these EU-level gaps. Ms Bowyer clarified that a “cluster approach” was used to support the assessment of whether groupings or clusters of policies and instruments are relevant in relation to the nature of the given threats, act coherently and/or result in gaps. Ms Bowyer then summarized the process of national policies review and noted that this complemented the inventory documented in the Wiki by giving a historical perspective and reviewing the threats and functions that are the addressed by MS policies.

In conclusion, Ms Bowyer provided an overview of overarching policies at EU level and highlighted a couple of important issues revealed by the analysis. First soil protection is an outcome mostly derived from protecting other environmental resources, second the EU Thematic Strategy on Soil is the only EU policy dedicated solely to soil and third only a limited number of MS have strategic, coordinated approach in relation to soil protection.

Inventory and Assessment of Soil Protection Policy Instruments in EU Member States, Soils and the CAP - EU legislation and MS implementation,

Ms Clunie Keenleyside, IEEP, focused on instruments for protecting soil within the context of the Common Agricultural Policy (CAP). Ms Keenleyside provided a brief summary of the instruments under the current CAP (2014-2020) and emphasised the role of CAP as an important economic driver of land management decisions across the EU.

An overview of relevant Good Agricultural and Environmental Conditions (GAEC) pertaining to soil standards was provided, GAECs number 4, 5, 6 specifically provide agricultural and environmental conditions relating respectively soil cover, soil erosion and soil organic matter - defined by Member States for 2015. Ms Keenleyside explained greening obligations in the current CAP and their potential impact on soil protection/improvement. In relation, to greening obligation concerning crop diversification, Ms Keenleyside pointed out that preliminary analysis of this greening measure indicates that farmers must change the crop on only approx. 1% of EU arable land. In relation to permanent grassland greening obligation, Ms Keenleyside noted that outside Natura 2000 areas only three Member States and one region have designated Environmentally Sensitive Permanent Grassland (ESPG) in contrast to 75% of permanent grassland designation as ESPG within Natura 2000.

Ms Keenleyside concluded her intervention by bringing attention to EU-28 analysis of selected land management practices required or programmed for GAEC standards 4, 5, 6 and 7, Pillar 1

greening obligations and agri-environment-climate schemes (under the Rural Development Policy) and illustrating the situation by showing the presence/absence of good management practices in Member States. The CAP is rather different from other EU policies in its scope and implementation, making it difficult to assess gaps at EU level when so much depends on implementation choices. The high a level of subsidiarity in Pillar 2 gives Member States the freedom to design and target very specific support for soil protection, if they wish to do so. They have choices in Pillar 1 too, for example in defining farm-level requirements for cross-compliance and Pillar 1 greening, within a framework set at EU level. It is clear from the EU-28 analysis that this flexibility has been used in many different ways, both in choosing which soil management actions to prioritise and whether to do this using Pillar 1 requirements or RDP funding. Perceived gaps in implementation in some Member States may be difficult to address without constraining the flexibility necessary for effective soil protection elsewhere in the EU, although there is scope to tighten some of the EU rules in a way that would strengthen potential soil protection benefits at Member State level.

Conclusions on soil inventory and identified gaps

Ms Josiane Masson (DG Environment) presented an overview of the current gaps in EU policies and instruments relating to soil health in general. Key disparities were highlighted, with a focus on the lack of a clear definition of soil across EU policies and in national legislation.

Ms Masson presented the main gaps in groupings or clusters of EU policy. These clusters are:

- CAP and forest cluster
 - Soil protection is addressed in 3 CAP instruments but a large flexibility is left to MS and farmers which do not always use the full potential of soil-related measures; forest soil protection is still limited.
- Local contamination cluster
 - Industrial Emissions Directive (2010/75/EU) - not all installations are covered, emissions to soil is mentioned but it is not a priority. The Environmental Liability Directive (2004/35/EC) only covers part of activities, only applies to damages caused after April 2007. Historic contamination and orphan sites are not addressed by EU policies and vary a lot from one MS to the other. Remediation can be financed under EU regional funds.
- Diffuse soil pollution cluster
 - Diffuse soil pollution partly addressed by EU legislation (waste and landfills, water policies etc.) but difficult to address and quantify

In conclusion Ms Masson pointed out that there is a list of 'open issues' pertaining to legislative gaps within the current EU framework, with emphasis put on the need to demonstrate that healthy soil and soil ecosystem services are essential for societal challenges and for sustainable development.

13.4.3 Panel and debate on soil policy in the EU

Ms Claudia Olazábal introduced the expert panel, and stressed the importance in engaging with stakeholders to examine current gaps in legislation and developing ideas on how to move forward. The panellists were asked to highlight the most important issues from their perspective and their thoughts on how to move forward.

Mr Co Molenaar, Senior advisor Soil and Water, Ministry of Infrastructure and Environment in the Netherlands, stressed that policy-making is more than legislation and some MS may decide consciously to use non-binding instruments instead of regulations. It is the role of governments to build capacity and facilitate change i.e. by raising awareness about the importance of soil and building support for action among citizens. Mr Molenaar also pointed out that soil policy in the Netherlands is currently in transition moving away from sectoral instruments towards an integrated approach (under spatial planning) that is fully decentralised policy and the responsibility of local governments. This new development is expected to deliver tailored solutions at the local and regional level and ensure a more effective soil protection.

Ms Liisa Pietola, Chairwoman of Working Party on Environment, COPA-COGECA, highlighted that soil is the farmers' main partner, specifically referring to the following three key elements. First, it is in the interest of farmers to have good productive soil, therefore, many agri-environmental schemes under the Rural Development Programme are useful for farmers and that there has been a lot of improvement in European farming practices over the last decades. Second, attention needs to be paid to key soil threats – in particular soil sealing and land abandonment which are big issues for productivity, and the impact of climate change on loss of fertility. Third, there is a lack of data relating to carbon content of soils. Ms Pietola stressed that this issue needs to be researched further, data collected with the active engagement of farmers as a prerequisite for developing targets for soil carbon content. In conclusion, Ms Pietola stressed that there is already too many instruments and flexibility is needed because soil management depends on local conditions and farmers are the ones who have the best knowledge in this area.

Mr Eric Gall (Policy Manager, IFOAM EU) stressed that intensive farming practices are part of the current problem relating to soil degradation and that we cannot afford to continue with a business – as – usual approach. Mr Gall pointed out that there is also good news, because there are a number of agri-ecological practices that can improve soil organic content and thus overall soil health. As farmers are among the first victims of climate change, the implementation of these practices is equally important for farmers as well as addressing climate change. Although a lot has been achieved over the years, the key question is whether it is enough.

In relation to the CAP, Mr Gall highlighted several issues. CAP continues to favour export based production and does not reward farmers who implement practices which are beneficial for the environment. Although greening measures are a positive step forward, a number of farms are exempted from obligations, thus the efficiency of these measures is significantly reduced. There is a lack of monitoring of the impact of CAP on the ground and first analyses show little impact of greening on the ground. Mr Gall also pointed out that the subject of soil is often sidelined because of focus on other issues like water quality, which have clear targets

through environmental policies. He stressed that an essential step forward is to reward farmers who maintain ecosystem services.

In conclusion, Mr Gall stated that there is no contradiction between the EU- level legislation and local level implementation as the authorities have sufficient scope for maneuver to achieve the desired outcome. Looking at past reforms CAP is a very big policy with many instruments but it is difficult to change, it should be reoriented towards ecosystem services delivered to farmers but also to citizens , which is not reflected in the current discussions on the new CAP reform. IFOAM supports the People4Soil initiative calling for a Soil Directive at EU level.

Mr Pieter de Pous (Policy Director, European Environment Bureau) stated that currently it is not possible to think of any topic as critical, and as essential as soil which at the same time receives so little political attention and that the fundamental problem is a structural neglect linked to the shrinking number of priorities of the Commission.

Mr de Pous stressed that there is now scientific consensus that soil is doing very badly in relation to its quality and health but 10 years after the Soil Framework Directive proposal little has changed at MS level. Mr de Pous emphasised that during the 40 years of EU environmental policy there has been improvement in air quality, return of wildlife, legislation dealing with chemicals, but a successful dealing of soil as a vital resource is still missing and the need for action is now greater than ever. Mr de Pous brought attention to the fact that currently it is possible to address the ownership issues with the collective problem together. Mr de Pous cited the example of EU directive on energy efficiency in buildings where these two issues were brought successfully together.

In conclusion, Mr de Pous stressed the need for the CAP to be transformed into a real food and farmer policy, close to citizens and consumers and that political responsibility on national level is critical for success in addressing soil protection issues.

Debate – questions and comments from the audience

The presentations were followed by discussion with the audience. The following issues were highlighted:

- Soil health definition and target setting should be done at farm level, employing a practical and bottom up approach
- The issue of soil sealing, which is currently the main soil threat for agricultural land.
- The issue of implementation of soil protection measures within the CAP on the national level, where the Member States have a large scope for intervention and manoeuvre (DG AGRI)
- The potential of local measures and society at large as opposed to continual legislative measures at EU level i.e. many Member States still need soil protection legislation as they are at different development stages (an academic representative from Portugal in reference to Mr Co Molenaar’s intervention)
- Substantial volume of regulation is counterproductive in achieving healthy soil i.e. there is a need to take a different approach – start at the farm level as every farm

is unique and requires targeted solutions - a bottom-up approach is therefore a way forward.

The panellists were then asked to respond to these issues:

Mr Gall stated that CAP is not currently supporting small farmers, in relation to soil management and on-going soil sealing, it is very difficult for small farmers to find land. Therefore, access to land as basis for agricultural production is crucial and priority has to be given to sustainable farming practices. In response to emphasising bottom-up approaches, Mr Gall agreed in principle, but stressed that since the action on soil is given very low priority, we first need clear policy framework, which could then drive action on the ground. What is needed is flexibility at the local level as well as clear targets to drive policy action. Mr de Pous also stressed that we need both bottom-up and top-down approaches to be successful and address current gaps in policy implementation.

Ms Pietola agreed that we need farm specific measures. She also emphasised the need to focus in particular on productive soils. Mr Molenaar highlighted that there are differences between Member States and legislation needs to reflect this, and suggested strongly, that we need to harness the energy of society not just legislation, and that the instruments and solutions are tailor-made. Ms Pietola re-stated that farmers have too many regulations to deal with and that, in her opinion, this represents a barrier because farmers fear that they will be penalised if they are not compliant with all these rules. Mr Gall restated that there are regulations applicable to farmers but this is necessary because soil is a common good and farmers receive a significant public support, referring to current expenditure for CAP (approx. 40% of the EU budget).

Ms Olazábal concluded the morning session and thanked the speakers, panelists and participants for their active participation.

13.5 Lunch Time Session – European Soil Partnership (ESP)

13.5.1 Introduction to the European Soil Partnership

Ms Elena Havlicek (ESP Chair) explained that the European Soil Partnership (ESP) was launched in 2013 and members include all 28 EU Member States (plus other non-EU countries) as well as 90 pan European organisations. Ms Havlicek then emphasised soil sealing as a main threat alongside soil contamination and loss of biodiversity. The main challenge is not only to protect the soil but also to manage it (as opposed to other elements like the air for example where management is not needed). Along these lines, Ms Havlicek stressed that we need different approaches than the ones we currently apply to other resources, as soil is a living organism.

Consequently, Ms Havlicek noted that knowledge, practice, legislation and guidance are all in place, so where are the problems coming from? What is needed is a shift in thinking and convincing politicians about various soil functions, for example the role of soil in food security.

In this respect, Ms Havlicek explained that the role of the ESP is not primarily concerned with obtaining more knowledge and developing more studies, but it is concerned with bringing people together and talking to people on the working on the ground. Using a case study from

Germany, where a tool to embed soil functions in the spatial planning was developed, Ms Havlicek illustrated the work of the ESP. The tool that was created was a map indicating soils of high value. The map can be used to determine differentiated taxes for developers or planner intending to use a certain parcel of land.

In conclusion, Ms Havlicek stressed that in many countries such as Switzerland, UK and Germany, guidelines to protect soil during construction and excavation already exist and this good practice should be spread.

Luca Montanarella added that everyone is welcome to join the ESP and that the partnership is open to anyone interested in the issue of soil. Josiane Masson said that more promotion of the ESP activities would be good to facilitate sharing knowledge, and exchange experiences and good practice. All participants are invited to become partners to the ESP by contacting the ESP secretary (email address esp-sc@jrc.ec.europa.eu).

13.5.2 Discussion with the audience

A question regarding how “in-the-field” organizations can get involved was put forward. Ms Havlicek referred to the implementation of the five Global Soil partnerships pillars, indicating that one pillar aims to create a network of advisers and farmers. This action is also supported by DG Environment as it sees bringing soil stakeholders together as an essential step. Mr Montanarella stressed that the ambition is to involve all stakeholders i.e. each time there is a discussion about soil we end up discussing agriculture, and pointed out that there is a lot of soil which needs attention not just agricultural and we need to reach out to all stakeholders.

A second remark from the audience stressed that farmers do not operate in the vacuum – how do we integrate all relevant stakeholders, not only farmers?

In response, Mr Montanarella stressed that the idea of global soil partnership was to involve everyone, not only farmers but also agro-industry. Currently, complex global soil data systems are being developed by big companies. Mr Montanarella agreed that there are many communities which deal with soil and have a lot of valuable information not just farmers and this needs to be explored.

13.6 Parallel working sessions

Robert Pederson (Milieu) introduced the parallel working sessions and explained that the objectives of the working sessions were to:

- Identify key challenges and gaps (both knowledge and policy)
- Develop possible ideas and improvements on ways to move forward on soil protection in the EU
- Collect stakeholders opinions and views related to the themes

Or put in simpler terms to get input from stakeholders regarding current challenges and potential solutions.

The parallel working sessions were built up around four themes as described in the agenda and the participants were dividing into 3 – 4 smaller subgroups of 10-15 people to facilitate richer discussion of the issues. A “world café” method was used to ensure active discussion

and participation in the working sessions. Each subgroup worked with a specific sub-theme and was given a set of guiding questions to ensure a more targeted discussion of relevant issues. Details on the sub-themes and guiding questions for each parallel working session are provided in Appendix 2.

Each subgroup was then asked to identify three to four key actions, based on their discussion and present those to the bigger session group. In the following all participants were asked to prioritize all presented actions (using three votes per participant). The rapporteurs for each of the parallel working sessions presented then the key messages and results in the plenary session. The outcomes are presented in section 6 below.

13.7 Plenary Session 2 – Wrap up from parallel sessions

13.7.1 Reports from parallel sessions

Session I – Identifying challenges and opportunities

Dr. Ana Frelid-Larsen (Ecologic Institute) presented the following priorities and actions in relation to the theme of identifying challenges and opportunities:

- Improve policy coherence following agreed environmental / soil targets
- Reach agreement on common definitions (good status, soil functions) before defining duty of care
- Need to regulate land use change (e.g. spatial planning)
- More specific focus on soil protection within climate policies
- Gaps in EU soil policy remain (historical contamination, agricultural soil management)
- Opportunity for the EU to be a frontrunner in implementing international targets (SDG 15.3, FAO's Voluntary Guidelines for Soil Sustainable Management)

Session II – Moving from a physico-chemical mind-set towards a soil ecosystem and ecosystem services approach?

Robert Pederson (Milieu) highlighted the active participation in this group and outlined the themes that the parallel session worked with and based on discussion across groups highlighted two cross cutting issues that are important to consider:

- Ecosystem services is not only about farms but also about cities where the majority of people live in EU and where the majority of consumption takes place
- The concept of ecosystems and ecosystem services is still evolving

Mr. Pederson highlighted three main priorities and actions identified by participants in the working session:

- Ecosystem services are an integrated tool to raise awareness on the value of soil among stakeholders - companies, farmers, citizens
- The need to develop integrated spatial planning policy

- Developing tools to help people understand ecosystem services– user guidance to define and assess ecosystem services – the objective is to develop an ecosystem assessment tool – as very practical approach

In addition, discussion on ownership relating to private land and public goods (ecosystem services) an interesting case of good practice from the Netherlands was highlighted – a pilot partnership between water providers and farmers, where water providers pay farmers for the ecosystem service they provide in relation to water.

Session III – Identification and remediation of contaminated sites – how much public intervention is needed for historically degraded soils?

The rapporteur for Session III, Ms Bowyer (IEEP) outlined the main emphasis of the work of Session III:

- Preventing contamination/site identification/promoting remediation – what motivated change/how can change be motivated/good examples
- Public versus private interventions and case of orphan sites
- Agreement on gaps and issues identified and question of historic sites/coordination of soil contamination activities

In the discussions in the smaller groups 3, three cross-cutting themes emerged:

- Discussion on the role of overarching policy; its role in setting a baseline and methodological approaches
- How to overcome the issue of funding and the funding gap for remediation and who pays, the role of private actors and the role of public actors in their motivation
- Role of public actors as facilitators in the process of remediation not delivering but making it happen.

Ms Bowyer then presented definite ‘top actions’ with a high degree of agreement and common themes that emerged from the groups:

- Make the most of synergies between public/private partnerships and motivate this further – good examples of this with proven value in recycling land. Motivator for action.
- Transfer of ownership – opportunity linked to real estate, generation of data for understanding potential contamination. Linked to the point on feasibility studies to support land purchases and encourage investment.
- Legislation is a motivator for water protection/food quality.
- Procedural instrument would be helpful setting out methodological approaches to standards, risk based approaches setting continuity of approach but allowing site specific adaptation.
- Guidelines for use of public versus private funding, clarification of what is possible in line with state aid.

Session IV – How to promote sustainable soil management in agriculture and forestry?

Rapporteur Ms Keenleyside (IEEP) presented the following key messages for Session IV:

- Soil policies, measures and targets must respect the specific local soil conditions, status and issues (e.g. relative importance of peat soils and salinisation varies across the EU). Targets may be difficult but if attempted must respect this point.
- Soil organic matter is critical to soil regeneration and to soil fertility and soil biodiversity. It takes time to improve Soil Organic Matter (SOM) at farm level, but soil can be regenerated. There is a need to remember that soils should not be treated as renewable resources.
- Importance of training, information and advice/advisers needs to be given more recognition/effort in context of changing land management behaviour and farmer attitudes. More specific points in this context:
 - To raise technical skills of farmers, training could be a compulsory condition of CAP support (with those farmers who could pass a soil management 'exam' or test exempted from this requirement)
 - Must train the farm advisers, not just the farmers; also focus on 'lead' farmers who can influence their peers.
- Another approach to changing farmer behaviour/management, raised in one sub-group, could be an initial up-front incentive payment which would no longer be necessary after a few years.
- To improve orientation of the CAP towards soils, there is a need for underpinning soil legislation (compare with WFD for water, Natura 2000 for biodiversity). Peat soil management and maintenance of soil carbon needs specific rules.
- European Innovation Partnership on Agricultural Productivity and Sustainability (EIP-AGRI), Operational Groups (which are bottom-up) and farming industry-led initiatives (which may not be using government funds) could be a useful way of promoting local/regional initiatives on soil protection/management.
- Paludiculture (production of specialised crops which grow in rewetted peatland soils) was mentioned as a promising approach.
- Result-based payments and targets may be possible for SOM but more difficult for erosion.
- Crop rotation has benefits (but unclear if it can replace crop diversification in CAP greening obligations).

13.7.2 Plenary discussion

Following the presentations of key messages, conference chair Claudia Olazábal opened the floor to the audience to raise any outstanding points/comments in relation to the four parallel sessions in turn. The following provides a summary of the points raised in each session.

Session I

It was highlighted as a positive sign that the discussion is moving from soil threats to ecosystem services (COPA-COGECA).

Session II

- The change from a physico-chemical mind-set towards a soil ecosystem and ecosystem services approach presents a major shift and huge step in thinking, which also necessitates new knowledge (Claudia Olazábal, DG ENVI)
- It is important to show how ecosystem services are connected to societal challenges and that ecosystem services can be protected by protecting soil rather than emphasising soil threats and decline of soil functions (Dutch Ministry of Infrastructure and Environment).
- The role of soil in carbon sequestration and climate change mitigation was stressed (COPA-COGECA).
- A question was asked regarding compensation for ecosystem services i.e. what would be the territorial limits (researcher in Environmental Law)?
- Finally, regarding integrated spatial planning, a question was asked regarding who would be responsible for implementing an integrated/spatial planning approach and what does it include, e.g., water, soils (German Environmental Agency)? Mr. Pederson responded, that by integrated spatial planning, his understanding was to develop a more integrated approach across sectors. Ms Olazábal (DG ENVI) added that it is Member States who would be responsible for spatial plans, while the Commission is asked to assist Member States in implementation (with data, guidance, tools etc). Finally the point was raised– that integration should be taken very broadly, involve different sectors and societal challenges employing a systematic approach. It is a challenge but an important one (the Dutch National Institute for Public Health and Environment).

Session III

No issues or comments were raised.

Session IV

- At the beginning of the session a point was made that soil can be regenerated and restored. Ms Olazábal confirmed that indeed there is a lot of effort focusing on restoration and remediation activities at the Commission.
- A question about new technologies, which were hardly discussed, was raised i.e. substantial amount of data is currently available via digital technologies, satellites which create a situation ('data economy') where companies have more information than farmers. What is the view of the panellists in building this big data platform and how to combine public and private investments in data gathering and made it publically available (Yara, Mineral Fertilizer Company)? Ms Olazábal responded that data generated by private companies such as Unilever or Kellogg's are very useful and available without compromising commercial confidentiality and creating new public-private partnerships could be an option. Rapporteur Ms Frelih-Larsen added that the issue of coordinating and harmonizing data sources is an important one. For example, combining data for CAP payments with carbon accounting for farms requires harmonization, but it is an interesting area to explore. Such data could provide a valuable source for CAP assessments

and the evaluation/valorisation of land. Finally, it was stressed that the quality of data is very important as well as privacy issues - farmers have their responsibility but should also gain some profit if their data are shared (COPA-COGECA).

13.7.3 Conclusions

In conclusion, Ms Olazábal announced that the report on the 'Inventory and Assessment of Soil Protection Policy Instruments in EU Member States' will be publicly available in the first quarter of 2017 on the Commission's website

(http://ec.europa.eu/environment/soil/publications_en.htm)

The Commission plans to continue to engage in a structured dialogue with the Member States and with 'soil stakeholders' to discuss the possibility of a new soil policy legislation and to conduct an impact assessment to prepare for a new policy proposal. Ms Olazábal pointed also out, that although the legislative proposal on soil by the Commission is unlikely to come in 2017 or 2018, a continuous dialogue between the Member States, the Commission and stakeholders is nevertheless very important in order to come up with a high quality proposal which will receive sufficient support. Ms Olazábal closed the conference and thanked the organisers, and speakers and participants for the fruitful discussions.

Appendix 1: Themes and questions for parallel working sessions

Session I: Identifying challenges and opportunities (international agenda, duty of care, comprehensive vs. 'cluster' based approach etc.)

Moderator: Claudia Olazábal, DG Environment

Subgroup 1 - Gaps in EU legislation

- Which do you think are the main gaps at EU level and why? What could be the added-value of EU action to fill the existing gaps?
- What would be the advantages and disadvantages of a common binding framework at EU level vs. voluntary approaches or various national rules?
- Should the EU focus on a subset of the soil threats or on all the soil threats present in the EU?

Subgroup 2 – Integration in other policy areas

- In terms of integration in other policy areas, what are the key policy areas (besides agriculture and forestry) where challenges for integration exist and what is needed to improve the integration of soil protection concerns in these policies?
- How can the 2030 climate policy being developed (e.g. LULUCF, etc.) contribute to the protection of soil in the EU? Are there any associated risks/threats to be managed?
- How can the global Sustainable Development Goals and targets on soil protection and land degradation neutrality trigger EU action on soil? How to ensure that the different SDGs with provision on land and/or soil (SDGs 2, 3 and 15) are implemented in an integrated manner? What policy changes are needed?

Subgroup 3 – Level playing field and duty of care

- How should a level playing field be ensured for economic operators to operate in the internal market?
- What degree of duty of care should be applied on privately owned soils given that these are delivering benefits for the wider society (i.e. ecosystem services)?

Subgroup 4 - Data to support policy making

- In your view is there sufficient soil data generated in the EU or should there be an extra effort on data collection and dissemination?
- How to improve the valuation of soil functions and soil protection costs-benefit analysis (e.g. how to collect evidence, quantitative vs qualitative approach, etc.)?

Session II: Evolving from a pure physico-chemical mind-set towards a soil ecosystem and ecosystem services approach?

Moderators: Margot de Cleen (Ministry of Infrastructure and the Environment, NL and Robert Pederson (Milieu)

Subgroup 1 - Benefits and good examples of an ecosystem services approach

- What are the benefits of moving towards an ecosystem service approach for soil protections and what would be necessary for such a transition?
- What are existing good examples for this and opportunities for moving forward?

Subgroup 2 – Legislative tools for ecosystem approach

- How could soil protection be better ensured with an ecosystem approach and what policy and legislative tools should be employed?

Subgroup 3 – Information and capacity building needs

- What are the information and capacity building needs?

Session III: Identification and remediation of contaminated sites – how much public intervention is needed for historically degraded soils?

Moderator: Johan Ceenaeme (OVAM, Belgium)

Subgroup 1 – Motivators and good examples

- What are the key motivators to take forward identification and remediation of sites?
- What are existing good examples of identification and remediation approaches (privately and publicly funded)?

Subgroup 2 – Public vs private intervention, and management of orphan sites

- What are the advantages and disadvantages of public intervention and the key success factors for this to work better than private intervention? When private intervention is on the contrary necessary or more effective?
- What are the conditions for dealing with orphan sites and remediating those with high risk to human health and environment? Set up of specific fund for orphan sites: is it feasible/acceptable for all MS? How to incentivize PPPs?

Subgroup 3 - Gaps and the role of EU policy for soil contamination

- Do you agree with identified gaps in existing legislation (identification of historical contaminated sites, remediation of sites when there is a risk on human health and/or environment, issue of remediation)? Do you consider those gaps should be covered by EU policy instrument?
- The national legislation on contaminated sites varies a lot from one MS to the other. Would it be possible to define common requirements and/or targets to deal with contaminated sites? How to define actions with sufficient flexibility to accommodate the variety of situation, avoiding additional requirements for MS already well advanced in the management of contaminated sites but defining objectives for MS where national legislation is less advanced?

Session IV: How to promote sustainable soil management in agriculture and forestry?
Moderators: Josiane Masson (DG ENVI) and Angelo Innamorati (DG AGRI)

Subgroup 1 & 2- CAP

- This year the Global Soil Partnership of FAO adopted the "Voluntary Guidelines for Soil Sustainable Management" which identify sustainable management practices applicable at global level. Such practices are already implemented e.g. in conservation agriculture. How to promote the implementation of those guidelines in the EU? Do you consider that they need to be adapted to the European situation? How could their implementation be better supported by CAP measures (compulsory/voluntary)?
- How to make best use of existing CAP instruments and principles (subsidiarity, flexibility)?
- Do you consider that more precise targets on soil would help to improve soil protection in CAP? What changes to existing instruments and/or additional instruments under a future CAP could be envisaged to ensure a sustainable management of agricultural and forestry soils? Could result-based payment be an effective way of achieving soil protection under the CAP?

Subgroup 3 - Research and innovation, and new technologies

- Within the CAP framework, what should be the soil protection priorities for research/innovation and farm advisory systems? What characterises the best examples and what issues have these focused on?
- How can new technologies and innovation help to protect soils and get a better knowledge of soil properties?
- What are the challenges for national and regional authorities in promoting sustainable soil management in both agriculture and forestry and how can these be overcome?

Subgroup 4 - Balance between voluntary and legal obligations

- How can sustainable soil management be ensured at the scale of individual holdings? Can this be ensured only by voluntary action or should there be legal obligations to ensure a level playing field among different agriculture/forestry holdings?

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1 EU Adaptation Strategy

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - An EU Strategy on adaptation to climate change (COM (2013) 216)

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Adaptation Strategy (COM (2013) 216) provides an overarching framework with the aim to increase adaptation through different voluntary mechanisms that enhance the preparedness and capacity to respond at different levels to climate change effects, including on soil, develop a coherent approach and improve coordination. The Strategy explicitly address erosion and flooding, while indirectly provide support to limiting compaction, loss of soil biodiversity, loss of soil organic matter and soil sealing. It also indirectly supports almost all soil functions.

Although no explicit soil-focused mandatory requirements are enclosed in the Strategy, a wide number of voluntary instruments are provided to Member States (guidelines, reports, monitor, financing, develop indicators for measuring resilience preparedness, promote awareness-raising) with the aim to increase the number of national adaptation strategies, which may have in turn direct or indirect positive impacts on soil protection. Given the wide range of instruments available, as well as the extent to which they may be relevant to soil protection, it is likely that Member States' approaches vary widely.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	I	Through implementation by Member States of Rural Development Programmes (RDPs) under Pillar 2 of the CAP	
Contamination - diffuse	N/A		
Contamination – point source	N/A		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Desertification	N/A		
Erosion - water	E	By selecting LIFE programme projects prioritising adaptation action; By mainstreaming adaptation measures into EU forestry policy and Member States legislation	
Erosion - wind	E	As above	
Flooding / landslides	E	By supporting Member States' action in relation to planning and flood risk management	Landslides are indirectly addressed by adaptation actions in relation to planning and management by identifying resources (e.g. soil) that are vulnerable to climate change.
Loss of soil biodiversity	I	By selecting LIFE programme projects prioritising adaptation action; By mainstreaming adaptation measures into EU biodiversity policy and Member States legislation	
Loss of soil organic matter	I	Indirectly addressed through adaptation actions by Member States in relation to planning and management by identifying resources (e.g. soil) that are vulnerable to climate change.	
Salinisation	N/A		
Soil sealing	I	Indirectly addressed through adaptation actions by Member States in relation to planning and management by identifying resources (e.g. soil) that are vulnerable to climate change.	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	I	By selecting LIFE programme projects prioritising adaptation action	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Platform for human activities	I	Through implementation by Member States of Rural Development Programmes (RDPs) under Pillar 2 of the CAP	
Biomass production	I	Through implementation by Member States of Rural Development Programmes (RDPs) under Pillar 2 of the CAP By mainstreaming adaptation measures into EU forestry policy and Member States legislation	
Hosting biodiversity	I	By mainstreaming adaptation measures into EU biodiversity policy and Member States legislation	
Providing raw materials	I	Through implementation by Member States of Rural Development Programmes (RDPs) under Pillar 2 of the CAP	
Storing, filtering and transforming nutrients and water	I	By supporting Member States' action in relation to planning and flood risk management	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Strategy provides an overarching framework to increase adaptation through different voluntary mechanisms that enhance the preparedness and capacity to respond at different levels to climate change effects, including on soil, develop a coherent approach and improve coordination

Weaknesses - are there aspects limiting the protection afforded?

- There are no explicit soil-focused mandatory requirements

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- A wide number of voluntary instruments are provided to Member States (guidelines, reports, monitor, financing, develop indicators for measuring resilience preparedness, promote awareness-raising) with the aim to increase the number of national adaptation strategies, which may have direct or indirect positive impacts on soil protection

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Adaptation Strategy itself, but from the non-action by Member States

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Given the wide range of voluntary measures available to Member States, as well as the extent to which they may be relevant to soil protection, it is likely that Member States' approaches vary widely.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Following the publication of the Adaptation Strategy, no relevant evaluation reports have been produced.

Section 3 - Base Information¹

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - An EU Strategy on adaptation to climate change (COM (2013) 216)

Summary

The EU Adaptation Strategy (COM(2013) 216 final) was put forth by the Commission on 16 April 2013 and the Council adopted its conclusion in June of the same year.² The Strategy was preceded by the 2009 White Paper "Adapting to climate change: Towards a European framework for action", which set out adaptation actions.

Implementation of the Strategy is based on eight different actions:³

- 1) Encourage all Member States to adopt comprehensive adaptation strategies. The Commission developed guidelines to assist Member States in creating adaptation strategies, it is developing a 'scoreboard' to measure Member States' resilience, and in 2017 there will be an assessment of Member States progress.
- 2) Provide LIFE funding to support capacity building and step up adaptation action in Europe (2014-2020). The LIFE programme created a climate action sub-programme and areas vulnerable to climate change have been prioritised for the 2014-2020 LIFE work programmes.
- 3) Introduce adaptation in the Covenant of Mayors framework (2013/2014). The Commission has launched an initiative where local authorities can commit to adopting local strategies and awareness-raising activities for adaptation.
- 4) Bridge the knowledge gap. Knowledge gaps and appropriate tools to address them will be identified and fed into the Horizon 2020 research programme, and a cross-sectoral review of EU risks has been completed which is to inform the EU-wide vulnerability assessments.

¹ Section 3 - Base information for the EU fiches included in this Annex is mostly extracted from the document: Frelih-Larsen, A., S. Naumann, L. Porsch, E. Dooley, S. Bell, B. Görlach (2016) "Up-to-date review of EU policies and integrated impact assessment methodology". Deliverable 9.1 RECARÉ project. Ecologic Institute, Berlin.

² See European Commission DG Climate Action, EU Adaptation Strategy Package, http://ec.europa.eu/clima/policies/adaptation/what/documentation_en.htm.

³ European Commission, The EU Strategy on adaptation to climate change, http://ec.europa.eu/clima/publications/docs/eu_strategy_en.pdf.

5) Further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe.

6) Facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP). The CAP reform was completed and there were greening measures included, and the COM provided guidance on how to integrate climate adaptation into the programme design, development and implementation during 2014-2020. Cohesion and CAP funds can also be used "to address knowledge gaps, to invest in the necessary analyses, risk assessments and tools, and to build up capacities for adaptation."⁴

7) Ensuring more resilient infrastructure

8) Promote insurance and other financial products for resilient investment and business decisions

Entry into Force

The EU Adaptation Strategy was adopted in June 2013.

Policy Field

Integration/coordination issues with other related pieces of legislation

The EU Adaptation Strategy references the following pieces of legislation:

- LIFE programme (cross-ref): co-financing for joint adaptation projects by EU countries and cities, in which the EU provides funding under the climate action sub-programme (paragraphs 3 and 4);
- Cohesion policy funds (cross-ref), under paragraph 3;
- EU Floods Directive (cross-ref) under para. 4.1 for cross-border management of floods;
- As climate change has wide-ranging effects on multiple different areas, one of the targets of the Adaptation Strategy is "Climate-proofing EU action: promoting adaptation in key vulnerable sectors";
- "Adaptation has already been mainstreamed in legislation in such sectors as marine waters (Council Directive 2008/56/EC and EU Regulation No 1255/2011), forestry (Regulation (EC) 2152/2003), and transport (Decision 661/2010/EC); and in important policy instruments such as inland water (COM(2012)673 final), biodiversity (COM(2011)244 final) and migration and mobility (COM(2011) 743 final), under Paragraph 4.3;
- Legislative proposals on integrating adaptation in agriculture and forestry (now 1305/2013), maritime spatial planning and integrated coastal management (COM(2013) 133 final), energy (COM(2011) 665/3), disaster risk prevention and management (COM(2011)934 final), transport (COM(2011) 650/2 final), research, plant health (COM(2013) 267 final)⁵, and the environment (COM(2012) 628 final)."

⁴ Ibid.

⁵ The Commission has proposed a new EU plant health regulation in May 2013. See: http://ec.europa.eu/food/plant/plant_health_biosecurity/legislation/new_eu_rules/index_en.htm.

- Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP), especially under Action 6.

Aims of the policy and its relevance to soil protection

Objectives

The Adaptation Strategy is the EU's overarching strategy to increase adaptation through different mechanisms which enhance the preparedness and capacity to respond at different levels to climate change effects, develop a coherent approach and improve coordination. The three main objectives are to:

- 1) promote action by Member States;
- 2) result in better-informed decision making, and
- 3) climate-proofing key vulnerable sectors in the EU.

Spatial coverage and management unit

The whole of the EU, at all levels of governance.

Relevance to soil protection

Negative impacts are projected to occur to natural resources from climate change, including soil. This is likely to have impacts on the conditions of agricultural and industrial practices, so the Strategy aims to assist with capacity through the EU.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The Adaptation Strategy has no direct soil-focused aims or objectives

Implicitly: The first objective focuses on stimulating action by the Member States in terms of planning and management, so increasing adaptation strategies to help target action and investment could be relevant to soil protection as a resource that is vulnerable to climate change events (i.e., floods, extreme rainfall events, droughts). Joint approaches and coherence between adaptation strategies and national risk assessments is positive under this objective as well for soils due to potentially higher emphasis being placed on at-risk soils if that is actually measured and can then be targeted to increase resilience through better management strategies.

With regard to the second objective, the climate-action sub-programme under the LIFE programme also increases adaptation by prioritising adaptation projects which address "key cross-sectoral, trans-regional and/or cross-border issues" and those which use green infrastructure and ecosystem-based approaches.⁶ This could include soil protection through projects targeting improved management (e.g., agricultural and building sector measures to reduce soil erosion and habitat/ecosystem protection), although soil was mentioned as a thematic priority under the environment sub-programme rather than the climate action sub-programme.

The third objective regarding climate-proofing may indirectly aim toward adaptive soil management through the mainstreaming of adaptation into forestry and biodiversity

⁶ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: An EU Strategy on adaptation to climate change, COM(2013) 216 final.

legislation. Adaptation in the forestry sector may result in less deforestation, for example, and thereby maintain soil cover and prevent erosion of forest soils, and management to enhance biodiversity's role in contributing to adaptation would potentially include a focus on soil biodiversity.⁷ Agriculture is also identified as a key sector that at the time of the adopted Communication was debating the terms of the CAP reform, which incorporated climate into two of the six thematic priorities for the Rural Development Programmes (RDPS) under Pillar 2 of the CAP.

Soil threats addressed by the policy

Explicitly: Soil erosion and flood risk, through support for ecosystem-based approaches to adaptation

Implicitly: Loss of soil organic matter, landslides, sealing and loss of biodiversity could be indirectly addressed through focus on better planning and management by identifying resources (e.g. soil) that are vulnerable to climate change.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	The Monitoring of adaptation efforts and development of Evaluation indicators could include soil to determine whether adaptation efforts are effective.	There are no direct soil-focused expected impacts, but indirectly the expectation is that resources within the EU (including soil) become more resilient to climate change.

Mandatory requirements and voluntary options for Member States (types of management measures)

There are no explicit soil-focused requirements.

Due to the nature of the Adaptation Strategy, there are no mandatory requirements on Member States. The key voluntary instrument emphasised within the policy has the aim to increase the number of Member States adopting adaptation strategies at national level.

In order to do this, the Commission will:

- Provide guidelines for developing adaptation strategies and “By 2014 the Commission will develop an adaptation preparedness scoreboard, identifying key indicators for measuring Member States' level of readiness. In 2017, basing itself on the reports it receives as set out in the Monitoring Mechanism Regulation and on the adaptation preparedness scoreboard, the Commission will assess whether action being taken in the Member States is sufficient. If it deems progress to be insufficient, by reference to the coverage and quality of the national strategies, the Commission will consider without delay proposing a legally binding instrument.” Paragraph 4.1, Action 1;
- Provide financing through LIFE and vulnerability assessments and adaptation strategies are also to be supported by the Commission, as well as promote awareness-raising (including indicators, risk communication and management). (Action 2);

⁷ Brussaard, L., de Ruiter, P.C., Brown, G.G. (2007) Soil biodiversity for agricultural sustainability. Agriculture, Ecosystems and Environment 121: 233-244.

- Provide support to adaptation in cities, notably by launching a voluntary commitment to adopt local adaptation strategies and awareness-raising activities. (Action 3)
- Work with MS and stakeholders to reduce knowledge gaps and identify tools and methodologies to address, as well as vulnerability assessment, comprehensive review of global climate impacts on the EU, and support the work of the JRC on climate change (Action 4)
- Further develop Climate-ADAPT to provide a comprehensive information source on adaptation in the EU, which with the EEA will also interact with other relevant platforms (Action 5)
- Provide guidance on how to integrate adaptation under the CAP and Cohesion Policy and CFP (Action 6)
- Mandate European standardization organizations map industry-relevant standards for energy, transport and buildings to better integrate adaptation. Provide guidelines for project developers working on infrastructure and physical assets. Explore the need for more guidance on ecosystem-based adaptation (Action 7)
- Require the Commission “promote insurance and other financial products for resilient investment and business decisions.”

Key soil-relevant instruments

Mandatory

Commission provide guidelines, reports, monitor, financing, develop indicators for measuring resilience preparedness, promote awareness-raising.

Voluntary

Member State national adaptation strategies

2 Biodiversity Strategy

Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions: Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (COM (2011) 0244 final)

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The EU Biodiversity Strategy (COM (2011) 0244 final) sets the EU’s 2050 long-term vision and a 2020 heading target for maintaining and protecting biodiversity within the EU. The Strategy aims to recognise the EU’s shortcoming in meeting the 2010 biodiversity target and endorses strategic action proposed by the Commission in its Communication “Options for an EU vision and target for biodiversity beyond 2010”. The Strategy’s framework for action builds upon six targets and associated actions, with the aim to help halving biodiversity loss and ecosystem services conservation in the EU.

As an overarching instrument dedicated to biodiversity, the Strategy does not explicitly address the issue of soil protection. However, its targets and actions may indirectly address a wide number of soil threats, including acidification, compaction, contamination, erosion, flooding, loss of soil organic matter, loss of soil biodiversity and flooding. They could also indirectly contribute to all soil functions. By nature, the Strategy sets no mandatory targets or explicitly soil-focused voluntary actions. Nonetheless, it does provide opportunities to contribute to soil protection by upscaling biodiversity conservation measures within the EU’s Natura 2000 network, as well as at international level in the context of the CBD and Nagoya protocol. It also requires further integration of biodiversity and ecosystems services concerns into non-nature policy areas, such as agriculture and forestry, as well as their correct implementation by Member States. The approaches to the Strategy’s implementation are likely to vary across EU Member States.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	Through Member States’ implementation of underpinning actions and conservation measures under Targets 1, 2 3 and 6 of the Strategy	
Compaction	I	As above	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Contamination - diffuse	N/A		
Contamination – point source	I	As above	
Desertification	N/A ?		
Erosion - water	I	As above	
Erosion - wind	I	As above	
Flooding/ landslides	I	As above	
Loss of soil biodiversity	I	As above	
Loss of soil organic matter	I	As above	
Salinisation	N/A		
Soil sealing	I	As above	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	I	Through Member States' implementation of underpinning actions and conservation measures under Targets 1, 2 3 and 6 of the Strategy	
Platform for human activities	I	As above	
Biomass production	I	As above	
Hosting biodiversity	I	As above	
Providing raw materials	I	As above	
Storing, filtering and transforming	I	As above	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
nutrients and water			
Storing geological and archeological heritage	N/A ?		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Strategy sets a long-term vision by 2050 and a 2020 heading target for maintaining biodiversity within the EU beyond 2010 – including positive implication for a wide number of soil threats and functions.

Weaknesses - are there aspects limiting the protection afforded?

- No mandatory targets nor explicitly soil-focused voluntary actions included in the Strategy

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Through the upscaling of biodiversity conservation measures in the EU's Natura 2000 network, as well as at international level in the context of the CBD and Nagoya protocol;
- Through further integration of biodiversity and ecosystems services concerns into non-nature policy areas, such as agriculture and forestry, as well as their correct implementation by Member States.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Strategy itself, but from the non-implementations of the actions set by Member States

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The implementation of most conservation actions is site and locally dependent across Member States, as well as the extent to which they may be relevant to soil protection. It is therefore likely that Member States' approaches vary widely.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

A "Mid-term review of the EU Biodiversity Strategy to 2020" (COM (2015) 478 final) <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0478&from=EN>

was undertaken in 2015 and adopted by the Council in December 2015 and by the European Parliament in February 2016.

Direct reference to soil is minimal. However, the overall outcome of the mid-term review is relevant to soil in that it provides an indication as to the progress made by the EU in enhancing biodiversity protection and ecosystem services conservation, including those related to soil.

According to the review and compared to the 2010 biodiversity baseline, biodiversity loss and the degradation of ecosystem services in the EU have continued, with serious implications for the capacity of biodiversity (including soil) to meet human needs in the future, despite local successes demonstrating that actions on the ground deliver positive outcomes. These examples need therefore to be scaled up to have a measurable impact on the overall negative trends.

Section 3 - Base Information

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Our life insurance, our natural capital: an EU biodiversity strategy to 2020 COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (COM/2011/0244 final)

Summary

The EU Biodiversity Strategy (COM (2011) 0244 final) sets the EU's 2050 long-term vision and a 2020 heading target for maintaining and protecting biodiversity within the EU. The Strategy aims to recognise the EU's shortcoming in meeting the 2010 biodiversity target and endorses strategic action proposed by the Commission in its Communication "Options for an EU vision and target for biodiversity beyond 2010". It also responds to the global mandate set out by the 10th COP of the Convention on Biological Diversity in 2010.

The Strategy sets out a framework for action beyond 2010, building upon six targets and associated actions. (See Section 3)

Entry into Force

The Biodiversity Strategy was adopted in May 2011.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Biodiversity Strategy references the following pieces of legislation or policy:

- The Europe 2020 Strategy;
- Strategic Plan for biodiversity 2011-2020;
- The Resource Efficient Europe flagship initiative (cross-ref)
- Strategy to mobilise resources for global biodiversity;
- Water Framework Directive (cross-ref);
- EU legislation on nature (Birds and Habitats Directives) (cross-ref);
- Common Agricultural Policy;
- Common Fisheries Policy;
- Cohesion Policy (cross-ref);

- Common Strategy Framework (including closing the knowledge gaps between biodiversity and relevant sectors such as climate change and soil);
- Environmental Impact Assessment and Strategic Environmental Assessment Directives.
- At international level:
- Convention on Biological Diversity;
- Nagoya Protocol on Access to Genetic resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation (ABS Protocol);

Aims of the policy and its relevance to soil protection

Objectives

The Biodiversity Strategy aims at “reserving biodiversity and speeding up the EU’s transition towards a resource efficient and green economy.” It is part of the Europe 2020 Strategy and, especially of the Resource Efficiency Europe flagship initiative.

The Strategy sets out six targets (which are broken down in further actions, enclosed in the Strategy’s Annex) with the aim to help halting biodiversity loss and the degradation of ecosystem services:

i. Conserving and restoring nature

Target 1: “To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments: (i) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status; and (ii) 50% more species assessments under the Birds Directive show a secure or improved status.”

ii. Maintaining and enhancing ecosystem and their services

Target 2: “By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems.”

iii. Ensuring the sustainability of agriculture, forestry and fisheries

Target 3A: Agriculture: “By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement(*) in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.”

Target 3B: Forests: “By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM), are in place for all forests that are publicly owned and for forests holdings above a certain size that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services as compared to the EU 2010 Baseline.”;

Target 4: Fisheries: “Achieve Maximum Sustainable Yield (MSY) by 2015. Achieve a population age and size distribution indicative of a healthy stock, through fisheries

management with no significant adverse impacts on other stocks, species and ecosystems, in support of achieving Good Environmental Status by 2020, as required under the Marine Strategy Framework Directive.”

iv. Combating invasive alien species

Target 5: “By 2020, Invasive Alien Species and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.”

v. Addressing the global biodiversity crisis

Target 6: “By 2020, the EU has stepped up its contribution to averting global biodiversity loss.”

Spatial coverage and management unit

The whole territory of the EU

Relevance to soil protection

The Biodiversity Strategy does not explicitly aim to protect soil. However, it recognizes the role of soil biodiversity in delivering key ecosystem services (i.e. carbon sequestration and food supply), and sets out targets and underpinning actions (especially Targets 1, 2, 3 and 6) that may contribute to soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: No direct soil-focused aims and objectives

Implicitly: One of the Strategy’s objectives is “to help halting biodiversity loss and the degradation of ecosystem services. The associated targets and underpinning actions might have a positive impact on the state of soil. Especially Targets 1, 2, 3 and 6 and their associated actions are ‘positive’ that aim to maintain and restore habitats and species, ecosystem services and limiting overall biodiversity loss, and have potential to enhance soil quality and contribute to its protection.

Soil threats addressed by the policy

Explicitly: No soil threats are directly addressed by the Biodiversity Strategy. This is partly because the Strategy refers to the proposal for a framework directive to protect soil (withdrawn), which was intended to address a whole suite of soil threats.

Implicitly: As soil is one of the physical factors/component that a site is made up of – a positive impact of the conservation measures on soil might be expected. The Biodiversity Strategy could therefore contribute indirectly to increased soil organic matter (SOM) content, reduced soil contamination (point sources), erosion risk, compaction, soil biodiversity loss, acidification, flooding and sealing.

Member States and the Commission are encouraged to:

- “Complete the establishment of the Natura 2000 network and ensure good management” by
- establishing the Natura 2000 network by 2012, integrate requirements into land and water use policies, set out conservation measures and sharing experience and good practices. (Action 1) This might contribute to addressing different threats to soil (see list above)
- “Ensure adequate financing of Natura 2000 sites” by providing necessary funds and incentives for Natura 2000 via EU funding instruments. (Action 2) This might contribute to addressing different threats to soil (see list above)
- “Increase stakeholder awareness and involvement and improve enforcement” by launching a communications campaign on Natura 2000 and specific training programmes. (Action 3) This might contribute to addressing different threats to soil (see list above)
- “Improve and streamline monitoring and reporting” under the Birds and Habitats Directives. (Action 4) This might contribute to addressing different threats to soil (see list above)

- “Set priorities to restore and promote the use of green infrastructures” by will developing a strategic framework and a Green Infrastructure Strategy by 2012. (Action 6) This might contribute to addressing different threats to soil (see list above)
- Integrating biodiversity priorities and aims into the CAP (Direct payment, GAECs and Rural Development measures), forest management and associated funding programmes (LIFE+) (Actions 8, 9, 10, 11 and 12) This might contribute to addressing different threats to soil (see list above)
- “Reduce indirect drivers of biodiversity loss” by taking appropriate measures to reduce biodiversity impacts of EU consumption patterns and enhancing the contribution of trade policy to conserving biodiversity. (Action 17) This might contribute to addressing different threats to soil (see list above)
- “Mobilise additional resources for global biodiversity conservation” within the CBD and improving effectiveness of international funding. (Action 18) This might contribute to addressing different threats to soil (see list above)
- “Biodiversity proof EU development cooperation by screening development cooperation and minimising any negative impacts through undertaking EIAs and SEAs. (Action 19) This might contribute to addressing different threats to soil (see list above)

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	<p>Target 1: “Halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant measureable improvement in their status by 2020”</p> <p>Target 2: “By 2020, ecosystems and their services and maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems”</p> <p>Target 3A: “By 2020, maximize areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP”</p> <p>Target 3B: “By 2020, Forest Management Plans or equivalent instruments are in place for all forests that are publicly owned and for forest holdings above a certain size that receive funding under the EU Rural Development Policy”</p> <p>Target 6: “By 2020, the EU had stepped up its contribution to averting global biodiversity loss”</p> <p>By acting towards achieving the above mentioned targets, Member States may indirectly contribute to enhance soil organic matter (SOM) content, reduce soil contamination (point sources), erosion risk, compaction, soil biodiversity loss, acidification, flooding and sealing.</p>	None

Mandatory requirements and voluntary options for Member States (types of management measures)

The Biodiversity Strategy has no soil-focused mandatory requirements. However, halting biodiversity loss and contributing to ecosystems conservation contributes indirectly to soil protection through meeting the targets set and the application of necessary conservation measures (Targets 1, 2, 3 and 6 and associated actions).

As to the voluntary actions, the Strategy sets out the following:

Under Target 1, the Biodiversity Strategy sets out actions to complete the establishment of the Natura 2000 network and ensure good management, ensure adequate financing, increase stakeholder awareness and involvement and improve monitoring and reporting.” As soil is

one of the physical factors/component that a Natura 2000 site is made up of – a positive impact of the conservation measures on soil might be expected.

Under Target 2, the Strategy establishes actions to improve knowledge of ecosystems and their services in the EU, set priorities to restore and promote the use of green infrastructure, and ensure no net loss of biodiversity and ecosystem services. Through appropriate conservation of ecosystems and the integration of green infrastructures in land planning, a positive impact of soil may be expected.

Under Target 3, the Strategy establishes actions to further integrate biodiversity and ecosystem conservation into agriculture and forestry policies. A positive impact on soil may be expected.

Under Target 6, the Strategy commits to take measures to reduce indirect drivers of biodiversity loss, mobilise additional resources for global biodiversity conservation and ‘biodiversity proof’ EU development cooperation. A positive impact on soil may be expected.

Key soil-relevant instruments

Mandatory

None

Voluntary

Biodiversity and ecosystems conservation measures within Natura legislation, as well as integrating these priorities into other policy areas (agriculture, forestry). Contributing to international efforts to halt biodiversity loss through the CBD.

3 Circular Economy Action Plan

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Closing the loop - An EU action plan for the Circular Economy COM/2015/0614 final

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Circular Economy Action Plan (Action Plan) sets out a programme of action and encloses legislative proposals to stimulate Europe’s transition to a circular economy including addressing indirectly targeted soil threats and functions. In particular, proposed legislation on waste management could indirectly contribute to reduce soil contamination and loss of soil organic matter.

The Action Plan provides an overarching framework for taking action on waste and better use of resources. It encloses a wide number of legislative proposals on waste and related matters, as well as a future proposal on fertilisers, which may indirectly support soil protection. However, due to its non-binding nature, action and focus on soil ultimately depends on the willingness of the European Institutions and Member States to, respectively, pass the legislation proposed and implement it. The approaches to soil protection are likely to vary significantly.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	I	The approval and implementation of the proposed legislation on waste management could indirectly contribute to reduce soil contamination	The Action Plan does not make a distinction between diffuse or point source contamination
Contamination – point source	I	The approval and implementation of the proposed legislation on waste management could indirectly contribute to reduce soil contamination	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	N/A		
Loss of soil organic matter	I	Through the revision of the EU regulation on fertilisers, which may focus on new measures to facilitate the use of organic and waste-based fertilisers	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	N/A		
Platform for human activities	I		
Biomass production	?	By encouraging measures and legislation for the re-use of waste and raw material, this could avoid further soil to be used for biomass production	
Hosting biodiversity	N/A		
Providing raw materials	?	By encouraging measures and legislation for the re-use of waste and raw material, this could avoid further soil to be used for biomass production	
Storing, filtering	I	The Commission is tasked to take a series of	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
and transforming nutrients and water		actions to promote the reuse of treated waste water, including legislation on minimum requirements for reused water in agriculture	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Action Plan provides an overarching framework for taking action on waste and better use of resources, which may indirectly support soil protection

Weaknesses - are there aspects limiting the protection afforded?

- The Action Plan is a non-binding measure, whose action on soil ultimately depend on the willingness of the European Institutions and Member States to, respectively, pass the legislation proposed and implement it

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- The Action Plan encloses proposal for new legislation on Waste, Packaging Waste, Landfill and Waste Electrical & Electronic Equipment (WEEE) aiming to improve waste management, which may support soil protection;
- The Action Plan mentions that the European Commission is to propose a revised EU regulation on fertilisers, facilitating the recognition of organic and waste-based fertilizers in the single market and supporting the role of bio-nutrients in the circular economy and therewith reducing the need for mineral-based fertilisers, with potential positive impacts on soil protection;
- The European Commission will also publish a legislative proposal on minimum requirements for reused water, e.g. for irrigation and groundwater recharge, which may support soil protection;
- A set of indicators will be proposed to monitor progress; some of the indicators – e.g. on waste management – may be relevant to soil protection

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Action Plan itself, but from the non-implementation of legislation supporting soil protection by Member States, or the non-passing of legislation over the EU decision-making process

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The approaches to soil protection are likely to vary depending on the focus that each Member State will put on soil matters when implementing the requirements of the proposed waste legislation

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

No evaluation has been carried out yet on the Circular Economy Action Plan.

Section 3 - Base Information

An EU action plan for the Circular Economy (COM/2015/0614 final)

Summary

The Action Plan adopted by the European Commission includes legislative proposals on waste and has the aim to “stimulate Europe’s transition towards a circular economy which will boost global competitiveness, foster sustainable economic growth and generate new jobs.” The Action Plan establishes a programme of action, with measures covering the whole cycle: from production and consumption to waste management and the market for secondary material.

The legislative proposals on waste adopted by the Action Plan include four proposed Directives on Waste, Packaging Waste, Landfill and WEEE.

The Circular Economy Action Plan follows the withdrawal of the previous proposal in December 2014, which focused on waste.

Entry into Force

The Communication on the Circular Economy Action Plan was published in December 2015.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Action Plan provides overarching direction on the whole waste management cycle with the aim to ensure coordination among the several pieces of legislation. It refers to the following legislation:

- Ecodesign Directive;
- Horizon 2020 programme;
- Cohesion Policy 2014 – 2020;
- New proposed Directives on Waste, Packaging Waste, a Landfill and WEEE;
- Sustainable Development Goals (SDGs).

Aims of the policy and its relevance to soil protection

Objectives

The Action Plan sets out a programme of action and legislative proposals to stimulate Europe’s transition to a circular economy including addressing indirectly targeted soil threats

and functions. In particular, proposed legislation on waste management could indirectly contribute to soil protection such as:

- Proposals for new legislation on Waste, Packaging Waste, Landfill and WEEE that, aiming to improve waste management, may improve soil contamination;
- Plan to revise the EU regulation on fertilisers, with emphasis on organic and waste-based fertilisers to be used on soil;
- Plan to publish a legislative proposal on minimum requirements for reused water, e.g. for irrigation and groundwater recharge, which may support soil protection;
- Plan to propose a set of indicators to monitor progress; some of the indicators – e.g. on waste management – may be relevant to soil protection.

Spatial coverage and management unit

The Action Plan applies to the whole of the EU. The European institutions are in charge of following up to the legislative proposals enclosed in the Action Plan, as well as Member States are in charge of implementation.

Relevance to soil protection

The Action Plan is relevant to soil protection in that it contains proposals for waste legislation and additional guidelines on how to improve waste management, which could contribute to reduce soil contamination. It also mentions a future revision of the EU regulation on fertilisers, which will support the use of organic and waste-based fertilisers on soil.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Although the Action Plan does not specifically refer to soil in its aims and objectives, it does refer to the overall aim of counteracting “irreversible damages caused by using up resources at a rate that exceeds the Earth’s capacity to renew them in terms of, inter alia, [...] soil.”

Implicitly: The Action Plan encloses proposals for approval of legislation on waste management and the revision of the EU regulation on fertilisers, which may indirectly contribute to address soil contamination and loss of soil organic matter.

<p>Soil threats addressed by the policy</p> <p>Explicitly: None</p> <p>Implicitly: Contamination - The approval and implementation of the proposed legislation on waste management could indirectly contribute to reduce soil contamination</p> <p>Loss of soil organic matter - Through the revision of the EU regulation on fertilisers, which will involve new measures to facilitate the use of organic and waste-based fertilisers</p>
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Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	Not possible to estimate, as it depends on how Member States will implement the proposals for legislation enclosed in the Action Plan.

Mandatory requirements and voluntary options for Member States (types of management measures)

No specific mandatory requirements relevant to soil. Member States will be in charge of implementation of EU waste legislation, as relevant to soil, once this approved by the EU institutions.

Key soil-relevant instruments

Mandatory

None

Voluntary

Funding opportunities provided by Horizon 2020 programme and Cohesion policy 2014 – 2020

4 7th Environment Action Programme (EAP)

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’

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The 7th Environment Action Programme (7th EAP) recognizes the need for action on a number of EU soil threats and functions (directly and indirectly) by 2020 through i) the implementation of current, sectoral EU legislation and ii) the examination of a binding legal framework for action on soil.

The non-binding nature of the 7th EAP limits its strength, as it is ultimately dependent upon action by Member States and the European institution (in case of new legislation on soil). Member States’ approaches to implementation and willingness to go beyond current EU legislation with a view to protect soil may vary significantly. The 7th EAP, however, proposes the examination of a binding legal framework on soil, as well as the adoption of a target for soil.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		N/A
Compaction	N/A		N/A
Contamination - diffuse	E	In the context of Thematic Priority 1.23, the 7th EAP recognizes soil degradation due to contamination It calls for the integration of environmental considerations on water protection and biodiversity conservation into planning decisions relating to land use, with a view to making progress towards the objective of ‘no net land take’ by 2050.	E
Contamination – point source	E	See above	E

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Desertification	E	Within Priority objective 9, the 7th EAP refers to addressing international environmental challenges, including desertification. In particular, this would be achieved by supporting the implementation of the United Nations Convention to Combat Desertification (UNCCD) and, in particular, by taking action striving to achieve a land degradation neutral world as agreed at Rio + 20.	E
Erosion - water	E	In the context of Thematic Priority 1.23, the 7th EAP recognizes soil degradation due to erosion (by water). It calls for the integration of environmental considerations on water protection and biodiversity conservation into planning decisions relating to land use, with a view to making progress towards the objective of 'no net land take' by 2050.	E
Erosion - wind	E	Under Priority objective 1, the 7th EAP calls for increasing efforts to reduce soil erosion – thus potentially including erosion by wind – while calling for enhanced integration of land use aspects into decision-making, supported by the adoption of targets on soil.	E
Flooding/ landslides	I	Under Priority objective 1, the 7th EAP implicitly addresses flooding and landslides by acknowledging that 'environmental considerations including water protection and biodiversity conservation should be integrated into planning decisions relating to land use so that they are made more sustainable, with a view to making progress towards the objective of 'no net land take', by 2050.'	I
Loss of soil biodiversity	I	Under Priority objective 1, the 7th EAP calls for stepping up the implementation of the EU Biodiversity Strategy without delay, which may contribute to address loss of soil biodiversity.	I
Loss of soil organic matter	E	Under Priority objective 1, the 7th EAP recognizes loss of soil organic matter as a serious threat and calls for increasing efforts to address this issue.	E
Salinisation	I	Through Member States' implementation of the Marine Strategy Framework Directive	I
Soil sealing	E	In the context of Thematic Priority 1.23, the 7th EAP recognizes soil sealing as soil threat. In response to such threat, the Commission has developed guidelines on how to deal with soil sealing (see dedicated fiche), while calling for 'further efforts to strengthen the regulatory context, develop networks, share knowledge, produce guidelines and identify examples of best practice can also contribute to better soil protection'.	E

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	I	Through Member States' implementation of legislation tackling climate change	The 7th EAP does not link the specific soil function with EU policies
Platform for human activities	I	Through Member State's implementation of legislation tackling industrial pollution and waste	See above
Biomass production	I	Through Member States' implementation of legislation dealing with the provision of raw materials, including the Renewable Energy Directive (RED)	See above
Hosting biodiversity	I	Through Member State's implementation of the Habitats and Birds Directives	See above
Providing raw materials	I	Through Member States' implementation of legislation dealing with the provision of raw materials, including the Renewable Energy Directive (RED)	See above
Storing, filtering and transforming nutrients and water	I	Through Member States' implementation of water and nutrient-related legislation, including Water Framework Directive, Urban Wastewater Directive, Nitrates Directive, Marine Strategy Framework Directive, Floods Directive	See above
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- 7th EAP provides strategic direction for achieving soil protection through policy in 2020 and beyond and an overarching framework for coordination of sectoral policies relevant to soil

Weaknesses - are there aspects limiting the protection afforded?

- No soil-related mandatory requirements are included in the 7th EAP. The 7th EAP is a non-binding document, whose proposals and overall impact depends entirely on i) the implementation and monitoring of current EU policies by the Member States and the European institutions; and ii) the political momentum when potentially binding legislation is proposed.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- The Programme proposes that a ‘binding legal framework’ to address EU soil issues (in particular soil quality) is examined, as well as the adoption of targets on soil and on land as a resource including sustainable land use.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the 7th EAP itself, but from the non-implementation of enabling policies by Member States

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Member States’ approaches to implementation and willingness to go beyond current EU legislation with a view to protect soil may vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

The European Commission is in charge of producing an evaluation of the 7th EAP – based on information provided by the European Environment Agency (EEA) – and to submit to the European Parliament and Council in due course by 2020.

No such evaluation has been produced yet.

Section 3 - Base Information

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’

Summary

The 7th EAP sets out a long-term vision and priority objectives for EU environmental policy up to and beyond 2020.

Entry into Force

7th EAP was signed on 20 November 2013 and entered into force 17 January 2014 and will be guiding European environment policy until 2020 (2014-2020). The 7th EAP is to be implemented by 2020 and the reporting based on the programme’s evaluation must be “in due course before the end of the 7th EAP” (Art. 4(2)). As an overarching environmental policy, the funds available for all environmental programmes would contribute towards achieving the priority objectives of the 7th EAP.

Policy Field

Integration/coordination issues with other related pieces of legislation

The 7th EAP is an overarching programme with the aim to provide direction and improve current legislation, integration and implementation of EU environmental policy. The 7th EAP

specifically references the Water Framework Directive, Urban Wastewater Directive, Nitrates Directive, the Floods Directive, Habitats and Birds Directives, Air Quality Directive, Marine Strategy Framework Directive, Waste Framework Directive, the Effort Sharing Decision, Renewable Energy Directive, Emission Trading Scheme Directive, Fuel Quality Directive, Carbon Capture and Storage Directive, Vehicle emission standards regulation. In addition, Communications on Smart regulation, Innovation in the EU, Europe 2020, Low-carbon economy, EU Biodiversity Strategy to 2020, and the Resource Efficiency Roadmap were referenced.

Aims of the policy and its relevance to soil protection

Objectives

Among the 7th EAP priority objectives, objective 1 has the aim to “protect, conserve and enhance the Union’s natural capital”. With regard to soil protection, this aim to achieve that by 2020 “land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway” (para 28(e)). To do so “increasing efforts to reduce soil erosion and increase soil organic matter, to remediate contaminated sites and to enhance 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 (para 28 (vi))” are necessary.

The 7th EAP also proposes that a ‘binding legal framework’ to address EU soil issues (in particular soil quality) is examined.

Spatial coverage and management unit

The 7th EAP covers the whole territory of the European Union. Based on the subsidiary principle, Member States – at the appropriate governance level – are in charge of implementation.

Relevance to soil protection

As mentioned in Section 3, priority objective 1 is particularly relevant to soil protection, while priority objective 3 – aiming to safeguard the Union’s citizens from environment-related pressures and risks to health and well-being – is relevant to address the issue of soil contamination.

The vision beyond 2020 acknowledges the need to manage natural resources sustainably, including soil. In particular, “the 7th EAP recognises that soil degradation is a serious challenge. It provides that by 2020 land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway and commits the EU and its Member States to increasing efforts to reduce soil erosion and increase soil organic matter and to remediate contaminated sites.”⁸

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Contamination, erosion (by water and potentially also by wind), desertification, loss of soil organic matter and soil sealing

⁸ http://ec.europa.eu/environment/soil/index_en.htm

Implicitly: Potentially flooding/landslides, loss of soil biodiversity, compaction (depending on the degree of implementation of EU policies referenced) and salinisation

<p>Soil threats addressed by the policy</p> <p>Explicitly: Contamination (Thematic priority 1.28(iv)) – “In order to protect, conserve and enhance the Union’s natural capital, the 7th EAP shall ensure that by 2020” “(vi) increasing efforts to reduce soil erosion and increase soil organic matter, to remediate contaminated sites and to enhance 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”.</p> <p>Erosion (Thematic priority 1.28(iv))</p> <p>Desertification (Thematic priority 1.23, Priority Objective 9))</p> <p>Loss of soil organic matter content (Thematic priority 1.28(iv))</p> <p>Soil sealing (Thematic priority 1.24) – “In response to concerns such as adverse impacts on the natural water cycle, the Commission has developed guidelines on soil sealing⁹. Further efforts to strengthen the regulatory context, develop networks, share knowledge, produce guidelines and identify examples of best practice can also contribute to better soil protection. The Commission has submitted a proposal for a Directive establishing a framework for the protection of soil and amending Directive 2004/35/EC¹⁰”</p> <p>Implicitly: Based on the EU policies specifically referenced in the 7th EAP (see Section 2), implementation may contribute to potentially address a number of soil threats, such as flooding/landslides, loss of soil biodiversity, compaction and salinisation. However, this depends on the degree of effective implementation and monitoring of such policies by Member States.</p>

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
<p>None.</p> <p>However, thematic priority 1.23 refers to the objective of ‘no net land take’ by 2050 and, more generally, calls for a ‘land degradation neutral world’.</p> <p>Thematic priority 1.25 urges the EU and Member States to reflect on how soil quality issues could be addressed and calls for setting targets for sustainable land use and soil.</p>	<p>As acknowledged in Section 5, monitoring of the implementation of the EU policies relevant to soil could potentially support soil protection.</p> <p>Article 4.1 explicitly requires Member States to monitor policy implementation, supported by the EEA’s set of indicators on the state of the environment.</p>	<p>No soil-focused expected impacts are explicitly required by the 7th EAP.</p> <p>However, priority objective 1 on the protection, conservation and enhancement of the EU’s natural capital, including soil resources, is expected to be reached by implementing relevant EU policies, as referenced by the 7th EAP.</p>

Mandatory requirements and voluntary options for Member States (types of management measures)

No soil-related mandatory requirements are included in the 7th EAP. Nonetheless, the EU and Member States have to ensure the achievements of the priority objectives of the Programme. In order to implement the priority objectives, the 7th EAP commits the EU and the MSs to

⁹ SWD(2012) 101

¹⁰ COM(2006) 232

speed up the implementation of existing strategies, fill gaps where legislation doesn't exist yet, and improve existing legislation¹¹, followed by appropriate monitoring.

According to the 7th EAP, an appropriate mix of policy instruments and cooperation with businesses, civil society and citizens is called to achieve the objectives of the programme.

The European Commission is in charge of conducting an evaluation of the 7th EAP, based on the State of the Environment report by the EEA – and submit to the Parliament and the Council. These developments will inform that proposal of the 8th EAP.

Key soil-relevant instruments

Mandatory

The European Union and the Member States take appropriate action to achieve priority objectives, including: economic incentives and market-based instruments, legislation, monitoring process, information requirements, public-private partnerships, monitoring, evaluation (involving stakeholder consultation) and reporting

Voluntary

Tools and measures to complement legislative frameworks and to engage stakeholders at different levels

¹¹ <http://ec.europa.eu/environment/newprg/objectives.htm>

5 EU Forest Strategy 2013 and multi-annual implementation plan

COM(2013) 659 final A new EU Forest Strategy: for forests and the forest-based sector. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels, 20.9.2013.
SWD(2015) 164 final COMMISSION STAFF WORKING DOCUMENT Multi-annual Implementation Plan of the new EU Forest Strategy Brussels, 3.9.2015

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

The EU Forest Strategy is very relevant to soil protection, particularly through emphasis on achieving sustainable forest management (SFM) of the EU forests, because Forest Europe's criteria for SFM specifically address soil function and protection. However, the strategy is founded on the principle of subsidiarity and depends upon voluntary, coordinated action by Member States and the Commission, funded principally by the use of the RDP 2014–20 forestry measures.

Description of the EU Forest Strategy

Although the Treaties for the European Union make no provision for a common forest policy, there is a long history of EU measures supporting certain forest-related activities, coordinated with Member States mainly through the Standing Forestry Committee. The first EU Forestry Strategy, which promoted sustainable forest management and the multifunctional role of forests, was adopted in 1998 and reviewed in 2005 (followed by the Commission's EU Forest Action Plan for 2007-11).

The current ***EU Forest Strategy dates from 2013*** and, like its predecessors, is based on the principle of subsidiarity. It aims at establishing a framework for forest-related actions in support of sustainable forest management, based on the coordination of the forest policies and initiatives relevant to forests and to the forest-based sector. It is based on three ***guiding principles***:

- sustainable forest management and the multifunctional role of forests, delivering multiple goods and services in a balanced way and ensuring forest protection;
- resource efficiency, optimising the contribution of forests and the forest sector to rural development, growth and job creation;
- global forest responsibility, promoting sustainable production and consumption of forest products.

The Strategy's forest objectives for 2020 are to ensure and demonstrate that all forests in the EU are managed according to sustainable forest management principles and that the EU's contribution to promoting sustainable forest management and reducing deforestation at global level is strengthened, thus: contributing to balancing various forest functions, meeting

demands, and delivering vital ecosystem services; and providing a basis for forestry and the whole forest-based value chain to be competitive and viable contributors to the bio-based economy.

These 2020 objectives are linked to eight priority topics in three groups, which identify specific activities for the Commission and Member States. These are: The objective that ‘sustainable forest management contributes to major societal objectives’ is most relevant to the CAP cluster because around 90% of total EU forestry funding comes through the forestry measures under the Rural Development Regulation. The Strategy states that:

‘The Commission considers that rural development funds should be used to support the implementation of sustainable forest management. Member States should use the opportunities given in the new Rural Development Regulation and prioritise investments in: modernising forestry technologies; optimising the sector’s contribution to the bio-economy; improving the resilience, environmental value and mitigation potential of forest ecosystems; achieving nature and biodiversity objectives; adapting to climate change; conserving genetic resources; forest protection and information; and creating new woodland and agro-forestry systems.’

In 2015 the Commission published a multi-annual Implementation plan of the new EU Forest Strategy (Forest MAP), which provides a concrete list of actions for the period 2015-2020 under the eight priority areas of the EU Forest Strategy, and identifies the actors and timing of the different activities as well as the expected outcomes.

Relevance to soil protection

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	Through Member States’ implementation of the RDP (optional) forestry measures	
Compaction	I	Through Member States’ implementation of the RDP (optional) forestry measures	
Contamination - Diffuse	I	Through Member States’ implementation of the RDP (optional) forestry measures	
Contamination - point source	I	Through Member States’ implementation of the RDP (optional) forestry measures	

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Desertification	I	Through Member States' implementation of the RDP (optional) forestry measures	
Erosion - water	I	Through Member States' implementation of the RDP (optional) forestry measures	
Erosion - wind	I	Through Member States' implementation of the RDP (optional) forestry measures	
Flooding/landslides	I	Through Member States' implementation of the RDP (optional) forestry measures	
Loss of soil biodiversity	I	Through Member States' implementation of the RDP (optional) forestry measures	
Loss of soil organic matter	I	Through Member States' implementation of the RDP (optional) forestry measures	
Salinisation	I	Through Member States' implementation of the RDP (optional) forestry measures	
Soil sealing	N/A		

Coverage of Soil Function - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon Pool	I	Through Member States' implementation of the RDP (optional) forestry measures	
Platform for Human Activities	I	Through Member States' implementation of the RDP (optional) forestry measures	
Biomass production	I	Through Member States' implementation of the RDP (optional) forestry measures	
Hosting biodiversity	I	Through Member States' implementation of the RDP (optional) forestry measures	
Providing raw materials	N/A		
Storing, filtering and transforming nutrients and water	I	Through Member States' implementation of the RDP (optional) forestry measures	

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Storing geological and archaeological heritage	I	Through Member States' implementation of the RDP (optional) forestry measures	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The objective of ensuring that by 2020 all EU forests are managed according to the principles of sustainable forest management. The six Pan-European criteria for SFM that describe the different aspects of sustainable forest management in Europe are defined by Forest Europe as:

C1: Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles;

C2: Maintenance of forest ecosystems' health and vitality;

C3: Maintenance and encouragement of productive functions of forests (wood and non-wood);

C4: Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems;

C5: Maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water); and

C6: Maintenance of other socio-economic functions and conditions.

Weaknesses - are there aspects limiting the protection afforded?

- Implementation depends almost entirely on voluntary action by the Member States (and also the Commission), with co-financing mainly through the 2014-20 RDPs.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Member States could make more use of RDP forestry measures (some Member States do not use them at all).
- The forest investment measure (M8.5) and the forest environment climate measure (M15) are included in the list of environment and climate measures to which Member States must allocate 30% of their EAFRD funding.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not within the Forest Strategy itself, only from limitations of implementation by Member States.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

There are significant variations in the approach is adopted by Member States, some of whom prefer to use state aid for forestry measures, not RDP funding.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

A review of the Forest Strategy will be carried out by 2018 to assess progress in implementing the strategy.

Other planned studies and evaluation reports 2016-20 by DG Agriculture that may be relevant to some aspects of o the EU Forest Strategy and implementation of the RDP forest measures include the following (for more information see http://ec.europa.eu/agriculture/evaluation/plan_en.pdf).

2015:

A study (not an evaluation) 'mapping and analysis of the implementation of the CAP'

2016:

Framework contract for the evaluation studies of CAP measures contributing to the general objective "sustainable management of natural resources and climate action"

Evaluation of the forestry measures under the rural development policy

2017:

Evaluation of the impact of the CAP on climate change and greenhouse gas emissions

2018:

Evaluation of the impact of the CAP on habitats, landscapes and biodiversity (under FC-2)

Evaluation of the impact of the CAP on water

A study (not an evaluation) 'mid-term review of the EU Forest Strategy'

2019-2020:

Evaluation of the impact of the CAP towards the general objective "sustainable management of natural resources and climate action"

Mapping and analysis of the implementation of the CAP

Forest MAP identifies the following timetable for the Standing Forestry Committee to prepare Opinions on the ex-post evaluations of RDPs (2016), the initial evaluations of RDPs (2015) and on the Commission's evaluation of forestry measures under RD policy (2017).

Section 3 - Base Information

COM(2013) 659 final A new EU Forest Strategy: for forests and the forest-based sector. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels, 20.9.2013.
SWD(2015) 164 final COMMISSION STAFF WORKING DOCUMENT Multi-annual Implementation Plan of the new EU Forest Strategy Brussels, 3.9.2015

Summary

Entry into Force

In September 2013 the Commission adopted a Communication on a new EU Forest Strategy for forests and the forest-based sector accompanied by two Staff Working Documents on the EU Forest Strategy and a Blueprint for the EU Forest-based Industries. It was followed by Conclusions from the Council, by an own-initiative report from the European Parliament and by Opinions from both the Economic and Social Committee (ESC) and the Committee of the Regions (COR).

Policy Field

Integration/coordination issues with other related pieces of legislation

Aims of the policy and its relevance to soil protection

Objectives

Please see Section 1

Spatial coverage and management unit

EU wide actions by the Commission and individual Member State authorities

Relevance to soil protection

Relevant to voluntary use of the RDP forestry measures by Member State and regions in a way that will deliver the objectives of sustainable forest management.

Soil-focused aims and objectives

None

Implicit: The Strategy identifies ways in which the Commission considers the RDP forestry measures should be used (modernising forestry technologies; optimising the sector's contribution to the bio-economy; improving the resilience, environmental value and

mitigation potential of forest ecosystems; achieving nature and biodiversity objectives; adapting to climate change; conserving genetic resources; forest protection and information; and creating new woodland and agro-forestry systems). Any of these could potentially have soil benefits but this depends firstly on Member States choosing to include forestry measures in their RDPs and secondly on the detailed, design implementation and targeting of the sub-measures.

Soil threats addressed by the policy
Explicitly: Potentially all except acidification and salinisation
Implicitly: Potentially all except acidification and salinisation

Soil-focused targets and/or expected impacts

Direct soil-focused targets	Indirect soil-focused targets	Soil-focused expected impacts
none	none	none

Mandatory requirements and voluntary options for Member States (types of management measures)

Key soil-relevant instruments
Mandatory
 None
Voluntary
 None

6 Roadmap to a Resource Efficient Europe

Communication from the Commission to the European parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Roadmap to a Resource Efficient Europe. COM/2011/0571 final

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Roadmap to a Resource Efficiency Europe provides an overarching framework for policy transformation towards a European Union where resources, including soil, are sustainability managed. It defines medium and long-term milestones for soil protection and means to achieve them.

The high-level nature of the Roadmap limits its strength, as it is ultimately dependent upon action by Member States and the European institutions (in case of new legislation/policy on soil). Member States could decide to go beyond the requirements of the European Commission’s guidelines on soil sealing, with the aim of approving ambitious legislation. However, the approaches to implementation and willingness to go beyond current EU legislation with a view to protect soil may vary significantly.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	E	The Roadmap urges Member States to set up an inventory of contaminated sites, and a schedule for remedial work by 2015	The Roadmap does not distinguish between diffuse or point source contamination
Contamination – point source	E	See above	
Desertification	I	The Roadmap promotes further research in order to improve the use of fertilisers and reduce dependence on mined phosphate. This could	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		indirectly contribute to reduce desertification.	
Erosion - water	E	The Roadmap urges Member States to implement the action needed for reducing erosion	The Roadmap does not distinguish between erosion by water or by wind
Erosion - wind	E	See above	
Flooding/ landslides	E	The Roadmap requires the European Commission to further integration of resource-efficiency considerations into water policy, e.g. the Water Framework Directive and to Member States to set water efficiency targets for 2020 at River Basic level. These actions aim to minimize the impacts of droughts and floods by increasing water retention in soils and irrigation efficiency.	
Loss of soil biodiversity	N/A		
Loss of soil organic matter	E	The Roadmap urges Member States to implement the action needed for increasing soil organic matter content	
Salinisation	N/A		
Soil sealing	E	The Roadmap anticipates that in 2012 the European Commission will publish guidelines on best practice to limit, mitigate or compensate soil sealing.	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function i.e. How does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	I	Through Member States' implementation of legislation tackling climate change	
Platform for human activities	?		
Biomass production	I	Through Member States' implementation of legislation dealing with the provision of raw materials, including in relation to the production of energy	
Hosting biodiversity	I	Through integration of biodiversity and conservation protection values, including on	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function i.e. How does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
		soil, in other EU policies, and their implementation.	
Providing raw materials	I	Through Member States' implementation of legislation on agriculture and fisheries	
Storing, filtering and transforming nutrients and water	E	Member States to set up water efficiency targets by 2020 at river basin level	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Roadmap provides strategic direction for Member States to put in place action to protect soil and integrating soil issues into other environmental and non- EU policies

Weaknesses - are there aspects limiting the protection afforded?

- There are no soil-focused targets, nor specific quantitative requirements as to the reduction of soil threats

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Member States could decide to go beyond the requirements of the European Commission's guidelines on soil sealing, with the aim of approving ambitious legislation

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Roadmap itself, but from the non-implementation of soil protection enabling policies by Member States

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Member States' approaches to implementation of the requirements and willingness to go beyond current EU legislation with a view to protect soil may vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

No evaluation reports have been produced on the Roadmap to Resource Efficient Europe.

Section 3 - Base Information

Communication from the Commission to the European parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Roadmap to a Resource Efficient Europe. COM/2011/0571 final

Summary

The Resource Efficiency Roadmap (COM/2011/0571 final) is part of the Resource Efficiency Flagship of the Europe 2020 Strategy, which aims to establish “a smart, sustainable and inclusive economy” in Europe. As part of it, the Roadmap sets soil and land related milestones to be reached by 2020, and a vision for the structural and technological change needed up to 2050, with milestones to be reached by 2020.

Entry into Force

The Roadmap for Resource Efficient Europe was published in September 2011.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Roadmap provides a strategic framework of action to 2050, including illustrating how relevant policies interrelate and build on each other in relation to soil. The Roadmap does not reference specific policies, though it acknowledges that “[t]he EU agricultural, energy, transport and cohesion policy reforms will provide the opportunity to set the framework and the right incentives and land owners to achieve the relevant soil-related objectives”, set out in the section below.

Aims of the policy and its relevance to soil protection

Objectives

In the relation to soil protection, the Roadmap has the aim to achieve that “[b]y 2020, EU policies take into account their direct and indirect impact on land use in the EU and globally, and the rate of land take is on track with an aim to achieve no net land take by 2050; soil erosion is reduced and the soil organic matter increased, with remedial work on contaminated sites well underway.”

The above mentioned milestone is achieved through two main objectives:

- EU policies take into account their direct and indirect impact on land use in the EU globally, and keep on track the rate of land take with an aim to achieve no net land take by 2050;
- Continuously implement the action needed for reducing soil erosion and increasing organic matter and set up a schedule for remedial work on contaminated sites.

Spatial coverage and management unit

The Roadmap to Resource Efficient Europe applies to the whole territory of the European Union and relies on implementation of EU legislation relevant to soil protection by Member States.

Relevance to soil protection

The Roadmap for Resource Efficient Europe is relevant to soil as it provides an overarching framework for policy transformation towards the achievement of sustainable soil management in 2050. By 2020, the Roadmap demands that soil erosion is reduced and soil organic matter increased, with remedial work on contaminated sites well underway. EU policies should also take into account their direct and indirect impact on land use in the EU and globally, with the aim to achieve no net land take by 2050.

The Roadmap considers soil as an integral part of Europe's ecosystems and a service provided. It also sets that "[b]y 2020 the loss of biodiversity in the EU and the degradation of ecosystem services will be halted and, as far as feasible, biodiversity will be restored." This involves integration of biodiversity protection and ecosystem actions in other policies, with particular focus on agriculture and fisheries, and progress towards the objectives of the Biodiversity Strategy by integrating ecosystem services into policy-making. This could contribute to soil protection; however, soil relevance may vary, depending on the extent to which the integration focuses soil protection aspects.

The Roadmap also promotes further research in order to identify improvements to fertilisers, food production and bio-waste issues could reduce dependence on mined phosphate. This will benefit soil protection, especially soil fertilization.

Finally, the Roadmap promotes further integration of resource-efficiency considerations into water policy, e.g. the Water Framework Directive (WFD) and for Member States to set water efficiency targets for 2020 at River Basic level. This has the aim to minimize the impacts of droughts and floods by increasing water retention in soils and efficient irrigation, which would therefore lead to better soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The Roadmap sets the following milestones that may directly contribute to address soil sealing, erosion, contamination, loss of soil organic carbon, and flooding/landslides:

- Milestone on soils: By 2020, soil erosion is reduced and soil organic matter increased, with remedial work on contaminated sites well underway (Section 4.6 on Lands and Soils);
- Milestone on Water: By 2020, all WFD River Basin Management Plans (RBMPs) have long been implemented. Good status – quality, quantity and use – of waters was attained in all EU river basins in 2015. The impacts of droughts and floods are minimized, with adapted crops, increased water retention in soils and efficient irrigation. [...] (Section 4.4 on Water).

Implicitly: The Roadmap sets the following milestones that may indirectly contribute to soil biodiversity:

- Milestone on Biodiversity: By 2020 the loss of biodiversity in the EU and the degradation of ecosystem services will be halted and, as far as possible, biodiversity will be restored. (Section 4.2 on Biodiversity).

Soil threats addressed by the policy

Explicitly: Soil sealing (Section 4.6 on Land and Soils) “If we are to reach the state of no net land take by 2050, following a linear path, we would need to reduce land take to an average of 800 km² per year in the period 2000-2020. In many regions soil is irreversibly eroded, or has a low content of organic matter. Soil contamination is also a serious problem.”

Soil erosion (Section 4.6 on Land and Soils)

Contamination (Section 4.6 on Land and Soils)

Loss of soil organic matter (Section 4.6 on Land and Soils)

Flooding/landslides (Section 4.4 on Water)

Implicitly: Soil biodiversity (Section 4.2. on Biodiversity) “[b]y 2020 the loss of biodiversity in the EU and the degradation of ecosystem services will be halted and, as far as feasible, biodiversity will be restored” which may indirectly address soil biodiversity.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None.	None	Milestone for Land and Soil: The Roadmap establishes that by 2020, EU policies take into account their direct and indirect impact on land use in the EU and globally, and the rate of land take is on track with an aim to achieve no net land take by 2050; soil erosion is reduced and the soil organic matter increased, with remedial work on contaminated site well underway.

Mandatory requirements and voluntary options for Member States (types of management measures)

The Roadmap requires Member States to continuously implement the actions needed for reducing erosion and increasing soil organic matter, as well as set up an inventory of contaminated sites, and a schedule for remedial work by 2015. They are also required to improve the integration of direct and indirect land use and its environmental impacts in their decision-making and therewith limit land take and soil sealing to the extent possible.

The Commission was required to publish in 2012 guidelines on best practice on soil sealing¹², as well as to propose a candidate European Innovation Partnership aiming, inter alia, to secure soil functionality at a satisfactory level. Further integration of policy objectives, as relevant to soil, at EU level is also sought.

In addition, Member States are required to set water efficiency targets for 2020 at river basin level and work towards the objectives of soil-relevant legislation, such as in the area of Biodiversity.

¹² Guidelines on soil sealing were published in April 2012:
http://ec.europa.eu/environment/soil/pdf/soil_sealing_guidelines_en.pdf

Key soil-relevant instruments

Mandatory

Actions needed to reduce erosion and increase soil organic matter

An inventory of contaminated sites

Schedule for remedial work

Publication of guidelines on best practice on soil sealing

Voluntary

None

7 Soil Sealing Guidelines

Commission Staff Working Document – Guidelines on best practice to limit, mitigate or compensate soil sealing (SWD(2012) 101 final/2)

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Guidelines on best practice to limit, mitigate or compensate soil sealing enclose a wide range of best practices and approaches to limit, mitigate and compensate soil sealing across Member States, which may be applicable at national, regional and local level. The Guidelines, despite focusing on expressively addressing sealing as a threat to soil protection, also indirectly address a much wider number of soil threats including compaction, contamination (point source), erosion (by water), flooding, loss of soil organic matter, loss of biodiversity and salinisation. They explicitly cover most soil functions.

With the aim of decreasing the effects of soil sealing, the Guidelines promotes the integration of land use consideration in relevant EU level policies, although recognise that “it is through regional and local spatial planning in the Member States that the principles of sustainable land use can be implemented on the ground.” Although the coverage of best practices and examples provided by the Guidelines provide sufficient flexibility to Member States authorities in the implementation, the Guidelines include no mandatory requirements as such. The approaches and the related degree of soil protection are likely to vary among Member States.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		N/A
Compaction	I	The Guidelines recognise the need to avoid unnecessary damage to soils that are not directly affected by construction activities. They recognise that soil that is removed should be re-used and taken care of to prevent damage, i.e. cultivation measures to avoid compaction. Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);	N/A

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		Integration by Member States of the principles of sustainable land use in regional and local spatial planning	
Contamination - diffuse	?		?
Contamination – point source	I	<p>The Guidelines propose re-using topsoil from a contaminate site to create a favorable environment for seed germination and plant establishment. Best practices to limit contamination from caused by sealing include rehabilitation of industrial sites through Cohesion Policy funding. Measures to compensate for soil sealing effects include the re-use of topsoil from contaminated sites.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	I
Desertification	N/A		N/A
Erosion - water	I	<p>Best practices to mitigate the effects of soil sealing include the use of permeable materials and surfaces that may reduce water erosion on soil.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	I
Erosion - wind	N/A		N/A
Flooding/ landslides	I	<p>Urban sprawl and soil sealing increase the risk of flooding. Best practices related to effective national planning policies and by local authorities at the development plan level and planning application level may significantly reduce flood risks. Examples to practices to mitigate floods risks are green infrastructure and natural water harvesting systems.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	I

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Loss of soil biodiversity	I	<p>Urban sprawl and soil sealing are recognized to threaten biodiversity. Best practices to compensate loss of soil biodiversity include eco-accounts and compensation systems.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	I
Loss of soil organic matter	I	<p>Soil sealing in relation to building activities is recognized as being responsible for strip off topsoil that contains high organic carbon concentrations.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	I
Salinisation	I	<p>The Guidelines indirectly recognise salinisation as a soil threat, with particular reference to the sealing of agricultural fertile areas.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	I
Soil sealing	E	<p>The Guidelines explicitly focus on limiting, mitigation and compensation for the effects of soil sealing. A wide number of best practices are proposed for Member States to put in place.</p> <p>Integration of land use considerations into relevant EU level policies (EIA, SEA, CAP, Cohesion policy, etc);</p> <p>Integration by Member States of the principles of sustainable land use in regional and local spatial planning</p>	E

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	E	The Guidelines recognize that the removal of the upper layer of topsoil due to building activities may cut off the exchange of gasses between the soil and the air. By affecting soil biodiversity, soil sealing is also recognized as affecting carbon sequestration and storage.	
Platform for human activities	E	The Guidelines suggest the construction of green infrastructures to mitigate the impacts of soil sealing effects in urban areas.	
Biomass production	I (?)		
Hosting biodiversity	E	The Guidelines recognize that soil sealing affects both above and below ground biodiversity.	
Providing raw materials	E	The Guidelines recognize that soil sealing often affects most fertile areas by influencing soil security.	
Storing, filtering and transforming nutrients and water	E	The Guidelines recognize that the removal of the upper layer of topsoil may prevent the infiltration of rainwater and cause major pressure on water resources and changes in the environmental state of the catchments affecting ecosystems and water-related services. The Guidelines suggest that the construction of natural water harvesting systems and the use of permeable materials and surfaces may mitigate the impacts of soil sealing.	
Storing geological and archeological heritage	E	The Guidelines recognize that an 'overly intensive degree of soil sealing, without open spaces of sufficient quality, may degrade the landscape, with its historical and cultural value.	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Guidelines provide a detailed set of best practices and examples to limit, mitigate and compensate for soil sealing effects in the EU by insisting on the fact that it is through the implementation of regional and local spatial planning that the principles of sustainable land use can be implemented on the ground.

Weaknesses - are there aspects limiting the protection afforded?

- The Guidelines set no mandatory requirements.
- Opportunities - are there potential opportunities for soil protection moving forward, e.g., through MS implementation approaches or new proposals or clauses that might be used better?
- In putting in place the measures to limit, mitigate or compensate for soil sealing, Member States have a degree of flexibility in the implementation of certain types of measures and at the appropriate level of governance.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- In putting in place the measures to limit, mitigate or compensate for soil sealing, Member States have a degree of flexibility in the implementation of certain types of measures and at the appropriate level of governance.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Guidelines themselves, but from the non-implementation of best practices.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The nature of the Guidelines provide a degree of flexibility to Member States as to which instruments or tools they may use to limit soil sealing. Therefore, the approaches and the related degree of soil protection may vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

No evaluations have been carried out.

Section 3 - Base Information

Commission Staff Working Document – Guidelines on best practice to limit, mitigate or compensate soil sealing (SWD(2012) 101 final/2)

Summary

The Guidelines on best practice to limit, mitigate or compensate soil sealing (Guidelines) (SWD(2012) 101 final/2) were developed based on the 2011 report “Overview of best practices for limiting soil sealing or mitigating its effects in EU-27”, which presents the land take and soil sealing trends in the EU.¹³ The report stemmed from the Soil Thematic Strategy (COM(2006) 231) and the Roadmap to a Resource Efficient Europe (COM(2011) 571), the latter proposing “that by 2020, EU policies take into account their impacts on land use with

¹³ European Commission DG Environment, Soil sealing, http://ec.europa.eu/environment/soil/sealing_guidelines.htm

the aim to achieve no net land take by 2050”.¹⁴ The guidelines include “examples of policies, legislation, funding schemes, local planning tools, information campaigns and many other best practices implemented throughout the EU” targeted at competent Member State authorities (at national, regional and local levels), land planning and soil management professionals, and general stakeholders.¹⁵ They also provide guidance on best practices to limit, mitigate and compensate for the effects of soil sealing.

The Guidelines were officially presented to the Member States by the Commission during a high-level conference on “Soil remediation and soil sealing”, which took place in Brussels in May 2012.

Entry into Force

The Commission’s Staff Work Document was published in April 2012.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Guidelines require integration and coordination with a number of EU pieces of legislation and policy measures including:

- The Thematic Strategy for Soil Protection (cross-ref)
- The Roadmap to a Resource Efficient Europe (cross-ref)
- The Environmental Impact Assessment Directive (cross-ref), mentioning that an EIA would be required for a project that could pose soil sealing risks and with regard to local participatory input into land use planning, mitigation measures and compensatory measures;
- The Strategic Environmental Assessment Directive (cross-ref), with regard to local participatory input into land use planning, mitigation measures and compensatory measures;
- Cohesion Policy;
- Common Agricultural Policy (CAP);
- Or transport, industry and energy policy.

The Guidelines are likely to require some form of coordination with land use planning policies at the national, regional and local levels. Furthermore, Annex 3 of the Guidelines provides an overview of the existing EU policies and legislative instruments that have a bearing on land take and thus soil sealing.

Aims of the policy and its relevance to soil protection

Objectives

According to the Guidelines, the objectives of the Commission Staff Working Document is “to provide information on the magnitude of soil sealing in Europe (EU), its impacts and examples

¹⁴ *Ibid.*

¹⁵ *Ibid.*

of best practice”¹⁶ to limit, mitigation and compensate for the effects of soil sealing. The Guidelines are particularly addressed to national, regional and local level authorities in Member States, professionals dealing with land planning and soil management, stakeholders in general and potentially to individual citizens.

Spatial coverage and management unit

The Guidelines extends to the whole territory of the European Union and are targeted to Member States’ competent authorities at national, regional and local level, land use planners, soil managers and relevant stakeholders more generally.

Relevance to soil protection

The Guidelines are directly relevant to soil in that are intended to be multi-functional (i.e. awareness raising, planning, identifying and implementing mitigation measures, protecting soil from sealing, etc) to limit, mitigate and compensate for soil sealing.

Soil-focused aims and objectives

Explicitly: Reducing soil sealing and land take is the major focus of the Guidelines. In particular, the Guidelines aim to:

- Provide a definition to the concept of soil sealing and land take (Section 2.1 and Annex I);
- Outline the situation and trends of soil sealing and land take in the EU (Section 2.2 and Annex II);
- Identify major drivers (Section 2.3 and Annex III)
- Outline the impacts of soil sealing (Chapter 3) and provide best practice examples (Chapter 4);
- Describe approaches based on limiting, mitigating and compensating for the effects of soil sealing (Chapters 6, 7, and 8)

Implicitly: N/A

<p>Soil threats addressed by the policy Explicitly: Soil sealing (and land take) Implicitly: Compaction, Contamination (point source), Erosion (by water), Flooding, Loss of soil biodiversity, Loss of soil organic matter, Salinisation</p>
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Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
Examples of best practice from Member States were highlighted as targets which could be taken up to reduce effects from soil sealing. E.g., quantitative land take limits per	Planning restrictions (i.e., building controls around cities); land planning guidance taking soil quality into account and steering new	“The most advanced situations present a structure that applies all three actions (limiting – mitigating – compensating) at the same time, in a hierarchy that goes from a higher to a

¹⁶ Guidelines, p. 5

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
annum – indicative and used as monitoring tools, but insufficient without binding measures and programmes; protection of agricultural soils and valuable landscapes through a fee for conversion or restrictions or removal of topsoil upon conversion to replace elsewhere; soil quality in city planning; eco-accounts and compensation systems for development.	developments away from valuable soils to preserve existing functions; designation of peri-urban areas; and brownfields regeneration and use for infrastructure development.	lower level of ambition.” By addressing soil sealing that also means land take will be dealt with, with the overall outcome of more efficient and sustainable use of natural resources (of which soil is a primary component) rather than stopping economic development or freezing current land uses forever.

Mandatory requirements and voluntary options for Member States (types of management measures)

The Guidelines, by nature, include no mandatory options for Member States. The document presents a comprehensive outline of the best practices collected from Member States for others to use as examples in limiting soil sealing, mitigating the effects of soil sealing, and compensating soil sealing. Awareness rising is also offered as an example of initiatives and activities which may reduce soil sealing and land take by eliminating barriers to more sustainable land planning policies and land use.

<p>Key soil-relevant instruments</p> <p><u>Mandatory</u></p> <p>None</p> <p><u>Voluntary</u></p> <p>Member States are left room to choose whether they want to utilise the best practices highlighted in the Guidelines and adapt them to their national context.</p>
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8 Thematic Strategy for Soil Protection (and related instruments)

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection [SEC(2006)620] [SEC(2006)1165]

Proposal for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC (COM/2006/0232 final - COD 2006/0086)

Commission staff working document - Accompanying document to the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection - Summary of the impact assessment {COM(2006)231 final} {SEC(2006)620}

Commission staff working document - Document accompanying the Communication from the Commission to the Council, The European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection - Impact assessment of the thematic strategy on soil protection {COM(2006)231 final} {SEC(2006)1165} (SEC/2006/0620)

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Thematic Strategy for Soil Protection provides a framework for action to address soil threats and functions at EU level. It encloses both voluntary and mandatory requirements for Member States, which have a degree of flexibility in the selection of ‘risk areas’, targets and specific preventative or remediation actions on soil. The Strategy addresses all soil threats (except for acidification) and several others dealt with by dedicated EU legislation or guidelines.

Although the Strategy sets out a rather comprehensive framework for soil protection, the only mandatory requirement enclosed (the proposed Framework Directive) was effectively withdrawn in 2014. This nonetheless provides a potential basis for future action by Member States, alongside voluntary efforts in the fields of awareness-raising, policy integration and research. Member States’ approaches to translate EU requirements into action at national level may vary significantly and therewith also the level of protection of soil.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	E	The Strategy recognizes compaction as a soil threat. The proposed Directive recognizes that compaction may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. Member States are required to report to the Commission on progress regarding soil compaction.	
Contamination - diffuse	E	<p>The Strategy recognizes contamination as a soil threat. On the basis of a common definition of contaminated sites and an agreed list of polluting activities, Member States are required to identify the contaminated sites (at least for those polluted by Annex II substances) on their territory within five years from transposition, and establish a national remediation strategy. This is complemented by the obligation for a seller or a prospective buyer to provide to the administration and to the other party in the transaction a soil status report for sites where a potentially contaminated activity occurred or is taking place.</p> <p>The Strategy suggests that a national or regional approach is more appropriate to deal with contamination.</p> <p>To strengthen soil contamination prevention actions, the Commission was tasked to review the Integrated Pollution Prevention and Control (IPPC) Directive and ensure integration of soil protection aspects into product policy.</p>	The Strategy, nor the proposed Directive, makes a distinction between diffuse or point source contamination.
Contamination – point source	E	See above	See above
Desertification	E	<p>The Strategy recognizes desertification as a combination of several soil threats in arid or sub-arid climatic conditions. The Directive should contribute to halting desertification.</p> <p>Within the pillar on awareness-raising, the Strategy encourages initiatives by Member States within the UNCCD, especially in the context of the 2006 International Year of</p>	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		Deserts and Desertification.	
Erosion - water	E	<p>The Strategy recognizes erosion as a soil threat, as well as its transboundary impact between countries.</p> <p>The proposed Directive recognizes that erosion may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. MS are required to report to the Commission on progress regarding soil erosion.</p>	The Strategy, nor the proposed Directive, makes a distinction between erosion due to water or wind with regards to required action.
Erosion - wind	E	See above	See above
Flooding/ landslides	E	<p>The Strategy recognizes landslides as a soil threat.</p> <p>The proposed Directive recognizes that landslides may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. Member States are required to report to the Commission on progress regarding landslides.</p>	The Strategy mentions that flooding has been addressed in a separate proposal for a Directive on the assessment and management of floods (COM(2006)15).
Loss of soil biodiversity	I	The proposed Directive does not cover soil biodiversity directly. Biodiversity will generally benefit from the action proposed in relation to other threats.	Dealt with in the 7th EAP
Loss of soil organic matter	E	<p>The Strategy recognizes loss of soil organic matter as a soil threat, as well as its transboundary impact between countries.</p> <p>The proposed Directive recognizes that soil organic matter decline may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. Member States are required to report to the Commission on progress</p>	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		regarding soil organic matter.	
Salinisation	E	<p>The Strategy recognizes salinisation as a soil threat.</p> <p>The proposed Directive recognizes that salinisation may occur in specific risk areas, which Member States are required to identify within five years from transposition. Risk acceptability, the level of ambition regarding a target and the measures to achieve it, alongside a timetable for implementation and funding allocation, are left to each Member State. Member States are required to report to the Commission on progress regarding salinisation.</p>	
Soil sealing	E	<p>The Strategy recognizes soil sealing as a soil threat. It suggests that a national or regional approach is more appropriate to deal with soil sealing.</p> <p>The proposed Directive required Member States to take appropriate measures to i) limit soil sealing by rehabilitating brownfield sites or ii) if not possible, to mitigate its effects by using constructions techniques and products.</p>	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	N/A (E – FD)	<p>Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection.</p> <p>Carbon pool is recognized as a soil function by the proposed Framework Directive.</p>	
Platform for human activities	N/A (E – FD)	<p>Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection</p> <p>Platform for human activities is recognized as a soil function by the proposed Framework Directive.</p>	
Biomass production	N/A (E – FD)	Soil functions are not mentioned (N/A) in	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
		the Thematic Strategy for Soil Protection Biomass production is recognized as a soil function by the proposed Framework Directive.	
Hosting biodiversity	N/A (E – FD)	Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection Hosting biodiversity is recognized as a soil function by the proposed Framework Directive.	
Providing raw materials	N/A (E – FD)	Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection Providing raw materials is recognized as a soil function by the proposed Framework Directive.	
Storing, filtering and transforming nutrients and water	N/A (E – FD)	Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection Storing, filtering and transforming nutrients and water is recognized as a soil function by the proposed Framework Directive.	
Storing geological and archeological heritage	N/A (E – FD)	Soil functions are not mentioned (N/A) in the Thematic Strategy for Soil Protection Storing geological and archeological heritage is recognized as a soil function by the proposed Framework Directive.	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Strategy provides an overarching policy framework for addressing soil-related issues in Europe;
- It addresses directly almost all soil threats, with the exception of acidification and flooding;
- Member States are required to identify soil 'risk areas', based on an agreed methodology, though subject to local and regional conditions.

Weaknesses - are there aspects limiting the protection afforded?

- The only mandatory requirement included in the Strategy – the approval of a Framework Directive on soil protection – was withdrawn in 2014;

- The Strategy requires Member States to define measures and targets to address soil threats, but do not specify minimum requirements;
- For those threats that are not specifically addressed by the Strategy, their coverage is dependent upon the implementation of other policies/legislation at EU or Member State level;
- The Strategy does not deal with soil acidification, nor refers to any other policies or legislation that may be able to address that soil threat.

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- In defining the measures to address soil threats, Member States have a degree of flexibility in the implementation of the requirements, especially in relation to “risk acceptability, the level of ambition regarding the targets to be achieved and the choice of measures to reach those targets”;
- The Strategy includes a proposal for a Directive on soil protection. Although this has been withdrawn, it sets out a framework of action as a basis for proposing EU legislation or action on soil in the future;
- Member States can choose to put in place a suite of voluntary actions (in the area of research, policy integration and/or awareness-raising).with the aim of supporting sustainable use of soil.

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- Not in the Strategy itself, but from the non-implementation of measures addressing soil threats by Member States

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

Being the proposal for a Directive withdrawn, each Member States can decide independently on potential action (or not) to protect soil, with a likely degree of variability in terms of the approaches taken;

Given the degree of flexibility provided to Member States in auctioning the voluntary requirements set out by the Strategy, the approaches may vary significantly. The related degree of soil protection stemming from these approaches may therefore vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: The implementation of the Soil Thematic Strategy and ongoing activities (COM/2012/046 final) <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0046&from=EN>

The 2012 report on the Soil Thematic Strategy provides an overview of the implementation of the strategy since 2006. The report also covers soil degradation trends, both in Europe and globally, as well as upcoming challenges to soil protection.

Following the four-pillar structure of the Strategy, the report highlights the following progress:

- Awareness-raising – The Strategy has served as driver of both action EU and Member States level. This includes the organization of numerous events and conferences, dissemination of public material, the creation of Soil Atlases and of working groups on soil awareness (ESBN and ENSA);
- Research – 25 soil-related research projects have been funded under the 7th Framework Programme for Research. In addition, LUCAS has been integrated with specific indicators on soil;
- Integration – the Commission has continued its work on integration, with specific attention to policies related to agriculture (i.e. the Common Agricultural Policy), industrial installations, cohesion policy and state aid for remediation of soil contamination;
- Legislation – the proposal for a Framework Directive on soil protection has been withdrawn in 2014.

The report also highlights several key challenges for soil protection, namely land use, preservation of soil organic matter and a more efficient use of resources.

Section 3 - Base Information

Thematic Strategy for Soil Protection (and related instruments):

Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection [SEC(2006)620] [SEC(2006)1165]

Proposal for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC (COM/2006/0232 final - COD 2006/0086)

Commission staff working document - Accompanying document to the Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection - Summary of the impact assessment {COM(2006)231 final} {SEC(2006)620}

Commission staff working document - Document accompanying the Communication from the Commission to the Council, The European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection - Impact assessment of the thematic strategy on soil protection {COM(2006)231 final} {SEC(2006)1165} (SEC/2006/0620)

Summary

The Thematic Strategy for Soil Protection includes a Communication from the European Commission and a proposal for a Framework Directive. These were published in 2006. The

Communication sets out a strategic framework over a 10-year period, including a four-pillar structure for soil protection in Europe based on:

- Awareness raising – increasing public awareness of the need to protect soil;
- Research – closing the current recognised knowledge gap in certain areas of soil protection through research support by Community and national research programmes;
- Integration – integration of soil protection in the formulation and implementation of national and Community policies;
- Legislation – framework legislation with protection and sustainable use of soil as its principal aim (Section 4 of the Thematic Strategy).

The proposal for a framework Directive went through the co-decision process encountering opposition from a group of Member States (Austria, France, Germany, the Netherlands and the UK). Having being on hold for eight years, the Commission's proposal was withdrawn in April 2014. The Commission remains committed to the objective of the protection of soil and will examine options on how to best achieve this.

In 2012, the European Commission published a policy report on the implementation of the Soil Thematic Strategy, which provides an overview of the actions taken to implement the four-pillar strategy. It also presents the ongoing soil deterioration trend both in Europe and globally, as well as future challenges to ensure its protection.

Entry into Force

The Thematic Strategy for Soil Protection was published in September 2006.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Thematic Strategy for Soil Protection, as well as the proposal for a framework Directive, establishes a strategic framework of action, whose objective require integration and coordination with a number of EU and global policies, including regional and urban spatial planning, transport, energy, agriculture, rural development, forestry, raw material extraction, trade and industry, product policy, tourism, climate change, environment, nature and landscape (Art. 3 on integration of the Framework Directive). The following EU legislation is therefore related to the Thematic Strategy on soil:

- The 7th Environment Action Programme (EAP)
- The Resource Efficiency Roadmap
- The Water Framework Directive (WFD)
- The Groundwater Directive
- The Nitrates Directive
- The Habitats Directive
- The Birds Directive
- CAP GAECs Cross-compliance standards
- CAP Greening Direct Payments
- CAP Rural Development Programmes
- The National Emission Ceilings Directive
- The LULUCF Decision

- The Horizon 2020 Research and Innovation programme for 2014-2020

Aims of the policy and its relevance to soil protection

Objectives

The Thematic Strategy for Soil Protection has the aim to protect and use soil sustainably, based on two main principles:

“Preventing further soil degradation and preserving its functions:

When soil is used and its functions are exploited, action has to be taken on soil use and management patterns, and

When soil acts as a sink/receptor of the effects of human activities or environmental phenomena, action has to be taken at source.

Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil.”

Spatial coverage and management unit

The Thematic Strategy for Soil Protection covers the whole territory of the European Union. According to the proposal for a framework Directive, Member States are in charge of identifying and delineating ‘areas at risk’ in relation to five major soil threats (i.e. erosion, organic matter decline, compaction, salinization and landslides). The ‘risk areas’ are identified on the basis of a common methodology set out at EU level.

Relevance to soil protection

The Thematic Strategy for Soil Protection is an overarching document explicitly relevant to soil in that its primary aim is to ensure the protection and sustainable use of soil in the EU through policy.

Soil-focused aims and objectives (including those with potential negative impacts)

The main aims of the Thematic Strategies are identified in four pillars – awareness raising, integration, legislation and research (See Section 3).

Soil threats addressed by the policy

Explicitly: The Thematic Strategy addresses all the following soil threats, as part of a soil degradation process: erosion, decline of organic matter, local and diffuse contamination, soil sealing, compaction, salinization, and landslides. In addition, desertification is mentioned as the combination of some of the above threats in arid or sub-arid climatic conditions.

Implicitly: Soil biodiversity – The Thematic Strategy does not directly address soil biodiversity, though it states that action proposed within the Strategy will contribute to biodiversity.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
According to the proposal for a Directive on soil protection, Member States are required to “take specific measures to address soil threats”. It is however up to each Member State to choose how	None	The legislative and non-legislative proposals would contribute to the adoption of target action and measures to help addressing identified soil threats in Europe. However, the proposal for a Framework Directive was withdrawn.

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
to implement the requirements, e.g. “risk acceptability, the level of ambition regarding the targets to be achieved and the choice of measures to reach those targets”.		Outcomes vary depending on the implementation efforts by Member States and their choices in relation to the possibilities offered by the existing legislation, e.g. CAP cross-compliance.

Mandatory requirements and voluntary options for Member States (types of management measures)

The Thematic Strategy includes both mandatory and voluntary options. Research, integration and actions for awareness raising are voluntary options offered to Member States, while the only mandatory element was the proposal for the adoption of a framework Directive on soil.

The proposed Directive required Member States to identify ‘areas at risk’ to major soil threats and to take appropriate measures to reverse on-going degradation processes. The proposal further requires to identify contaminated sites and establish a national inventory, as well as carry out appropriate remediation actions. For each site, a soil status report has to be made available.

<p>Key soil-relevant instruments</p> <p><u>Mandatory</u> Proposal for a framework Directive on Soil Protection</p> <p><u>Voluntary</u> Policy integration, Actions for awareness-raising</p>

9 Effort Sharing Decision

Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020

Section 1 - Gap Analysis - Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

The Effort Sharing Decision establishes binding annual greenhouse gas emission targets for Member States for the period 2013–2020. These targets concern emissions from most sectors not included in the EU Emissions Trading System (EU ETS), such as transport (except aviation and international maritime shipping), buildings, agriculture and waste.

The Effort Sharing Decision covers the six greenhouse gases controlled by the Kyoto Protocol during its first commitment period (2008–2012): carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).

While the Effort Sharing targets to 2020 cover most sectors that fall outside the scope of the EU ETS, emissions from land use, land use change and forestry (LULUCF) and international shipping are not included. From 2020 onwards proposals have been put forward to formally make the link between binding LULUCF requirements and targets in non ETS sectors.

The ESD contains no specific actions focused on soil protection. However, its dual emphasis on emission reduction from the agricultural sector and on the control of methane and nitrous oxide emissions (among other GHG emissions) in particular means that there is a potential strong link to soil management and specifically animal waste, manure and fertiliser management. The extent to which any action in this field is taken up depends on a combination of a multiplicity of factors around the choices and pressures a MS is under to address emissions in the agricultural sector and the alternative opportunities to deliver emission reduction outside of soil/nutrient management. From 2020 (assuming proposals for flexibility around credits from LULUCF removals stand) there will be a stronger linkage between action under effort sharing and soil protection. Moreover, more stringent proposed targets up to 2030 would also push for more action in the agricultural and soil management arena.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of the soil threats
Acidification	I	Potential link related to changing practices in terms of nutrient management	
Compaction			
Contamination - Diffuse	I	Potential link related to changing practices in terms of nutrient management	
Contamination - point source			
Desertification			
Erosion - water			
Erosion - wind			
Flooding/landslides			
Loss of soil biodiversity			
Loss of soil organic matter	I	Potential link related to changing practices in terms of nutrient management. Link becomes clearer once LULUCF emissions are formally linked to reductions under effort sharing post 2020.	
Salinisation			
Soil sealing			

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon Pool	I	Linked to changing patterns of nutrient management, more clearly linked post 2020 when LULUCF is formally linked to effort sharing in non ETS sectors.	
Platform for Human Activities			
Biomass production	I	Linked to the manner in which biomass is produced, assuming changes in agricultural practice are adopted to limit emissions from the agricultural sector as part of wider actions under ESD.	

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Hosting biodiversity			
Providing raw materials			
Storing, filtering and transforming nutrients and water	I	Potential link to changes in nutrient management practices.	
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

Offers a basis for addressing wider emissions of GHGs linked to soil management in particular Nitrogen based nutrient management. Brings agricultural emissions into the context of wider GHG emission management.

Weaknesses - are there aspects limiting the protection afforded?

Currently doesn't cover emissions linked to land use, although these will be integrated post 2020 based on current new proposals for action on LULUCF (see linked fiche) and the proposed opportunity to link additional net removals from the land use sector to the wider GHG emission reduction profiles.

The current Decision is very open in terms of the actions a MS can take to deliver reductions and no one sector has to deliver reductions to a specific level. Therefore, actions to address soil management and relevant aspects of agricultural emissions will vary between MSs.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

The tightening of targets to 2030 offers an opportunity to increase focus on emission reduction. In some MSs agricultural emissions make up a significant proportion of non ETS emissions, therefore there is a significant driver for action and a key element of action is managing animal wastes, manure and in-organic fertilisers better. This potentially has benefits for soil management if alternative more holistic management strategies are employed to enable declining levels of nutrient additions.

The addition and linkage of the LULUCF sector into the ESD offers an opportunity as soil management strategies are key to delivering and maintaining removals within the LULUCF sector.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

There are many alternative strategies that can be employed to deliver emission reductions within the non ETS sectors. Without a policy structuring the importance of action on soils and

clearly establishing consistently the GHG benefits of action it is difficult to see how this might be coordinated going forward. Moreover, additional flexibilities afforded to meeting non ETS targets post 2020 including links to ETS sectors, links to LULUCF etc risks lessening the emphasis on emission reductions in the core sectors.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

MS each have a specific target under the ESD that is unique to their national circumstances. MS are free to develop their own strategic approach and measures for delivering emission reductions across the non ETS sectors.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Next phase of the European Climate Change Programme: Analysis of Member States actions to implement the Effort Sharing Decision and options for further community - Agriculture sector – Policy case studies report - https://ec.europa.eu/clima/policies/effort/docs/esd_case_studies_agriculture_en.pdfhttps://ec.europa.eu/clima/policies/effort/docs/esd_case_studies_agriculture_en.pdf

This report analyses best practice policy case studies for the agriculture sector which may serve as examples for Member States of policies that could be implemented at a national level to meet targets set out within the EU Effort Sharing Decision (ESD).

The agriculture sector differs from other sectors since methane (CH₄) and nitrous oxide (N₂O), not CO₂, are the main greenhouse gasses. In order to limit these emissions, the main abatement measures can be grouped into four main categories, i.e. i) changes in feeding rations for cattle and improved cattle fodder (mainly aimed at lower CH₄ emissions from manure storage and ruminants, respectively, and ii) anaerobic digestion (ruminants versus non ruminants e.g. pigs and poultry), iii) reduced N-application (aimed at less N₂O from soil applications of fertilizer and manure) and iv) application of nitrification inhibitors.

However, there are a number of barriers which limit the take up of these measures currently. The main barrier for farmers is related to higher costs for implementation of the specific measures and application of technologies. Other barriers include a lack of information and awareness among farmers about the possible abatement measures and of the potentials for reducing emissions of greenhouse gases on farm. Policy interventions can help to address these barriers.

In agriculture, farmers would need a more profound change in their management skills and options. There are no specific or general incentives for farmers and land owners to manage their land and select plan activities in order to reduce emissions of greenhouse gases including the emissions from soil carbon or stimulate the carbon removal from the atmosphere (soil carbon sink). Most farmers are not yet aware of their full impact through management practices and implementation of technologies on emissions of greenhouse gases. They cannot (or have no access to a tool to) calculate their farm GHG balance and changes as a result of their specific action. Such knowledge or the availability of a calculation tool would certainly stimulate farmers' awareness on the options.

In addition, the implementation of targeted policies might further add to improve the knowledge and management skills to farmers and provide the necessary tools and advice for them to act wise and with impact. It may help if payments and subsidies are in place to reward impact and stimulate activities and measures to be selected and implemented.

Evaluation in 2015 - Report evaluating the implementation of Decision No. 406/2009/EC pursuant to its Article 14 - COM/2016/0483 final

The ESD is still in the early stages of implementation. The evaluation concludes that ... from the evidence gathered so far ESD targets have been effective in stimulating new national policies and measures promoting effective reductions of GHG emissions within the ESD scope. Most emission reductions since 2009 have come from technological changes and policies which have resulted in increased uptake of less carbon-intensive technology. This effect has been reinforced by the fact that the ESD was launched together with a number of other EU climate and energy initiatives as part of the 2020 package, in particular on energy efficiency and renewable energy. For several of the ESD sectors, including buildings, transport, agriculture and waste, part of the emissions reductions to date can be attributed to factors that are influenced by policy interventions related to the 2020 package.

Whilst it was possible to identify that the ESD has had some effect in stimulating new national policies in some Member States, there was insufficient evidence to quantify the overall impact of the ESD on GHG emissions at this stage. Evidence on the direct costs of national policies implemented in response to the ESD is very limited; it was not possible to assess these costs with confidence. This is partly due to the fact that national policies and measures reported by Member States so far have provided insufficient information on expected and actual costs and benefits.

The ESD was found to have resulted in limited additional administrative burden on Member State level, although there may be opportunities for reducing administrative costs at EU level, for example by simplified or less frequent compliance controls.

The ESD remains coherent with other EU climate and energy policies. The public consultation showed strong consensus among stakeholders that there continues to be a need for an instrument such as the ESD after 2020.

The ESD was found to add value through EU action. There was a strong level of agreement among Member State stakeholders that the ESD raised awareness of mitigation potential in ESD sectors and contributed to establishing new national institutional and legal frameworks. It also improved coordination on GHG mitigation across the ESD sectors and between national and regional or local governments.

Stakeholders did not present any evidence that national policies resulting from the ESD have unduly distorted competition in the EU internal market.

Proposal for an Effort Sharing Regulation – 2021 to 2030

On 20 July 2016, the European Commission presented a legislative proposal for the "Effort Sharing Regulation", setting out binding annual greenhouse gas emission targets for Member States for the period 2021–2030. These targets cover sectors of the economy that fall outside the scope of the EU ETS (as per the earlier Decision). These sectors, including transport, buildings, agriculture and waste management, account for almost 60% of total EU emissions. The proposal is the follow-up to the Effort Sharing Decision, which established national emissions targets for Member States in the non-ETS sectors between 2013 and 2020. The

proposal increases the level of ambition to 30 per cent emission reductions by 2030 compared to 1990 baselines. In it adds in new 'flexibility' options. Critically, in the context of soil management, this includes the formal linkage of binding proposed action on LULUCF to credits under within the effort sharing framework. The key new arrangements under the proposed Regulation are:

- New one-off flexibility to access allowances from the EU ETS: This allows eligible Member States to achieve their national targets by covering some emissions in the non-ETS sectors with EU ETS allowances which would normally have been auctioned. EU-wide, this cannot be more than 100 million tonnes CO₂ over the period 2021-2030. Eligible Member States have to notify the Commission before 2020 of the amount of this flexibility they will use over the period. Since the transfer is strictly limited in volume, and decided beforehand, predictability and environmental integrity are maintained.
- New flexibility to access credits from the land use sector: In order to stimulate additional action in the land use sector, the proposal permits Member States to use up to 280 million credits over the entire period 2021-2030 from certain land use categories to comply with their national targets. All Member States are eligible to make use of this flexibility, while access is higher for Member States with a larger share of emissions from agriculture. In line with EU leaders' guidance, this recognises that there is a lower mitigation potential for emissions from the agriculture sector.
- Banking, borrowing, buying and selling: Just like under the current Effort Sharing Decision, in years where emissions are lower than their annual emission allocations (AEAs), Member States can bank any surplus and use them in later years. In years where emissions are higher than the annual limit, they can borrow a limited amount of AEAs from the following year's allocation. This gives Member States the flexibility to deal with annual fluctuations in emissions over the 2021-2030 period due to weather or economic conditions. Member States can also buy and sell allocations from and to other Member States. This is an important vehicle to ensure cost-effectiveness as it allows Member States to access emissions reductions where they are the cheapest and the revenue can be used to invest in modernisation.

Article 7 of the proposal sets out specific provisions on LULUCF and limits around when the new flexibility can be made use of to receive credits from the land use sector¹⁷.

¹⁷ To the extent that a Member State's emissions exceed its annual emission allocations for a given year, a quantity up to the sum of total net removals and total net emissions from the combined accounting categories of deforested land, afforested land, managed cropland and managed grassland referred to in Article 2 of Regulation [] [LULUCF] may be taken into account for its compliance under Article 9 of this Regulation for that year, provided that:

(a) the cumulative quantity taken into account for that Member State for all years of the period from 2021 to 2030 does not exceed the level set in Annex III for that Member State;

(b) such quantity is in excess of that Member State's requirements under Article 4 of Regulation [] [LULUCF];

(c) the Member State has not acquired more net removals under Regulation [] [LULUCF] from other Member States than it has transferred; and

(d) the Member State has complied with the requirements of Regulation [] [LULUCF].

Section 3 - Base Information – Effort Sharing Decision

DECISION No 406/2009/EC of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020

Summary

The Effort Sharing Decision establishes binding annual greenhouse gas emission targets for Member States for the period 2013–2020. These targets concern emissions from most sectors not included in the EU Emissions Trading System (EU ETS), such as transport (except aviation and international maritime shipping), buildings, agriculture and waste.

The Effort Sharing Decision covers the six greenhouse gases controlled by the Kyoto Protocol during its first commitment period (2008-2012): carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).

While the Effort Sharing targets cover most sectors that fall outside the scope of the EU ETS, emissions from land use, land use change and forestry (LULUCF) and international shipping are not included.

The Effort Sharing Decision forms part of a set of policies and measures on climate change and energy setting a series of targets to limit GHG emissions by 2020. The Effort Sharing Decision sets national emission targets (variable for each MS based on circumstance) for 2020, expressed as percentage changes from 2005 levels. It also lays down how the annual emission allocations (AEAs) in tonnes for each year from 2013 to 2020 are to be calculated.

By 2020, the national targets will collectively deliver a reduction of around 10% in total EU emissions from the sectors covered compared with 2005 levels. Together with a 21% cut in emissions covered by the EU ETS, this will accomplish the overall emission reduction goal of the climate and energy package, namely a 20% cut below 1990 levels by 2020.

In contrast to sectors in the EU ETS, which are regulated at EU level, it is the responsibility of Member States to define and implement national policies and measures to limit emissions from the sectors covered by the Effort Sharing Decision. Therefore, it is up to each MS to decide how and where emission cuts will be targeted and the policy measures to be used. Examples of potential policies and measures include reducing transport needs, promotion of public transport, a shift away from transport based on fossil fuels, support schemes for retrofitting of the building stock, more efficient heating and cooling systems, renewable energy for heating and cooling, more climate-friendly farming practices, and conversion of livestock manure to biogas. The annual European Semester policy coordination exercise helps Member States monitor progress towards meeting their 2020 targets.

Entry into force – 25.6.2009

Specific Actions – Relevant to Soil Protection

The ESD contains no specific actions focused on soil protection. However, its dual emphasis on emission reduction from the agricultural sector and on the control of methane and nitrous oxide emissions in particular means that there is a potential strong link to soil management and specifically animal waste, manure and fertiliser management. The extent to which any action in this field is taken up depends on a combination of: the stringency of the emission reduction target both overall and for a given MS; how large a proportion of non ETS emissions

originate from the agricultural sector; what proportion of this is linked to nutrient management vs. wider livestock management issues; and what actions and policies a MS chooses to put in place to address methane and nitrous oxide emissions linked to agriculture; and finally whether or not policies are taken up/changes in practices are adopted by the key actors.

10 Environmental Impact Assessment Directive

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The EIA Directive 2011/92/EU (alongside the amending Directive 2014/52/EU) establishes a framework for determining whether a project (likely to have environmental impacts) shall undertake an environmental impact assessment prior to development consent is granted, including providing relevant information on the likely impacts on soil and alternative practices. The Directive’s requirements may therefore indirectly contribute to limiting a wide number of soil threats – compaction, contamination, erosion, flooding/landslides, loss of soil biodiversity, loss of soil organic matter and sealing. It may also indirectly contribute to the protection of several soil functions.

The EIA Directive sets no mandatory or voluntary soil-relevant outcomes or targets. However, in defining less harmful alternatives in case a project is likely to affect soil quality, project developers are free to select the most suitable measures to ensure high level of soil protection. Project developers’ approaches to translate the EIA Directive requirements are likely to vary significantly and be dependent on the characteristics of each project at stake.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil (Article 3; Annex IV).	
Contamination - diffuse	?		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Contamination – point source	I	As above	
Desertification	N/A		
Erosion - water	I	As above	
Erosion - wind	I	As above	
Flooding/ landslides	I	As above	
Loss of soil biodiversity	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil and biodiversity (Article 3; Annex IV).	
Loss of soil organic matter	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil (Article 3; Annex IV).	
Salinisation	N/A		
Soil sealing	I	As above	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil (functions) (Article 3; Annex IV).	
Platform for human activities	I	As above	
Biomass production	I	As above	
Hosting biodiversity	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including -	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
		among others – likely impacts on soil and biodiversity (Article 3; Annex IV).	
Providing raw materials	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil (functions) (Article 3; Annex IV).	
Storing, filtering and transforming nutrients and water	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil (functions) (Article 3; Annex IV).	
Storing geological and archeological heritage	I	Through the mandatory undertaking of an Environmental Impact Assessment, which includes a description of the factors likely to be significantly affected by the project, including - among others – likely impacts on soil and biodiversity (Article 3; Annex IV).	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The EIA Directive establishes a framework for determining whether a project (likely to have environmental impacts) shall undertake an environmental impact assessment prior to development consent is granted, including information on the likely impacts on soil and alternative practices.

Weaknesses - are there aspects limiting the protection afforded?

- The EIA Directive does not explicitly set soil-relevant mandatory outcomes or targets.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- In defining less harmful alternatives in case a project is likely to affect soil quality, project developers are free to select the most suitable measures to ensure high level of soil protection;
- On top of the requirements set by the Directive, guidance or best practice examples, beneficial to soil protection, may be provided to project developers to encourage higher levels of soil protection.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Directive itself, but from the non-implementation of its requirements by Member States.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Project developers are required to identify for each project likely impacts (including on soil) and any potential less harmful alternatives. It is therefore likely that the approach may vary significantly among countries, as well as the degree of soil protection likely to be granted.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Member States have to apply the requirements introduced by the 2014 amending EIA Directive by May 2017 at the latest.¹⁸

At least two recent evaluations were undertaken with regard to the EIA Directive, as reported below. However, no relevant reference to soil protection was found.

The evaluation reports include:

COWI (2009) Study concerning the report on the application and effectiveness of the EIA Directive http://ec.europa.eu/environment/archives/eia/pdf/eia_study_june_09.pdf

IMPEL (2012) The implementation of the Environmental Impact Assessment on the basis of precise examples <http://ec.europa.eu/environment/eia/pdf/IMPEL-EIA-Report-final.pdf>

Section 3 - Base Information

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

Summary

The Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment was originally passed in 1985 (85/337/EEC). It is known as the Environmental Impact Assessment (EIA) Directive. The Directive was amended three times – in 1997, 2003 and 2009):

“Directive 97/11/EC brought the Directive in line with the [UN ECE Espoo Convention](#) on EIA in a Transboundary Context. The Directive of 1997 widened the scope of the EIA Directive by increasing the types of projects covered, and the number of projects requiring mandatory environmental impact assessment (Annex I). It also provided for new screening arrangements,

¹⁸ <http://ec.europa.eu/environment/eia/review.htm>

including new screening criteria (at Annex III) for Annex II projects, and established minimum information requirements.

Directive 2003/35/EC was seeking to align the provisions on public participation with the Aarhus Convention on public participation in decision-making and access to justice in environmental matters.

Directive 2009/31/EC amended the Annexes I and II of the EIA Directive, by adding projects related to the transport, capture and storage of carbon dioxide (CO₂).”¹⁹

The 2011 Directive codifies all of the amendments and the original into a single document. Then, in 2014 the Directive was amended again (Directive 2014/52/EU), so the two versions must be read together as the 2014 version only amends certain articles and paragraphs.²⁰

Entry into Force

The IEA Directive was published in December 2011, while the 2014 amendments entered into force in May 2014.

Policy Field

Integration/coordination issues with other related pieces of legislation

The IEA Directive refers to two Directives:

- the Integrated Pollution, Prevention and Control (IPPC) Directive (now the Industrial Emissions Directive);
- the Public Access to Environmental Information Directive 2003/4/EC.

The 2014 amending Directive refers to a wide number of EU pieces of legislation:

- Habitats Directive,
- Birds Directive,
- Water Framework Directive,
- Waste Framework Directive,
- Nuclear Installations Directive;
- Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances;
- Regulation (EU) No 1315/2013 on Union guidelines for the development of the trans-European transport network;
- Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure.

At international level, the 2014 Directive refers to the Convention on Biological Diversity.

Aims of the policy and its relevance to soil protection

Objectives

The overall of the EIA Directive is assessing “the environmental effects of those public and private projects which are likely to have significant effects on the environment.” (Article 1)

¹⁹ DG Environment, Environmental Impact Assessment – EIA, <http://ec.europa.eu/environment/eia/eia-legalcontext.htm>.

²⁰ <http://ec.europa.eu/environment/eia/review.htm>

The aim is therefore to assess projects in view of minimising any adverse effect on the environment.

Spatial coverage and management unit

The EIA Directive applies to those public and private projects that are either mandatorily subject to an EIA²¹ or upon the voluntary discretion of the Member States²², as listed respectively in Annex I and Annex II.

Relevance to soil protection

The EIA Directive is relevant to soil protection in that it establishes a framework for the assessment of those projects that could have negative impacts on the environment, including on soil (Article 3). Therefore, the identification of such impacts and potentially less harmful alternatives could result in the choice of less impacting project methods on soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The EIA Directive aims to “identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project” through an environmental impact assessment, and one of the categories for which it aims to identify the effects of a project is “land, soil, water, air and climate”. (Article 3) Recital 9 of the EIA Directive also directly speaks to the aim of the policy to reduce projects’ impacts on soils/land.

Implicitly: Other categories for which the environmental impact assessment aims to identify the effects of projects are “biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (the Birds and Habitats Directives)” and “material assets, cultural heritage and the landscape”.²³ These may include soil as a medium that may have its biodiversity affected by projects, and soil is a component of landscapes, a material asset, and may play a role within the cultural heritage.

Soil threats addressed by the policy

Explicitly: No soil threats are directly addressed by the EIA Directive.

Implicitly: The EIA Directive indirectly addresses soil threats such as erosion, floods/landslides, loss of soil organic matter, contamination, sealing and loss of biodiversity. In particular, under Annex IV “A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape” must be included in the information submitted by the project developer.

²¹ Mandatory EIA: all projects listed in Annex I are considered as having significant effects on the environment and require an EIA (e.g. long-distance railway lines, motorways and express roads, airports with a basic runway length \geq 2100 m, installations for the disposal of hazardous waste, installations for the disposal of non-hazardous waste > 100 tonnes/day, waste water treatment plants > 150.000 p.e.).

²² for projects listed in Annex II, the national authorities have to decide whether an EIA is needed. This is done by the “screening procedure”, which determines the effects of projects on the basis of thresholds/criteria or a case by case examination. However, the national authorities must take into account the criteria laid down in Annex III.

²³ 2014 Directive amending the 2011 EIA Directive, Article 1 (referencing Article 3).

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	The target to reduce environmental impacts from projects would include soil, as a natural resource that the project makes use of.	No direct soil-focused expected outputs. However, the overall objectives of the EIA Directive is that few impacts on the environment happen due to the types of projects included in Annexes I and II of the Directive.

Mandatory requirements and voluntary options for Member States (types of management measures)

Information about a project's likely significant effects

When a Member State requires certain projects to complete an EIA based on a case-by-case assessment or if it meets certain thresholds or criteria, the developer must submit information about the project (listed in Annex II.A). One of the requirements is “a description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from: (a) the expected residues and emissions and the production of waste, where relevant; (b) the use of natural resources, in particular soil, land, water and biodiversity”.

Information to determine whether a project must undergo an EIA

Additionally, in determining whether a project should have to undergo an EIA, use of natural resources including soil needs to be indicated by the developer in the information submitted about the project (Annex III) as well as “The environmental sensitivity of geographical areas likely to be affected by projects must be considered, with particular regard to: (a) the existing and approved land use; (b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground”. This latter consideration of the sensitivity of the geographical area focusing on the land use and quality/regenerative capacity of soil and land at a minimum requires the recognition of the potential soil threats from the project. However, the option may still be chosen following an EIA rather than less harmful alternatives if the developer provides reasons why the more harmful activity was chosen. This is relevant to soil protection because in the end, the option which harms soil more may be chosen due to overriding interests – it is not mandated that the least harmful option be chosen.

Information about project measures to avoid, prevent or reduce impacts and reasonable alternatives

In the EIAs conducted under the Directive, “a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment” must be provided as well as “a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment”.²⁴ Specifically, the EIA must be

²⁴ 2014 Directive amending the 2011 EIA Directive, Article 1 (referencing Article 5).

prepared by competent experts, and transparency and participatory requirements are included in the process by allowing Member States to require “that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities or local and regional competences are given an opportunity to express their opinion on the information supplied by the developer and on the request for development consent”.²⁵ Additionally, the EIA participatory process requires that the “public shall be informed electronically and by public notices or by other appropriate means, of the following matters early in the environmental decision-making procedures”.²⁶

Information included in the EIA project description

Information which must be included in the EIA by the developer (under Annex IV) includes “a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used” and “an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases”. Both highlight soil and land, but the second requirement specifically identifies projected soil pollution quantities, which may influence the way the project is carried out if the potential impacts are high and there is a less harmful alternative which can be implemented without significantly different costs or complications. As pointed out above in the Soil threats section, a description of the factors including soil must be indicated if they are likely to be significantly affected by the project – specifying certain soil threats (“organic matter, erosion, compaction, sealing”) as well as the likely significant effects on soil (considering as far as possible the sustainable availability of this resource). The wording of this mandatory requirement allows for some flexibility in the extent to which information is provided on the significant effects which may occur.

Key soil-relevant instruments

Mandatory

Determination whether a project is required to complete an EIA; public participation in the decision-making process; and an EIA submitted to the competent authority for development consent.

Decisions which are issued based on the EIA regarding whether “to grant development consent shall incorporate at least the following information: (a) the reasoned conclusion referred to in Article 1(2)(g)(iv); (b) any environmental conditions attached to the decision, a description of any features of the project and/or measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment as well as, where appropriate, monitoring measures.” This instrument (the development consent with environmental conditions) may be soil-relevant because if soil was one of the highlighted resources within the EIA to be affected by the project, then the conditions could propose development of the project in a less harmful way for the soil.

Voluntary

No voluntary soil-relevant requirements

²⁵ Ibid. Article 1 (referencing Article 6(1)).

²⁶ Ibid. Article 1 (referencing Article 6(2)).

11 Environmental Liability Directive

Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage – the Environmental Liability Directive (ELD)

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Directive establishes a framework based on the polluter pays principle to prevent and remedy 'environmental damage'. It covers damage to land, water and biodiversity. Land damage is considered to be "any land contamination that creates a significant risk of human health being adversely affected as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms".

The Directive is highly relevant to the protection of soil associated with the clauses linked to land damage, but also provisions for remediating water and biodiversity impacts would indirectly potentially impact on issues of soil contamination and associated threats such as loss of soil biodiversity. It should however, be noted that the wording of the Directive refers to land contamination not specifically soils. Land contamination and remediation is subtly different to that which is focused on soil and the protection of soils functions and qualities in situ. It should, however, be noted that the use of wording differs between languages as in some national language versions of the Directive the word for soil is used. This issue, and its implications, should be investigated further in future.

The Directive requires that preventative measures are taken in response to an event, act or emission with a view to preventing and minimising that damage. It also sets out that where environmental damage has not yet occurred, but if there is an imminent threat of damage the operator shall take preventative measures. This is important as soil functions and quality can be hard to restore or take a significant time period to do so. Therefore, preventing damage is an important aspect of the requirements.

Importantly the Directive does not apply to:

- damage caused by an emission, event or incident that took place before the date referred to in Article 19(1),
- damage caused by an emission, event or incident which takes place subsequent to the date referred to in Article 19(1) when it derives from a specific activity that took place and finished before the said date,
- damage, if more than 30 years have passed since the emission, event or incident, resulting in the damage, occurred.
- There is, therefore, an outstanding question as to what the liability rules and ability to enforce remediation needs can be applied to historic contamination i.e. 2007.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text

- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification			
Compaction			
Contamination - diffuse	I	The Directive is intended to reduce incidents and also ensure remediation of emissions both to land and water. As a consequence this will support reductions in wider diffuse pollution levels. The Directive does not, however, directly cover diffuse pollution.	
Contamination – point source	E	The Directive is focused on local emissions of pollutants that change the status of land, water and biodiversity. Hence highly relevant to both increasing caution around questions of emissions to land and also addressing emissions/securing remediation when a change does occur	
Desertification			
Erosion - water			
Erosion - wind			
Flooding/ landslides			
Loss of soil biodiversity	I	The Directive is linked to emissions to land and also protection of biodiversity linked to the Nature Directives. As a consequence this is likely to be some protection afforded soil biodiversity. However, the extent to which this is the case will depend on the approach to remediation adopted.	
Loss of soil organic matter			
Salinisation			
Soil sealing			

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool			
Platform for human activities	I	The Directive is intended to reduce incidents of environmental pollution and the definition of land/soil damage is linked to protection of human health	
Biomass production			
Hosting biodiversity	E	The measure directly seeks to promote biodiversity protection and provisions are stronger in relation to biodiversity than for water and soil, i.e. enabling a second tier of liability to apply on top of Annex III installations. Moreover, protecting land outside of protected areas via the land protection clauses is also important in securing biodiversity across the wider landscape.	
Providing raw materials			
Storing, filtering and transforming nutrients and water	I	The Directive relates to the protection of water as well as of land. Additionally, reducing emissions to land will have a knock on consequence for emissions to water.	
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- ELD sets out a clear framework for the protection of land, and as a consequence soils, specifically from installations listed in Annex III. It sets very clear binding requirements requiring polluters to address emissions to land. Not only do the requirements to protect land impact on soil quality in the EU, those to protect biodiversity (including protection of specific sites of interest) and on water will also benefit soil protection. In particular, often emissions impacting on biodiversity will also be linked to the soil quality.
- It has been noted by interested parties that the ELD has improved environmental protection and in particularly raised expectations in terms of prevention actions to avoid damage or reduce the impact of damage.

Weaknesses - are there aspects limiting the protection afforded?

- It has been noted in the review of implementation in 2016 that there are issues in terms of the consistency of national implementation of the Directive and in particular the thresholds applied to trigger preventative action.
- The Directive very clearly sets out that it deals only with pollution events after April 2007, and in addition pollution linked to activities that had ended before April 2007 but occur after this date also are exempt. Therefore, there is a question of how MS deal with pollution or historic contamination that occurred before 2007.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- There is a proposal for an action plan in relation to the Environmental Liability Directive – indicated in response to the 2016 review. There are opportunities to share experience and understanding of implementation to ensure that this improves over time.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- The focus on land rather than soil quality in terms of remediation is a potential issue as often cheaper remediation techniques for land include removal and landfilling of contaminated material – which will often be contained in the soils²⁷. As a result remediation of land does not necessarily mean protecting the natural soils in a local – although there are of course many techniques for physically cleaning the soil on site the approach selected will likely be left to the contractor or local authorities to define and cost will play an important role.
- The 2016 review identified just over half of cases were linked to pollution of land, compared to biodiversity (20%) and water (30%). There are a number of reasons potentially for this including that emissions to land from the installations in Annex III may simply be more probable. However, there is a risk that land is not being sufficiently focused on by operators.

Continuity of coverage – how likely is it that the policy implemented there caters for significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Member States' approaches to implementation and willingness to go beyond current EU legislation with a view to protect soil may vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

²⁷ It should be noted that in different national language versions of the Directive different terms for land or soil are used. This should be investigated further to understand the potential impact on soil protection.

The implementation of the ELD has been reviewed with a report by the Commission and a REFIT Evaluation published in 2016 (see <http://ec.europa.eu/environment/legal/liability/>) and a subsequent action plan anticipated. The work concluded that the Directive has improved:

- the standards of prevention and restoration of environmental damage,
- the application of the ‘polluter pays’ principle,
- strict liability across the EU for environmental damage,
- EU-wide liability for biodiversity damage, and
- public participation and access to justice for people affected and NGOs.

At the same time, implementation still varies significantly from one Member State to another in terms of the number of ELD cases and the way the Directive is implemented. The observed ‘patchwork’ of environmental remediation (in particular linked to diverging interpretations of the significance threshold affecting in particular the trigger for preventative action), together with the lack of some key data on implementation and on the cost (both administrative and financial security), is a major challenge. There are concerns that this may result in insufficient enforcement of the ELD. Importantly, the amount of ‘better precaution’ is said by stakeholders to have risen but this is difficult to estimate.

The REFIT assessment concluded that opportunities for better application of the ELD are provided through

- publicly accessible registers of ELD cases,
- access of interested parties to submit comments and to cooperate with competent authorities,
- a secondary obligation of competent authorities to carry out preventive and remedial action if operators fail to do so,
- the repeal of overlapping national legislation, and
- the knowledge of the ELD by operators.

It should be noted that the report on the Directive’s implementation noted that slightly over 50% of reported cases related to environmental damage to land (compared to 30% for water and 20% for biodiversity). Based on the cases reported, the dangerous occupational activities (linked to strict liability) causing environmental damage are mostly:

- waste management activities;
- treatment of dangerous substances, preparations, plant protection products or biocidal products;
- activities under the Industrial Emissions Directive and
- transport of dangerous or polluting goods by road, rail, inland waterways, sea or air.

Other occupational activities (linked to fault-based liability) also caused environmental damage, but cause according to the ELD exclusively biodiversity damage.

Section 3 - Base Information

Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage – the Environmental Liability Directive (ELD)

Summary

The Directive establishes a framework based on the polluter pays principle to prevent and remedy environmental damage. The Directive deals with the "pure ecological damage", thus it is based on the powers and duties of public authorities ("administrative approach") and is distinct from a civil liability system for "traditional damage" (damage to property, economic loss, personal injury). Furthermore, the Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil. Operators carrying out dangerous activities listed in Annex III of the Directive fall under strict liability (without need to prove fault). Operators carrying out other occupational activities than those listed in Annex III are liable for fault-based damage to protected species or natural habitats. The establishment of a causal link between the activity and the damage is always required. Affected natural or legal persons and environmental NGOs have the right to request the competent authority to take remedial action if they deem it necessary."²⁸

This Directive applies only to damage caused after 2007 (30 April 2007) (Art. 17). Member States are required to transpose the Directive into the laws, regulations and administrative provisions necessary to comply with it within three years after entering into force of this Directive, i.e. by 30 April 2010 (Art. 19.1). There were many proceedings against MS for failure to implement the Directive²⁹, and finally the transposition was completed in July 2010.³⁰

The ELD was amended three times, through:

- Directive 2006/21/EC on the management of waste from extractive industries;
- Directive 2009/31/EC on the geological storage of carbon dioxide and amending several directives; and
- Directive 2013/30/EU on safety of offshore oil and gas operations and amending Directive 2004/35/EC.

Entry into Force

Entered into force on the day of its publication in the Official Journal of the European Union, which was 30 April 2004. Binding from 30 April 2007.

Policy Field

Integration/coordination issues with other related pieces of legislation

"The Birds and Habitats Directives are major reference points for the prevention and remediation of damage to protected species and natural habitats, one of the three categories of environmental damage under the ELD.

*The Water Framework Directive and the Marine Strategy Framework Directive are major reference points for damage to water, another of the three categories of environmental damage under the ELD."*³¹

Aims of the policy and its relevance to soil protection

Objectives

"The purpose of this Directive is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage." (Art. 1)

²⁸ <http://ec.europa.eu/environment/legal/liability/>

²⁹ <http://eur-lex.europa.eu/legal-content/EN/LKD/?uri=CELEX:32004L0035>

³⁰ <http://ec.europa.eu/environment/legal/liability/>

³¹ <http://ec.europa.eu/environment/legal/liability/>

Principles included in the legal text

- The referenced principles are generally the environmental principles in the TFEU (e.g., precautionary, polluter-pays, preventive, etc.)
- Polluter-pays principle is included with regards to prevention and remedying of environmental damage, in conjunction with the principle of sustainable development, and as the fundamental basis of the Directive.
- Subsidiarity principle is cited – the EU is authorized to adopt these measures given that accomplishing the objective of the Directive cannot be sufficiently achieved by a single Member States. In doing so, the proportionality principle is referenced as needing to be respected.

Spatial coverage and management unit:

The ELD covers the entire European Union's environment. The Member States are required to designate a "competent authority" which "*will ensure the effective implementation and enforcement of the ELD; safeguard the legitimate interests of the relevant operators and other interested parties; or is in charge of specific tasks such as assessing the significance of the damage and determining which remedial measures should be taken (in co-operation with the liable operator).*"³²

Relevance to soil protection

As mentioned in Section 3, priority objective 1 is particularly relevant to soil protection, while 'Land damage' is one of the three 'environmental damage' types defined in Art. 2(c) (in addition to 'damage to protected species and natural habitats' and 'damage to water'). The Directive applies the following definition: "*environmental damage' means land damage, which is any land contamination that creates a significant risk of human health being adversely affected as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms*" (Art. 2.1(c)). In this way, the Directive addresses explicitly soil contamination threat.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: See above the text on 'land damage' under the section 'Relevance to soil protection'.

Implicitly: Indirectly, soil protection might be expected under prevention and remediation of 'damage to protected species and natural habitats' which is defined as "any damage that has significant adverse effects on reaching or maintaining the favourable conservation status of such habitats or species." (Art. 2.1(a)) since soil is an important component of natural (terrestrial) habitats and contributes to conservation of habitats and species. Art. 2.1(a) further states that "*The significance of such effects is to be assessed with reference to the baseline condition, taking account of the criteria set out in Annex I*". An example of such criteria: "*the number of individuals, their density or the area covered, and the role of the particular individuals or of the damaged area in relation to the species or to the habitat conservation*" (Annex I).

³² <http://ec.europa.eu/environment/legal/liability/pdf/Summary%20ELD.pdf>

The Directive defines that *“The conservation status of a natural habitat will be taken as ‘favourable’ when: its natural range and areas it covers within that range are stable or increasing”* (Art. 2.4). As soil is one of the physical components that a terrestrial habitat is made of, achieving a favourable conservation status of terrestrial habitats could also contribute towards soils protection.

Soil threats addressed by the policy

Explicitly: only land/site (soil) contamination. The Directive addresses only land contamination as damaging to land and thereby potentially covered by the ELD if it reaches a certain threshold. *“Furthermore, to be considered damage, land contamination needs to pose a significant risk to human health.”*³³

Implicitly: reduced land/site contamination contributes generally to improved soil health and quality, and thus might contribute to improved soil biodiversity.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
There are no direct or specific soil-focused targets in the ELD.	As mentioned under soil threats section, <i>“to be considered damage, land contamination needs to pose a significant risk to human health.”</i> A mandatory risk-assessment procedure takes into account <i>“the characteristic and function of the soil, the type and concentration of the harmful substances, preparations, organisms or micro-organisms, their risk and the possibility of their dispersion”</i> (Annex II).	Reduced land/soil contamination and improved soil biodiversity could be expected – though not mentioned explicitly in the directive.

Mandatory requirements and voluntary options for Member States (types of management measures)

Preventative and remedial actions and measures to deal with environmental damage: Member States have to take preventative and remedial actions and measures to deal with environmental damage. The requirements differ depending on the status of environmental damage, for example, where there is an imminent threat of environmental damage but it has not occurred yet and where environmental damage has occurred:

- In case of an imminent threat of environmental damage but which has not occurred yet, the competent authority may require the operator (i.e. the potential polluter) to take the necessary preventive measures (Art. 5) or to recover the costs incurred if it has taken the measure itself (Art. 8).
- In case environmental damage has occurred, the competent authority may require the operator to take the necessary remedial measures (Art. 6) or to recover the costs incurred if it has taken the measure itself (Art. 8). The operator must identify potential remedial measures on the basis of the rules and principles set out in Annex II (Art. 7).

³³ Cp. Winter, Gerd, Jan H. Jans, Richard Macrory and Ludwig Kramer (2008): Weighing up the EC Environmental Liability Directive. *Journal of Environmental Law* 20:2. In: Susanne Altvater, Elizabeth Dooley, and Ennid Roberts (2014). *Legal Instruments to implement the objective “Land Degradation Neutral World” in International Law*. Final Report, 1 December 2014.

- “The operator shall bear the costs for the preventive and remedial actions taken pursuant to this Directive” (Art. 8.1), including where the competent authority recovers the costs from the operator (Art. 8.2). However, there are exceptions where the operator is not required to bear the costs (Art. 8.3-4).

Liability schemes: the Directive employs two liability schemes, where the first one is ‘**strict liability**’ applicable to the dangerous or potentially dangerous occupational activities listed in Annex III and the second one applies to “**any occupational activities** other than those listed in Annex III” that cause damage to protected species and natural habitats protected by Community legislation. Under the first scheme, the operator may be held responsible even if he/she is not at fault (no need to prove fault) and under the second scheme, the operator will be held liable only if he is at fault or negligent (fault based damage). Annex III includes a list of activities considered under a number of Directives, including mainly industrial activities requiring a license or authorization under the respective directives, such as for producing dangerous chemical substances under the IED or for activities that discharge heavy metals into water or air under the relevant water directives; or for waste management activities under the relevant waste legislation; or for activities concerning genetically modified organisms.

Financial security instruments: Member States must “take measures to encourage the development of financial security instruments and markets by the appropriate economic and financial operators”. It might include, for example “financial mechanisms in case of insolvency, with the aim of enabling operators to use financial guarantees to cover their responsibilities under this Directive” (Art. 14.1).

Land use must be “*ascertained on the basis of the land use regulations, or other relevant regulations, in force, if any, when the damage occurred. If the use of the land is changed, all necessary measures shall be taken to prevent any adverse effects on human health. If land use regulations, or other relevant regulations, are lacking, the nature of the relevant area where the damage occurred, taking into account its expected development, shall determine the use of the specific area. A natural recovery option, that is to say an option in which no direct human intervention in the recovery process would be taken, shall be considered.*”

There are training materials provided on ELD here:

http://ec.europa.eu/environment/legal/liability/eld_training.htm;

And national guidance documents on ELD implementation provided here:

http://ec.europa.eu/environment/legal/liability/eld_guidance.htm.

Funding

Recital 27 of the ELD states: “*Member States should take measures to encourage the use by operators of any appropriate insurance or other forms of financial security and the development of financial security instruments and markets in order to provide effective cover for financial obligations under this Directive.*” Article 14 directly covers financial security, which directs Member States to take measures to develop financial security instruments and markets (using financial mechanisms in case of insolvency) to enable operators to use financial guarantees to cover their responsibilities under the ELD.

12 Fertilisers Regulation

Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Fertilisers Regulation is a product standard that in its current form controls inorganic fertiliser products placed on the internal market to ensure a minimum nutrient content, consistent labelling and traceability of supplies. While soil protection is not a specific stated aim within its text, it is highly relevant. The Regulation sets out a system that allows users of fertilisers to understand better its content. Overuse of fertiliser and inaccurate use is associated with a number of soil threats i.e. acidification and diffuse pollution of water and deposition onto other soils with nutrients. The Regulation does not however, state how the fertiliser should be used. Rules related to appropriate application would be linked to other instruments such as the Nitrates Directive and CAP requirements.

The Fertilisers Regulation as stands is limited in scope as it deals only with inorganic material and also does not go beyond specifying nutrient content to deal with other potential contents or contaminants that might persist in fertiliser. In response, as part of the Circular Economy Package, the European Commission has set out a proposal for a new Regulation on fertiliser products. This extends the scope to organic fertilisers and includes provisions for the control of heavy metals they contain. The new proposal represents an important opportunity to address the weaknesses in the current Regulation and allow it to proactively protect soil quality, in the form of limiting contaminants, in addition to its information role. Increasing access to the market for organic fertilisers offers additional benefits in terms of increasing SOM as well as making better use of biowaste resources.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	Understanding levels of nutrients and components linked to Ammonia and N compounds is important to reduce acidification associated with fertiliser application and nutrient leaching.	
Compaction	N/A		
Contamination - diffuse	I	In theory if labelling systems are used correctly to	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		<p>understand the content of nutrients in a fertiliser better, it makes it more possible for land users to regulate fertiliser applications to what is needed and taken up by the plants reducing leaching of nutrients and diffuse pollution of water courses and enrichment of other soils.</p> <p>Into the future, assuming the proposed revisions to the Regulation are adopted, there will be an important impact on diffuse contamination of soils with heavy metals associated with fertiliser application.</p>	
Contamination - point source	N/A		
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	N/A		
Loss of soil organic matter	I	The current fertiliser regulation sets out the rules and quality in terms of nutrients providing a potentially better basis for improving soils. Into the future, the proposed amendment to the regulation will contribute more to this category given the emphasis on organic fertilisers which contribute better to SOM accumulation.	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	The increased use of organic fertilisers, often transformed waste products, should help assist promoting the carbon pool and sequestration in soils. Organic fertilisers are known to better support SOM accumulation	I
Platform for human activities	N/A		N/A
Biomass production	I	Fertilisers are intended to promote biomass production in the form of crops and these rules within the Directive ensure that fertilisers have the nutrient content claimed	I

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
		to facilitate this.	
Hosting biodiversity	I	Rules making clear the content of nutrients in fertilisers in theory should help reduce nutrient leaching by promoting understanding of nutrient content of fertilisers and therefore support more accurate application. Considerable damage is done to biodiversity through the leaching or deposition of nutrients in protected areas.	I
Providing raw materials	I	Phosphate is a key resource concern for the EU in terms of inorganic phosphorous is mined external to the EU and at great environmental expense. The consideration of organic fertilisers in the new proposal is important as it potentially adds to the pool of accessible raw materials reliably available as alternatives to inorganic phosphorous and other nutrients.	I
Storing, filtering and transforming nutrients and water	I	Rules making clear the content of nutrients in fertilisers in theory should help reduce nutrient leaching by promoting understanding of nutrient content of fertilisers and therefore support more accurate application.	I
Storing geological and archeological heritage	N/A		N/A

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Sets out clear labelling and consistency standards for inorganic fertilisers in the EU supporting better, more accurate use of fertilisers
- The existing Regulation would be considerably strengthened both in terms of coverage and in terms of its ability to protect soils from contamination based on proposed drafts of the revised fertiliser Regulation.

Weaknesses - are there aspects limiting the protection afforded?

- At present, the measure is more a facilitating tool i.e. it provides fertiliser users with the information they need to manage their fertiliser inputs, however, whether this is delivered will depend on other.
- There are clear weaknesses in the current Regulation that have been identified as to be built on including:
- The need to ensuring internal market access to organic not just inorganic fertilisers
- The lack rules on contaminants contained in fertilisers for example heavy metals or VOCs
- It should be noted that as a product standard, the fertiliser Regulation only covers material that are free to circulate on the internal market. Material dealt with on a

purely national basis is not covered which may be a more of a question in the future as organic fertilisers are generally traded more locally and the scope of the Regulation is being increased to include contaminants requirements not only nutrient based ones.

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- The proposed revisions under the circular economy package represent an important opportunity to expand and improve the Regulation and ensure it contributes more in terms of limiting soil threats and supporting soil functions.

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- There is a potential risk that proposed amendments to the Regulation will not be accepted or amended to weaken protection afforded to soil.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

This is a product standard, therefore if fertiliser products are to be traded across national borders they need a CE mark and have to comply with the standards set out. If they are traded nationally only they do not need to comply, therefore for material used only at a national level the rules do not apply and national standards would be required.

For the current Fertiliser Regulation that deals with inorganic fertilisers that would generally be commercially produced it is likely that the majority will be traded across boundaries, more over the consequences of non-compliance relate more to the information received by the land user. If the proposed amendments to the Regulation occur then non compliance with the CE rules would potentially mean that fertilisers were not in compliance with the safety standards set in relation to contamination with heavy metals etc. Moreover, organic material is likely to have shorter trading distances; there is therefore a potential risk associated with nationally regulated material, unless national laws do not exist. Having said this the proposed amendments are an important step forward in promoting organic fertilisers and also securing requirements to protect soils from contaminants.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

The proposed revision to the Regulation and associated impact assessment can be found at <http://ec.europa.eu/DocsRoom/documents/15949>

Section 3 - Base Information

Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers

Summary

The Regulation applies to products which are placed on the market as fertilisers designated 'EC fertiliser'. 'Fertiliser' means material, the main function of which is to provide nutrients for plants. The Regulation focuses on inorganic fertilisers. It sets out product standards that must be met for a fertiliser to receive a CE mark. This includes setting the minimum level of key nutrients to be contained in different fertiliser types and the nutrient content to be declared. It also sets out labelling and traceability requirements. The Regulation is essentially a tool facilitating the better use of fertilisers by increasing information available to the user and securing a minimum baseline level in terms of nutrient content.

A proposal for a new Regulation on making available on the market of CE marked fertilising products (COM(2016)157) has been put forward by the Commission. This would update and address key weaknesses within the current Regulation. The revised proposal applies to the entire catalogue of fertilising products: importantly including organic fertilisers to complement existing coverage of inorganic and enhancing the freedom of movement of these products – which also offer potential additional benefits for soil quality and the wider environment. The current Fertilisers Regulation does not address possible contamination of soil, inland waters, sea waters, and ultimately food, by EC marked fertilisers. Some fertilisers may contain substances that are considered dangerous to human health and environment. The Commission proposes harmonised limits for heavy metals (cadmium, chromium, mercury, nickel, lead, arsenic) in CE marked fertilisers. The limits for cadmium in phosphate fertilisers will be tightened from 60 mg/kg to 40 mg/kg after 3 years, and to 20 mg/kg after 12 years, reducing the risks for health and environment.

Entry into Force

Probably 2021

Policy Field

Integration/coordination issues with other related pieces of legislation

The Circular Economy Package proposes a new Fertiliser Regulation. The new proposed Regulation would complement provisions in the waste Directive on biowaste and sets out common rules on converting bio-waste into raw materials that can be used to manufacture fertilising products. In addition rules around end of waste are clarified for biowaste. A CE marked fertilising product that has undergone a recovery operation and complies with the requirements laid down in this Regulation shall be considered to comply with the conditions laid down in Article 6(1) of Directive 2008/98/EC and shall, therefore, be considered as having ceased to be waste.

Aims of the policy and its relevance to soil protection

Objectives

Among the 7th EAP priority objectives, objective 1 has the aim to “protect, conserve and enhance the Union’s natural capital. This is a product standard for the use of inorganic fertilisers. It sets out the minimum nutrient content of all inorganic fertilisers traded on the internal market. It does not explicitly reference soil protection but is highly relevant to issues related to soil nutrient balancing and associated emissions.

Relevance to soil protection

At present the measure is more a facilitating tool i.e. it provides the information to fertiliser users regarding the content of the material to inform their decision making around use.

The proposed amendment to the Regulation under the circular economy package would, were it adopted by the European institutions, significantly increase the relevance of the measure to soil protection. This is due to two key aspects:

- The inclusion of organic fertilisers and the facilitation of their trading across the internal market including the clarification of rules around the use of biowaste materials – organic fertilisers are known to be effective in boosting SOM content as well as providing nutrients to the soil.
- The inclusion of rules on the contaminants i.e. heavy metals and VOC components. This will limit the inputs of contaminants to soils at a diffuse level by fertilisers.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: none

Implicitly: If the feedback chain facilitated by this regulation is effective it should result in fertiliser use being more accurately controlled to focus on meeting the growth needs of the crop and reducing issues linked to over-fertilization including acidification and diffuse pollution by nutrients.

<p>Soil threats addressed by the policy Explicitly: none Implicitly: acidification, diffuse pollution</p>
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Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	None

13 EU Floods Directive

Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The EU Floods Directive 2007/60/EC established an approach to flood risk management within the EU through mandatory and voluntary requirements which may support the protection of soil. A three-level process is required to Member States, including i) undertaking a preliminary flood risk assessments by 2011, ii) producing flood hazard and risk maps by 2013, and iii) put in place flood risk management plans by 2015. The Directive addresses directly flooding and indirectly another series of soil threats - compaction, erosion and soil sealing. It may indirectly contribute to protecting selected soil functions.

The EU Floods Directive established an overarching approach to flood risk management at EU level which may support soil protection, if correctly implemented. No mandatory or voluntary requirements explicitly dedicated to soil are enclosed and the extent to which the Directive's requirements may benefit soil is dependent on Member States' implementation. Their approaches to translating EU requirements in national law are likely to vary significantly.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	I	Through the implementation of the Floods Directive requirements, which may lead to the promotion of natural water retention measures (NWRM) to increase retention capacity of rural landscape and reduce flood risk downstream.	
Contamination - diffuse	N/A		
Contamination - point source	N/A		
Desertification	N/A		
Erosion - water	I	Through the implementation of the Floods Directive	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		requirements, which may lead to the promotion of natural water retention measures (NWRM) to increase retention capacity of rural landscape and reduce flood risk downstream.	
Erosion - wind	I	Through the implementation of the Floods Directive requirements, which may lead to the promotion of natural water retention measures (NWRM) to increase retention capacity of rural landscape and reduce flood risk downstream.	
Flooding/ landslides	E	Through the implementation of the Floods Directive requirements, which have the explicit purpose of reducing risks of flooding. In particular, thorough the implementation of requirements in relation to undertaking and producing: Preliminary flood risk assessments; Flood hazard maps; Flood risk maps; Flood risk management plans.	
Loss of soil biodiversity	N/A		
Loss of soil organic matter	N/A		
Salinisation	N/A		
Soil sealing	I	Through the implementation of the Floods Directive requirements, which may lead to the promotion of land use planning rules and of green infrastructure to control run-off, pluvial flooding and over-topping of urban drainage network. May also promote the protection of soil by preventing the urbanization of floodplain and riparian land exposed to flooding.	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A		
Platform for human activities	?		Unclear from the phrasing of the Directive.
Biomass production	?		As above

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Hosting biodiversity	N/A		
Providing raw materials	?		As above
Storing, filtering and transforming nutrients and water	I	Through the implementation of the Floods Directive requirements, which have the explicit purpose of reducing risks of flooding. In particular, thorough the implementation of requirements in relation to undertaking and producing: Preliminary flood risk assessments; Flood hazard maps; Flood risk maps; Flood risk management plans.	
Storing geological and archeological heritage	?		As above

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The EU Floods Directive established an approach to flood risk management at EU level, with benefits for soil protection if implemented

Weaknesses - are there aspects limiting the protection afforded?

- No soil-focused mandatory requirements are established by the Directive

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Member States may choose to go beyond the Directive's requirements and put in place a suite of voluntary or mandatory actions aiming to support soil protection through limiting flooding

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the policy itself, but from the non-implementation of measures addressing soil threats by Member States.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The EU Floods Directive provides flexibility to Member States as to which instruments or tools they may use to limit flooding. Therefore, the approaches and the related degree of soil protection may vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

No evaluation reports have been produced as yet on the implementation of the EU Floods Directive. Nonetheless, Guidance for Reporting under the Floods Directive (2007/60/EC) has been produced and a Working Group on Floods has been established under the Common Implementation Strategy. The work programme for 2008 - 2009 focused on:

- the development of reporting formats;
- the joint implementation between the Water Framework Directive and the Floods Directive;
- Flood risk management information exchange.

The approach proposed by the Directive to minimise risks of flooding is to be reviewed every 6 years, and coordinated and synchronised with the Water Framework Directive implementation cycle.

Section 3 - Base Information

Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks

Summary

The Directive requires Member States to approach flood risk management in a three-stage process. First, preliminary flood risk assessment of river basins and associated coastal zones were to be done by 2011 in order to identify areas where potential significant flood risk exists. This assessment led to the identification of Units of Management (UoM) where risk of flood damage exists. Second, flood hazard maps and flood risk maps were to be prepared by 2013. Flood hazard maps show the flood extent, water depths and flow directions/velocities for high, medium, and extreme events. Flood risk maps should contain information about the number of inhabitants, economic activity, industries, source of pollution, cultural heritage and nature protection areas potentially affected. Third, flood risk management plans (including measures to reduce the probability of flooding and its potential consequences) must be drawn up for these areas by December 2015. Due to the nature of flooding, much flexibility on objectives and measures are left to the Member States. These steps need to be reviewed every 6 years in a cycle. They are synchronised with the Water Framework Directive (WFD) implementation.

Entry into Force

The EU Floods Directive entered into force in November 2007.

Policy Field

Integration/coordination issues with other related pieces of legislation

Integration/coordination issues with other related pieces of legislation

The EU Floods Directive is strictly linked to the Water Framework Directive (WFD), as highlighted in Article 3 according to which:

“For the purposes of this Directive Member States shall make use of the arrangements made under Article 3(1), (2), (3), (5) and (6) of Directive 2000/60/EC.

However, for the implementation of this Directive, Member States may:

- appoint competent authorities different from those identified pursuant to Article 3(2) of Directive 2000/60/EC;
- identify certain coastal areas or individual river basins and assign them to a unit of management different from those assigned pursuant to Article 3(1) of Directive 2000/60/EC.”

Aims of the policy and its relevance to soil protection

Objectives

The EU Floods Directive aims to establish a framework for the assessment and management of floods risks with the aim to reduce the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods within the EU (Article 1).

Spatial coverage and management unit

The EU Floods Directive covers all of the EU territory.

Relevance to soil protection

The Directive primarily aims to set in place common procedures for the management of all types of floods (river, lakes, flash floods, urban floods, coastal floods, including storm surges and tsunamis), on all of the EU territory. The Directive says little on the level of protection expected or the means through which flood risk reduction should be achieved. One of the main objectives of the Directive nevertheless is to promote a more integrated and sustainable approach to flood risk management, which is based on the use of both structural and non-structural measures. Structural measures include traditionally used grey measures (e.g. dykes, walls, dredging) and green infrastructures (e.g. natural water retention measures, natural flood management). Non-structural measures include e.g. flood warning, awareness-raising, land use planning, building regulations, and emergency services. The Directive strongly recognises the role of human activities in increasing flood risk (e.g. land sealing, loss of natural water retention capacities), the potential to reverse these impacts, and finding synergies with the implementation of the WFD and biodiversity legislation.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: No direct soil-focused aims or objectives. However, the EU Floods Directive has a clear focus on flood risk management.

Implicitly: The promotion of sustainable and integrated flood management in the Floods Directive may result in an indirect contribution to the protection of soils mainly by aiming to maximize natural infiltration and retention capacities of soils.

Soil threats addressed by the policy**Explicitly:** No soil threats are directly addressed**Implicitly:** Soil threats are only indirectly addressed by the Floods Directive, and only if competent authorities are willing to take forward green infrastructure and land use planning measures.

- soil erosion and compaction threats: the implementation of the Floods Directive may lead to the promotion of natural water retention measures (NWRM) to increase retention capacity of rural landscape and reduce flood risk downstream.
- soil sealing: the implementation of the Floods Directive may lead to the promotion of land use planning rules and of green infrastructure to control run-off, pluvial flooding and over-topping of urban drainage network. It can also promote the protection of soil by preventing the urbanization of floodplain and riparian land exposed to flooding.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	Through land use planning and the use of soil sealing control targets, protection of land exposed to the risk of flooding and intra-urban areas for green infrastructures.	A key expected impact from the implementation of the Floods Directive is reduced risk from flooding, which would involve less soil erosion and loss of SOM, potentially sealing and loss of biodiversity.

Mandatory requirements and voluntary options for Member States (types of management measures)

The EU Flood Directive includes no explicit mandatory or voluntary soil-focused requirements. No mandatory requirements are either set to use land use planning regulations, identify the potential for green infrastructure, or implement good practices on agriculture or forest land with a view to reduce flood risk.

As to voluntary requirements, Member States are required to review and report to the Commission on their preliminary risk assessments, flood hazard and risk maps, and management plans for the covered areas.

Key soil-relevant instrumentsMandatory

None

Voluntary

None

14 Habitats Directive

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Habitats Directive 92/43/EEC established a framework for the protection of biodiversity in the whole EU through the conservation of natural habitats and of wild fauna and flora, which may indirectly contribute to addressing a number of soil threats by identifying Special Areas of Conservation (SACs)³⁴ as part of the Natura 2000 network and appropriate conservation measures. The Habitats Directive is required not only to maintain and restore a “favourable conservation status” (FCS) of Natura 2000 habitats and species, but also to achieve a FCS for all species of Community interest (as listed in Annexes II, IV and V) in the whole EU territory, which also can entail specific management and/or conservation measures. Depending on the measures selected by Member States, the Directive may indirectly contribute to limiting a number of soil threats – loss of soil organic matter, contamination, erosion, compaction and soil biodiversity.

No mandatory or voluntary soil-specific requirements are established by the Directive. However, Member States are left free to select the most suitable measures (for each SAC) to ensure the conservation of animal and plant species, creating potential benefits to soil protection. Member States have, in fact, a wide range of actions among which they can choose, i.e.:

- reduced intensity of agriculture (in particular, reduced areas of monoculture)
- reduced input of chemical fertilisers and plant protection products (PPP),
- reduced habitat fragmentation,
- restoration or improvement of habitats, or
- regulating/management exploitation of natural resources on land,

All of the above may positively contribute to soil protection. Member States’ approaches translating EU requirements in national law are likely to vary significantly and be dependent on the characteristics of each site.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

³⁴ for habitats listed in Annex I and species listed in Annex II

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	I	Through Member States designation of Sites of Community Importance (SCIs) and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Contamination - diffuse	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Contamination – point source	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Desertification	N/A		
Erosion - water	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Erosion - wind	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Flooding/ landslides	N/A		
Loss of soil biodiversity	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Loss of soil organic matter	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A		
Platform for human activities	?		
Biomass production	?		
Hosting biodiversity	I	Through Member States designation of SCIs and SACs and carrying out of conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network or conducting management measures outside the Natura 2000 network.	
Providing raw materials	?		
Storing, filtering and transforming nutrients and water	N/A		
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Habitats Directive establishes a framework for the protection of biodiversity in the whole EU, which may be indirectly contribute to addressing a number of soil threats – loss of soil organic matter, contamination, erosion, compaction and soil biodiversity.

Weaknesses - are there aspects limiting the protection afforded?

- The Habitats Directive does not set explicitly soil-relevant mandatory requirements

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- In defining the conservation measures for each SAC, Member States are left free to select the most suitable measures to ensure nature conservation, including potential positive impacts on soil. Member States have a wide range of actions among which they can choose, i.e. reduced intensity of agriculture (in particular, reduced areas of monoculture) reduced input of chemical fertilisers and plant protection products (PPP) and reduced habitat fragmentation, which may contribute to soil protection.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Directive itself, but from the non-implementation by Member States of conservation measures relevant to soil protection.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The conservation measures are site-dependent and vary according to the conservation objectives specific for each site, as well as the extent to which that may be relevant to soil protection. It is therefore likely that Member States' approaches vary widely.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Currently, the Habitats (and Birds) Directive is subject to a Commission-led Programme for assessing Regulatory Fitness and Performance (REFIT)³⁵. The process has the aim to assess whether EU actions are "proportionate to their objectives and delivering as expected". Its outcome is expected to be released at the end of 2016.

Part of this process was informed by "The State of Nature in the European Union" report (COM(2015) 219 final)³⁶ and the corresponding results from reporting under the Nature Directives for the period 2007-2012 (see report from EEA 2015, State of nature in the EU)³⁷, which do not explicitly reference soil protection.

Section 3 - Base Information

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

Summary

The Habitats Directive 92/43/EEC has the aim "to contribute towards ensuring biodiversity through the conservation of nature habitats and of wild fauna and flora" (Article 2.1) in the whole territory of the EU. It establishes a framework protecting over 1000 animal and plant species (species of European importance), as well as over 200 types of habitats. Member States are required to designate Special Areas of Conservation (SACs) (Article 4) and establish necessary conservation measures (Article 6.1). The Directive establishes the EU-wide Natura 2000 network of protected areas including SACs and Special Protection Areas (SPAs) as established by the sister Birds Directive 2009/147/EC (former 79/409/EEC). However, the Habitats Directive is required not only to maintain and restore a "favourable conservation status" (FCS) of Natura 2000 habitats and species, but also to achieve a FCS for all species of Community interest (as listed in Annexes II, IV and V) in the whole EU territory.

³⁵ http://ec.europa.eu/environment/nature/legislation/fitness_check/index_en.htm

³⁶ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0219&from=EN>

³⁷ <http://www.eea.europa.eu/publications/state-of-nature-in-the-eu>

Entry into Force

The Habitats Directive was published in May 1992.

Policy Field

Integration/coordination issues with other related pieces of legislation

The objectives of the Habitats Directive are of particular importance for the following sectors: agriculture, forestry, the aquatic environment and climate change mitigation. In addition, the 2014 – 2020 LIFE evaluation programme required to determine the benefits to the conservation status of habitats under the Habitats Directive resulted from LIFE projects.

Aims of the policy and its relevance to soil protection

Objectives

The overall aim of the Habitats Directive is to promote the maintenance of biodiversity, by conserving natural habitats and wild fauna and flora and maintaining or restoring their “favourable conservation status” (FCS) in the territory of the Member States (Art. 2). An ecological network of special protected areas, known as Natura 2000, is being set up for this purpose. However, the concept of FCS is not limited to the Natura 2000 network and applies to the overall situation of all species of Community interest (Annexes II, IV and V),

Member States are asked by the Habitats Directive (Art. 8) to prepare Prioritised Action Frameworks (PAFs) to set out the official nature conservation priorities for a country or region. The PAFs seek to act as strategic planning tools encouraging access to as many EU financial instruments as possible in the financing of the Natura 2000 network.³⁸ Almost all Member States have submitted their PAFs to the Commission.

Spatial coverage and management unit

The Habitats Directive covers priority habitats and species protected sites throughout the EU Natura 2000 network. The network covers in total (also including SPAs designated under the Birds Directive) over 18 % of the EU’s land area and ca. 6 % of its marine territory. The management units are the protected areas, which are labelled Special Areas of Conservation (SACs). The designated sites of Community Importance (SCIs) are included in the Natura 2000 network and must be managed by the Member States according to the ecological needs of the species.

Relevance to soil protection

The Habitats Directive does not explicitly state any direct relevance to soil protection; however the conservation measures required to Member States in relation terrestrial ecosystems may contribute to soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: No explicit soil-relevant objectives.

Implicitly: The Habitats Directive may contribute to soil protection through ‘the conservation of natural habitats’ that has the aim to set conservation measures and avoid “the deterioration of natural habitats” (Article 6.2).

³⁸ <http://ec.europa.eu/environment/nature/natura2000/financing/docs/PAF.pdf>

The conservation measures are site-dependent and vary according to the conservation objectives specific for each site. As most of these measures aim to maintain or restore habitats and species, they have potential to enhance soil quality and contribute to its protection. The most relevant to soil include:

- Maintaining grasslands and other open habitats (e.g. grazing and removal/control of shrubs and other woody plants – might support soil organic matter content in the grasslands, though, burning (if applied not correctly) – might increase the risk of soil erosion),
- Adapting crop production (e.g. adapting input of pesticides/herbicides – reducing soil contamination),
- Restoring/improving forest habitats (e.g. replanting with autochthonous species, enable/promote natural re-growth – might contribute to reducing the risk of erosion, or burning/maintaining a fire regime - might increase the risk of soil erosion (if applied not correctly)),
- Adaptation/ abolition of military land use (e.g. nature management on military training grounds, abolition of military use – might contribute to reduced soil contamination).

Member States are required by the Habitats Directive:

- to establish priorities in the SACs “in the light of the importance of the sites for the maintenance or restoration, at a Favourable Conservation Status, of a natural habitat type [...] or a species [...] and for the coherence of Natura 2000, and in the light of the threats of degradation or destruction to which those sites are exposed” (Art. 4.4). This might contribute to the general protection of soil from degradation.
- to carry out conservation measures (such as extensive farming) or achieving the coherence of the Natura 2000 network. Reduced intensity of agriculture (in particular, reduced areas of monoculture, reduced input of chemical fertilisers and plant protection products (PPP) and reduced habitat fragmentation contribute positively to soil biodiversity, combat the threat of loss of SOM, erosion, contamination and compaction.
- to implement appropriate management measures outside the Natura 2000 network to maintain/restore a FCS of Annex IV and V species, which might contribute to soil protection in general.

Soil threats addressed by the policy

Explicitly: Soil threats are not directly addressed/affected

Implicitly: As soil is one of the physical factors/component that a habitat/a site is made up of – a positive impact of the conservation measures on soil might be expected. The Habitats Directive could therefore contribute indirectly to increased soil organic matter (SOM) content, reduced soil contamination, erosion risk, compaction and soil biodiversity loss, as well as land degradation in general.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	The Habitats Directive does not set a target of a FCS for all habitats types and species, as it is site specific. It should be defined at national, regional or bio-geographical level within the Member States. Depending on the ecological requirements of the	Art. 17.2 of the Habitat Directive underlines the need for “an appropriate evaluation of the progress achieved and, in particular, of the contribution of Natura 2000 to the achievement of the objectives

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
	habitats types and species and status of the site, each conservation site has its own conservation objectives that contribute to the attainment of the FCS. Though conservation objectives must be understood at site level, Member States may decide to develop generic conservation objectives and for the species and habitat types at broader geographical scales (e.g. national, regional or bio-geographical level) which then can be cross-referenced to the site level. The site-specific and regionally mandated conservation objectives often include land as an important component of the habitat.	set out in Art. 3 (i.e. attainment of FCS).” Only indirectly does this outcome of a FCS relate to the treatment of the soil through the various conservation measures, but reaching a FCS would likely not be possible if the soil and land were of a degraded status. The Habitats Directive does not set a date for the attainment of a FCS.

Mandatory requirements and voluntary options for Member States (types of management measures)

The Habitats Directive does not set explicitly soil-relevant mandatory requirements. However, the designation of SACs and SPAs contributes indirectly to soil protection through the application of necessary conservation measures (Article 6.1 in the Habitats Directive).

In order to achieve the aim of the Habitats Directive to promote the maintenance of biodiversity and ensure the conservation of a wide range of rare, threatened or endemic species (including around 450 animals, 500 plants and 200 rare and characteristic habitat types in their own right), the Habitats Directive requires the Member States:

- to establish the EU wide Natura 2000 ecological network of protected areas (Art. 3), that comprises designated SACs under the Habitats Directive and includes SPAs under the Birds Directive. For these areas, the network provides a high level of safeguards against potentially damaging developments,
- to designate the SACs (Article 4) and establish the appropriate conservation measures to maintain and restore the habitats and species for which the site has been designated to a favourable conservation status (Article 6.1),
- to avoid damaging activities in the SACs that could significantly disturb these species or deteriorate the habitats of the protected species or habitat types for which the areas have been designated (Article 6.2), and
- to carry out an assessment of implications for the site in view of the site's conservation objectives of “any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects” (Art. 6.3). In case the plan or project must nevertheless be carried out for imperative reasons, the Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected (Article 6.4).

Conservation measures are the actual mechanisms and actions to be put in place for a Natura 2000 site with the aim of achieving the site's conservation objectives. Conservation measures can include management plans, which are voluntary, either particularly designed for the site or integrated into other development plans. Alternative conservation measures include statutory, administrative or contractual measures. Member States must choose at least one of the three categories; the choice between these three options, or of management plans, is left to the Member States following the principle of subsidiarity. Furthermore, as mentioned

above, according to Articles 6.3 and 6.4, plans or projects likely to have a significant effect on the management of a SAC must be made the subject of an appropriate assessment, and when proceeding, all compensatory measures necessary to ensure the coherence of the Natura 2000 network must be taken.

Although management plans for SACs are not obligatory, their use is strongly recommended by the European Commission and it is a requirement under national legislation in some countries (e.g. Denmark, France, the Netherlands and some German Federal States). Management plans are considered as operational instruments that outline practical measures to achieve the conservation objectives for the sites in the network.

Key soil-relevant instruments

Mandatory

Designation of SCIs and SACs; Conservation measures such as statutory (e.g., restrictions on activities over urban development, industrial activity, or hunting), administrative or contractual measures (e.g., contracts with landowners or users for mowing of grasslands or with forest owners on the management of the forest); Actions to maintain or restore a “favourable conservation status” of targeted species and habitats

Voluntary

Preparation of Management Plans outlining practical conservation measures for each site; Uptake of voluntary schemes for sustainable land use under the Rural Development Programme (financing measures in Natura 2000 areas)

15 Birds Directive

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Birds Directive 2009/147/EC established a framework for the conservation of all species of naturally occurring birds in the wild state in the EU, which may indirectly contribute to addressing a number of soil threats by identifying Special Protection Areas (SPAs) and appropriate conservation measures. Depending on the measures selected by Member States, the Directive may indirectly contribute to limiting loss of soil organic matter, contamination, erosion, compaction and soil biodiversity.

No mandatory or voluntary soil-specific requirements are established by the Directive. However, Member States are left free to select the most suitable measures (for each SPA) to ensure the conservation of birds species and habitats, creating potential benefits for soil protection. Member States can, in fact, select among a wide range of conservation, which may positively contribute to soil protection. Member States' approaches translating EU requirements in national law are likely to vary significantly and be dependent on the characteristics of each site.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	I	Through Member States designation of SPAs and carrying out of conservation measures to achieve favourable status of habitats and species (Art. 1) by carrying out necessary conservation measures (Art. 6). This might contribute to reducing compaction.	
Contamination - diffuse	I	Through Member States designation of SPAs and carrying out of conservation measures by, i.e. taking appropriate steps to avoid pollution [...] of habitats [...] inside and outside protection areas (Art. 4.4), which might contribute to the reduced soil pollution (contamination).	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Contamination – point source	I	As above	
Desertification	N/A		
Erosion - water	I	Through Member States designation of SPAs and carrying out of conservation measures to achieve favourable status of habitats and species (Art. 1) by carrying out necessary conservation measures (Art. 6). This might contribute to reducing soil erosion.	
Erosion - wind	I	As above	
Flooding/ landslides	N/A		
Loss of soil biodiversity	I	Through Member States designation of SPAs and carrying out of conservation measures to achieve favourable status of habitats and species (Art. 1) by carrying out necessary conservation measures (Art. 6). This might contribute to reducing loss of soil biodiversity.	
Loss of soil organic matter	I	Through Member States designation of SPAs and carrying out of conservation measures by, i.e. paying particular attention to the protection of wetlands (Article 4.2), which may contribute to increase soil organic matter.	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A		
Platform for human activities	N/A		
Biomass production	N/A		
Hosting biodiversity	I	Through Member States designation of SPAs and carrying out of conservation measures to achieve favourable status of habitats and species (Art. 1) by carrying out necessary conservation measures (Art. 6). This might contribute to promoting this soil function.	
Providing raw	N/A		

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
materials			
Storing, filtering and transforming nutrients and water	N/A		
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The Birds Directive establishes a framework for the conservation of all species of naturally occurring birds in the wild state in the EU, which may indirectly contribute to addressing a number of soil threats – loss of soil organic matter, contamination, erosion, compaction and soil biodiversity.

Weaknesses - are there aspects limiting the protection afforded?

- The Birds Directive does not set explicitly soil-relevant mandatory requirements

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- In defining the conservation measures for each SPA, Member States are left free to select the most suitable measures to ensure their conservation, including measures having potential positive impacts on soil.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the Directive itself, but from the non-implementation by Member States of conservation measures relevant to soil protection

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The conservation measures are site-dependent and vary according to the conservation objectives specific for each site, as well as the extent to which they may be relevant to soil protection. It is therefore likely that Member States' approaches vary widely.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Currently, the Birds (and Habitats) Directive is subject to a Commission-led Programme for assessing Regulatory Fitness and Performance (REFIT). The process has the aim to assess whether EU actions are "proportionate to their objectives and delivering as expected". Its outcome is expected to be released at the end of 2016.

Part of this process was informed by "The State of Nature in the European Union" report <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0219&from=EN> Soil protection is not explicitly referenced in the report.

Section 3 - Base Information

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

Summary

The Birds Directive 2009/147/EC (replacing the former Birds Directive 79/409/EEC) has the aim to ensure “the conservation of all species of naturally occurring birds in the wild state in the European territory of the Member States [...]. It covers the protection, management and control of these species and lays down rules for their exploitation. (Article 1) Member States are required by the Birds Directive to designate Special Protection Areas (SPAs) for nearly 200 threatened bird species listed in the Directive and all migratory bird species. SPAs protect areas that are important for the survival of the targeted species, such as nesting grounds. The Birds Directive does not set any specific timelines for the implementation.

The SPAs, alongside with SCIs, SACs which Member States are mandated to designate by the Habitats Directive, make up the Natura 2000 network, the cornerstone of the EU’s action on nature conservation.

Entry into Force

The Birds Directive (2009/147/EC) was published in November 2009.

Policy Field

Integration/coordination issues with other related pieces of legislation

The objectives of the Birds Directive are of particular importance for the following sectors: agriculture, forestry, the aquatic environment and climate change mitigation. In addition, the 2014 – 2020 LIFE evaluation programme required to determine the benefits to the conservation status of habitats under the Habitats Directive resulted from LIFE projects.

Aims of the policy and its relevance to soil protection

Objectives

The overall aim of the Birds Directive is to ensure that all Europe’s wild birds are maintained, or restored, to a favourable conservation status (FCS) throughout their natural range within the EU. It identifies 194 particularly threatened wild bird species and all migratory bird species in Europe, as well as their most important habitats across the EU which should be protected with special conservation measures.

Spatial coverage and management unit

Priority species protected sites throughout the EU (Natura 2000 network). The management units under the Birds Directive are the protected areas, which are labelled as Special Protection Areas (SPAs).

Relevance to soil protection

As mentioned in Section 3, priority objective 1 is particularly relevant to soil protection, while The Birds Directive does not explicitly state any direct relevance to soil protection; however the conservation measures required to Member States in relation terrestrial ecosystems may contribute to soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: No explicit soil-relevant objectives.

Implicitly: One of the Birds Directives objectives is “the protection, management and control of [naturally occurring birds in the wild state in the European territory] species [...]. It applies to [...] habitats” (Art. 1.1-1.2). The associated conservation measures might have a positive impact on the state of soil.

The conservation measures that have to be implemented should depend on the conservation objectives specific for each site (or group of sites) and should be framed in the context of the overall attainment of the FCS. The majority of these measures are ‘positive’ that aim to maintain and restore habitats and species, and which have potential to enhance soil quality and contribute to its protection.

Soil threats addressed by the policy

Explicitly: No soil threats are not directly addressed/affected

Implicitly: As soil is one of the physical factors/component that a site is made up of – a positive impact of the conservation measures on soil might be expected. The Birds Directive could therefore contribute indirectly to increased soil organic matter (SOM) content, reduced soil contamination, erosion risk, compaction and soil biodiversity loss, as well as land degradation in general.

Member States are requires by the Birds Directive:

- “[to] pay particular attention to the protection of wetlands [...]” (Art. 4.2) - which might contribute to the increased size of areas with high SOM content.
- “[to] take appropriate steps to avoid pollution [...] of habitats [...]” inside and outside protection areas (Art. 4.4) - which might contribute to the reduced soil pollution (contamination).
- to achieve favourable status of habitats and species (Art. 1) by carrying out necessary conservation measures (Art. 6). This might contribute to combating different threat to soil (see the list conservation measures and their impacts above).

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	Each conservation site has its own conservation objectives that contribute to the attainment of the FCS. Though conservation objectives must be understood at site level, Member States may decide to develop generic conservation objectives. The site-specific and regionally mandated conservation objectives often include land as an important component of the habitat.	None

Mandatory requirements and voluntary options for Member States (types of management measures)

The Birds Directive does not set explicitly soil-relevant mandatory requirements. However, the designation of SPAs contributes indirectly to soil protection through the application of necessary conservation measures (in particular Art. 4.1 and 4.2 in the Birds Directive).

The Birds Directive identified the threatened wild bird species in need of special conservation measures that must be established by the Member States including the following three components (only the first one might have an impact on soil):

- to designate SPAs for these 194 particularly threatened wild bird species and all migratory bird species. SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive.
- to ban activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking off their eggs, and associated activities such as trading in live or dead birds.
- to establish rules that limit the number of bird species that can be hunted (82 species and sub-species) and the periods during which they can be hunted. It also defines hunting methods that are permitted (e.g. non-selective hunting is banned).

Key soil-relevant instruments

Mandatory

Designation of the SPAs. Conservation measures such as statutory (e.g., restrictions on activities over urban development, industrial activity, or hunting), administrative or contractual measures (e.g., contracts with landowners or users for mowing of grasslands or with forest owners on the management of the forest)

Voluntary

Conservation measures such as Management Plans. Voluntary schemes under the Rural Development Programme

16 Industrial Emissions Directive

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Industrial Emissions Directive proactively seeks to reduce and prevent emissions to land, water and air – with potential positive impacts on the diffuse pollution of soils. Installations regulated under the Directive must be permitted and permits must set out ‘appropriate requirements ensuring protection of the soil and groundwater and measures concerning the monitoring and management of waste generated by the installation’.

Before commencement of operations operators must submit a baseline report assessing soil and groundwater conditions to the competent authority. Upon cessation of activities the operator is required to return the site to the original baseline condition. In addition the installation permits are required to set ‘appropriate requirements ensuring protection of the soil and groundwater and measures concerning the monitoring and management of waste generated by the installation’ and ‘appropriate requirements for the regular maintenance and surveillance of measures taken to prevent emissions to soil and groundwater and appropriate requirements concerning the periodic monitoring of soil and groundwater in relation to relevant hazardous substances likely to be found on site’ . Periodic monitoring is also required of soil condition at least every 10 years. The implementation of IED is flexible due to the use of permits as a key tool to adapting conditions to an installation. However, due to this relies heavily on the quality of the permitting, inspection and monitoring regime to succeed in protecting soils. These regimes and their rigor are controlled by the relevant competent authorities within each Member State.

IED is a relatively strong tool in terms of preventing point source emissions to land, assuming effective permitting and monitoring and reporting are in place. However, for diffuse contamination it is felt that requirements are less developed/advanced. These impacts are harder to define, both in terms of the baseline and the monitoring regime to capture emission events.

Key strengths of IED for soil protection are that it relies on a system of application of evolving Best Available Techniques, while no single BAT is dedicated to soil this is considered within the different specifications. In addition, the Directive establishes clear enforcement procedures and requirements for returning the site to its former condition after use. Soil protection is also clearly stated as one of the actions to be considered by operators.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	E	IED controls some acidification sources	
Compaction	N/A		
Contamination - diffuse	E	Diffuse pollution from installations should be managed but is more challenging to address	
Contamination – point source	E	Emissions from installations should be managed	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	I	Emissions and pollution from installations should be managed under IED. Might contribute to soil biodiversity protection	
Loss of soil organic matter	I	Provisions around biowaste have the potential to promote alternative solutions for soil fertility that offer greater potential to address issues of SOM.	
Salinisation	N/A		
Soil sealing	I	Sealing might be used by installations to prevent input of toxic substances to soils as required by IED	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	A key instrument controlling emissions which may negatively affect soil carbon	I
Platform for human activities	E	Controls pollutant inputs from installations to soils and so can contribute to maintain quality for different human activities. Particular emphasis in restoring site after use	E
Biomass production	N/A		N/A
Hosting biodiversity	I	Controlling pollution from installations might	I

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
		contribute to soil biodiversity protection	
Providing raw materials	N/A		N/A
Storing, filtering and transforming nutrients and water	N/A		N/A
Storing geological and archeological heritage	N/A		N/A

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - *what does the policy cover well in relation to soil protection?*

- Covers diffuse as well as point source pollutants from industry/combustion plant/waste installations
- Covers all environmental impacts, including soils
- Requires full environmental assessment
- Requires operation to BAT
- Establishes clear enforcement procedures
- Provisions for return of site condition after use
- The provisions of Article 22 of IED on site closure resulted in Member States having to develop a system of background reports that highlighted the state of soils and understanding the nature of contamination. β
- Is flexible in allowing MS to add in additional elements (some include some soil spreading activities)

Weaknesses - *are there aspects limiting the protection afforded?*

- BAT is harder for operators to define for many diffuse sources and so regulators find it hard to set out some permit conditions
- Monitoring of diffuse emissions sources can be more problematic and less precise; it is therefore, potentially, easier operators to hide non-compliance/pollution incidents, etc.

Opportunities - *are there potential opportunities for soil protection moving forward e.g. through MS implementation approaches or new proposals or clauses that might be used better?*

- As BREFs develop further, consideration to diffuse pollution and soil protection may become more evident
- IMPEL and other exchange platforms begin to examine wider issues.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- There is not a threat to the provisions themselves – just a threat that full accounting for diffuse pollution in permitting and enforcement might take some time to filter through

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Covers the EU industrial installations under Annex I with a permitting scheme setting operating conditions. Installation level – “‘installation’ means a stationary technical unit within which one or more activities listed in Annex I or in Part 1 of Annex VII are carried out, and any other directly associated activities on the same site which have a technical connection with the activities listed in those Annexes and which could have an effect on emissions and pollution” (Article 3).

Continuity of approach and treatment of installations is based on the permitting regime and the rigor of coverage. Different MS will adopt different permitting approaches to deliver implementation which enables tailoring but also potentially inconsistencies. Moreover different approaches to monitoring and reporting may lead to differing qualities and requirements within the baseline reporting and end of installation life comparators.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Information on the evolution of BAT and other questions on implementation are set out at <http://ec.europa.eu/environment/industry/stationary/ied/implementation.htm> in addition the IMPEL network bring together understanding and expertise from competent authorities on the quality of permitting, monitoring approaches etc.

Studies looking at industrial emissions can be found at <http://ec.europa.eu/environment/industry/stationary/studies.htm>. Interestingly this includes references looking at emissions from industry to air and water but not in relation to land or soils. This would seem an omission given findings as part of the REFIT evaluation of the Environmental Liability Directive that over 50 per cent of cases brought forward relate to emissions to land.

Section 3 - Base Information

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

Summary

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) was proposed to combine seven different pieces of legislation and adopted in 2007.³⁹ Commonly known as the

³⁹ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast), Recital 23. DG Environment, The Industrial

Industrial Emissions Directive (IED), it was adopted in its current form in 2010 and entered into force on 6 January 2011. It had to be transposed into MS legislation by 7 January 2013.

The Directive aims to achieve a high level of protection of human health and the environment by reducing harmful industrial emissions across the EU, through the application of the Best Available Techniques (BAT). Annex I includes a list of around 50,000 installations in the EU undertaking the industrial activities which are required to operate in accordance with a permit that are granted by the authorities in the Member States. A permit should contain conditions set in accordance with the principles and provisions of the IED. In particular, the IED is based on: (1) an integrated approach, (2) use of best available techniques, (3) flexibility, (4) inspections and (5) public participation.⁴⁰

Entry into Force

6 January 2011.

Policy Field

Integration/coordination issues with other related pieces of legislation

Pollution and Waste Management

Aims of the policy and its relevance to soil protection

Objectives

The IED aims to prevent pollution or at least reduce emissions to air, water, and land and to prevent the generation of waste in order to reduce the environmental impacts from industrial activities. Specifically, it lays out a framework for industrial installation oversight (the covered industries are found in Annex I).

Relevance to soil protection

Within the Directive, however, there are individual chapters for major types of industrial installations. This is relevant to soil protection because by regulating industrial activities and requiring them to abide by environmental protection components contained in permits, it could potentially significantly reduce the risk of the soil threat of contamination.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The IED directly aims to prevent industrial pollution on land, which would include soil, but this specific component is not highlighted or given priority.

Implicitly: The IED indirectly aims to prevent industrial pollution to water and air, which could be directly discharged into a water body or into the air. However, the pollution could also be discharged on land and then rainfall or wind could carry the pollution (through soil particles or via leaching to groundwater) to water bodies or air emissions may result in atmospheric deposition onto land.

Emissions Directive, <http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm>. The legislation it “recasts” are the directives on Integrated Pollution Prevention and Control, Waste Incineration, limiting emissions of volatile organic compounds, titanium dioxide, and pollutants from large combustion plants (the latter repealed in 2016, all others repealed from 7 January 2014).

⁴⁰ <http://ec.europa.eu/environment/industry/stationary/ied/legislation.htm>

Soil threats addressed by the policy

Explicitly: Recital 23 points to the direct objective of the IED to prevent deterioration of soil quality from operation of an installation and the intention of the permitting system to prevent against soil contamination by setting conditions which “include appropriate measures to prevent emissions to soil and groundwater and regular surveillance of those measures to avoid leaks, spills, incidents or accidents occurring during the use of equipment and during storage”.

Implicitly: Contamination is also indirectly targeted by the requirement for waste incineration plants and waste co-incineration plant sites to be designed and operated so as to avoid unauthorised and accidental releases to soil (Article 46), and to take the necessary precautions in the delivery and reception of waste to prevent or limit the amount of pollution to soil (Article 52).

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	The baseline report which requires assessment of the state of soil and groundwater contamination prior to operation of the installation and the re-assessment following cessation of activities is expected to identify any changes in the level of soil and groundwater contamination. Where significant pollution of soil or groundwater has been caused, the operation must take the necessary measures (taking into account technical feasibility) to return the site to the state it was in at the time the baseline report was conducted.

17 Landfill Directive

Council Directive 99/31/EC on the landfill of waste

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Landfill Directive essentially controls all aspects of the landfilling of wastes in Europe, across all categories of landfill. It sets out provisions requiring the permitting of landfills and within the permit requirements for the management of the sites, their monitoring and reporting. The protection of soil, along with other environmental impacts, is explicitly highlighted as a priority under the Directive. Moreover, soil contamination is a known key consequence of uncontrolled landfilling.

The Directive represents a relatively strong policy tool for controlling this specific form of waste disposal and in particular contamination resulting from landfills both point source and diffuse (associated with emissions to water courses and groundwaters). Rules are clear and well established. However, there are known instances of non-compliance i.e. landfills run illegally without the required permits and conditions attached. Therefore, the limits are not necessarily in the conceptualising of the policy but in the effective control and implementation.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	E	Should ensure containment of pollution and so prevent diffuse pollution.	
Contamination – point source	E	Should ensure containment of pollution and so prevent emissions to local soils.	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Loss of soil biodiversity	I	Should ensure containment of pollution and so may contribute to soil biodiversity protection.	
Loss of soil organic matter	N/A		
Salinisation	N/A		
Soil sealing	I	Sealing is effectively a result of containment of landfill sites required by the LD.	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A		
Platform for human activities	I	Should prevent inputs of pollutants in contained landfills and so can contribute to maintain quality for different human activities.	
Biomass production	N/A		
Hosting biodiversity	I	Should ensure containment of pollution and so may contribute to soil biodiversity protection.	
Providing raw materials	N/A		
Storing, filtering and transforming nutrients and water	I	Should ensure containment of pollution both to soil and groundwater sources.	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Provisions for containment protect soils
- Relatively easy to determine compliance for regulated landfills

Weaknesses - are there aspects limiting the protection afforded?

- Considerable non-compliance in some MS – soils remain at significant risk
- Containment is, itself, a form of sealing

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Further emphasis on enforcement is likely
- New proposals seek to limit the scale of new landfilling

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- None – the provisions are extremely unlikely ever to be watered down

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Covers all landfilling activities in the EU, however, the actual management regime is dependent on permits and the monitoring and reporting requirements therein; as set out by the relevant competent authority.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

In a 2007 implementation report, soil contamination was highlighted as a key consequence of illegal landfills or illegal dumping of waste - http://ec.europa.eu/environment/waste/pdf/study/cowi_report.pdf

Section 3 - Base Information

Council Directive 99/31/EC on the landfill of waste

Summary

The Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land. Landfills are divided into three classes:

- landfills for hazardous waste;
- landfills for non-hazardous waste;
- landfills for inert waste.

It operates by requiring landfills to have a permit to operate which sets out permit conditions under which the landfilling activities are permitted and clauses on monitoring, notification of emissions to that are harmful to the environment and requirements for end of life are applied. The intention is to control the landfill throughout its life time and ensure risk associated are minimized and managed. Soil is not specifically mentioned with the permitting provisions, however, Annex I sets out requirements for all classes of landfill including specific rules on the protection of soil and water – including in particular leachate control.

On 2 July 2014, the European Commission adopted a legislative proposal (COM(2015) 594) to amend waste-related targets in the Landfill Directive (along with proposals linked to other waste legislation). The proposal aims at phasing out landfilling by 2025 for recyclable waste (including plastics, paper, metals, glass and bio-waste) in non-hazardous waste landfills. While

this does not directly impact on questions of soil management, there may be consequences linked to decline in biodegradable wastes as these are important sources of leachate.

Entry into Force

The Directive was signed on 26 April 1999; and entered into force on the day of its publication in the Official Journal of the European Union - 16 July 1999 (OJ L 182). The deadline for implementation of the relevant legislation to comply with this Directive in the Member States was 16 July 2001

Policy Field

Integration/coordination issues with other related pieces of legislation

Waste

Aims of the policy and its relevance to soil protection

Objectives

Soil is directly addresses in the aim of the Landfill Directive: “The aim of this Directive is, by way of stringent operational and technical requirements on the waste and landfills, to provide for measures, procedures and guidance to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect, as well as any resulting risk to human health, from landfilling of waste, during the whole life-cycle of the landfill.” (Article 1).

Spatial coverage and management unit

Landfills throughout the EU. It includes landfills for hazardous, non-hazardous and inert waste.

Relevance to soil protection

This Directive is very relevant to soil protection in the various provisions that focus on reducing or preventing damage to soil as well as groundwater pollution (see Article 1).

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Annex I on ‘General requirements for all classes of landfills’ sets specific requirements for protection of soil and water with which landfill sites must comply (Part 3 ‘Protection of soil and water’). In particular, and for preventing soil pollution, it considers the location and design of the landfill, including geological barriers, bottom liner, where geological barrier is determined by geological and hydrological conditions. Furthermore, the landfills base and sides shall consist of a mineral, drainage or artificial layer which satisfies permeability and thickness requirements set in the Annex I ‘General requirements for all classes of landfills’.

Implicitly: As according to the definition (Art. 2(g)), ‘landfill’ is a disposal site for the deposit of waste onto or into land”. Therefore, all the requirements with which landfill sites must comply - as regards location, conditioning, management, control, closure and preventive and protective measures to be taken against any threat to the environment, and more especially against the pollution of groundwater by leachate infiltration into the soil – contributes to the protection of soil.

Soil threats addressed by the policy

Explicitly: prevents against soil contamination, when fulfilling the requirements with which landfill sites must comply.

Implicitly: to soil biodiversity, as any improvement of soil health and quality leads to the improvement of soil biodiversity. Furthermore, the waste policy in general contributes to the reduction of soil sealing, as it considers landfilling as the least preferable option, which should be limited to the minimum.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	The Landfill Directive (Art. 5) requires Member States to set up a national strategy to reduce the amount of biodegradable waste going to landfills. Art. 5.2 sets three targets to reduce the total amount (by weight) of biodegradable municipal waste produced in 1995, by 75%, 50% and 35% in accordingly five, eight and fifteen years after national legislation is issued to implement the Landfill Directive.	The measures aimed to reduce the amount of waste, at the same time also reduce the risk of soil contamination, and reduce soil sealing (land covered by landfills). Reduced soil contamination and sealing contributes to reduced soil biodiversity loss.

18 Land Use and Land Use Change Decision, 2014

DECISION No 529/2013/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The LULUCF Decision sets out accounting rules applicable to emissions and removals of GHGs resulting from land use, land-use change and forestry activities. It sets out an obligation for MSs to report on their LULUCF actions to limit or reduce emissions and maintain or increase removals. It does not set out rules for the incorporation of LULUCF into EU emission reduction targets, LULUCF is not considered as part of the EU's 2020 emission reduction package. It provides a basis for reporting to understand the current situation and to contribute to MS commitments under the UNFCCC. It requires MSs to report on their carbon pools, SOM and flux between carbon pools. It also requires reporting on specific activities and the adoption (or plan for adopting) measures to promote carbon sequestration in soils (set out in Annex IV).

Soil protection is not the ultimate goal of the policy, the goal is emission reduction. However, soil management and actions to promote better nutrient and carbon management in soils are key to delivering positive outcomes. In addition the emphasis on the list of measures within annex IV clearly highlights good soil management techniques both for agricultural and forestry land. In addition, the requirement to report SOM will add to the knowledge and consistency of understanding on soil carbon and also could promote monitoring of other soil parameters to get a proper understanding of actions.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	Potential link related to changing practices in terms of nutrient management	
Compaction	I	Increased SOM has potential benefits for soil structure	
Contamination - diffuse	I	Potential link related to changing practices in	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		terms of nutrient management	
Contamination – point source	n/a		
Desertification	n/a		
Erosion - water	I	Increased SOM has potential benefits for soil structure	
Erosion - wind	n/a		
Flooding/ landslides	n/a		
Loss of soil biodiversity	n/a		
Loss of soil organic matter	E	Potential impact on the emphasis of retaining soil carbon and monitoring of SOM	
Salinisation	n/a		
Soil sealing	n/a		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	E	Maintaining carbon pool in the soils and sequestration	
Platform for human activities	n/a		
Biomass production	I	Maintaining the carbon pool and SOM increase will potentially impact on the way biomass is produced but also in theory the long term health of the soils for biomass production.	
Hosting biodiversity	n/a		
Providing raw materials	n/a		
Storing, filtering and transforming nutrients and water	I	Improvement in SOM should improve soil structure, assuming wider management improvements, therefore impacting on soil infiltration rates.	
Storing geological and archeological heritage	n/a		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - *what does the policy cover well in relation to soil protection?*

- Offers an opportunity to improve the monitoring and understanding of soils, sets out/promotes the adoption of specific 'measures' and management practices

Weaknesses - *are there aspects limiting the protection afforded?*

- Emission reductions are not required as part of the EU emission reduction framework up to 2020. Therefore while MS must report on LULUCF up to 2022 there is no requirement to better manage and improve activities. There are no clear rules set out on how reporting should be completed e.g. on what basis SOM should be determined.

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- The proposal for a regulation for the 2020 to 2030 period potentially offers an opportunity to drive better management and promote land use management given the inclusion of LULUCF within the accounting period for GHG emission reductions. However, the opportunity will relate to how MS choose to take forward action under LULUCF and whether they use this as an opportunity to holistically improve soil protection and management practices.

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- Within the newly proposed LULUCF Regulation some of the detail included in the Decision has been lost – in particular on soil management practices.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

Monitoring is required by all MS and reporting. However, there is quiet some flexibility in coverage and use of different actions.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Proposal for a Regulation on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry into the 2030 climate and energy framework, amending Regulation No 525/2013 - COM(2016) 479 final

This Proposal for a Regulation sets out Member States' commitments on land use, land use change and forestry ('LULUCF') to contribute to meeting the greenhouse gas emission reduction commitment of the Union for the period from 2021 to 2030. It also sets out rules for the accounting of emissions and removals from LULUCF and checking the compliance of Member States with these commitments. For the period from 2021 to 2025 and from 2026 to 2030, taking into account the flexibilities provided for in Article 11, each Member State shall ensure that emissions associated with LULUCF do not exceed removals. This is calculated as

the sum of total emissions and removals for a MS's territory in the land accounting categories referred to in Article 2 combined and as accounted in accordance with the proposed Regulation.

In 2027 and 2032, Member States shall submit to the Commission a compliance report containing the balance of total greenhouse gas emissions and removals respectively for the period 2021-2025 and 2026-2030. The report shall include information on each of the land accounting categories specified in Article 2, using the accounting rules laid down in the proposed Regulation.

Compared to the current Regulation the proposal contains no list of management measures considered relevant to LULUCF actions – which included a large number of positive management practices for soils. It does, however, set out specific measures linked to national forest plans that are required under the proposal. The national forestry accounting plan shall include a proposed new forest reference level based on the continuation of current forest management practice and intensity, as documented between 1990-2009 per forest type and per age class in national forests, expressed in tonnes of CO₂ equivalent per year.

Section 3 - Base Information

DECISION No 529/2013/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities

Summary

The LULUCF Decision sets out accounting rules applicable to emissions and removals of GHGs resulting from land use, land-use change and forestry activities. It sets out an obligation for MSs to provide information on their LULUCF actions to limit or reduce emissions and maintain or increase removals. It does not set out rules for the incorporation of LULUCF into EU emission reduction targets; LULUCF is not considered as part of the EU's 2020 emission reduction package. It starts to provide a basis for reporting for understanding and for reporting under international conventions.

Entry into Force

18.7.2014

Policy Field

Integration/coordination issues with other related pieces of legislation

The LULUCF Decision refers to all policies and measures “relating to forests and agriculture”.

Aims of the policy and its relevance to soil protection

Objectives

As referred to in Article 1, the LULUCF Decision sets out accounting rules applicable to emissions and removals of greenhouse gases resulting from land use, land-use change and forestry ('LULUCF') activities. On the other hand, it does not lay down any accounting or reporting obligations for private parties. It sets out the obligation for Member States to

provide information on their LULUCF actions to limit or reduce emissions and to maintain or increase removals.

Spatial coverage and management unit

The whole of the EU.

Relevance to soil protection

In the context of soil management, the LULUCF Decision sets requirements for monitoring including monitoring of SOM. It requires MSs to report 2016-2018 on the systems in place. Up to 2022, MSs will report their preliminary annual estimates of emissions. By March 2022, MSs will submit their final annual emissions estimate. The MS accounts should reflect emissions and removals resulting from:

- Afforestation
- Reforestation
- Deforestation
- Forest management

In addition from 2021, and thereafter each MS shall prepare accounts that reflect all emissions and removals resulting from:

- Crop land management
- Grazing land management.

The accounts shall cover emissions and removals of the following greenhouse gases: carbon dioxide, methane, nitrous oxide.

MS shall include in their accounts any change in the carbon stock of the following carbon pools:

- above-ground biomass;
- below-ground biomass;
- litter;
- dead wood;
- soil organic carbon;
- harvested wood products.

MSs must include the following information in their reporting (as a minimum):

- a description of past trends of emissions and removals including, where possible, historic trends, to the extent that they can reasonably be reconstructed;
- projections for emissions and removals for the accounting period;
- an analysis of the potential to limit or reduce emissions and to maintain or increase removals;
- a list of the most appropriate measures to take into account national circumstances, based on the list in Annex IV which includes actions to manage soils and land use more effectively

- existing and planned policies to implement the measures above
- indicative timetables for the adoption and implementation of the measures.

INDICATIVE MEASURES THAT MAY BE INCLUDED IN THE INFORMATION ON LULUCF ACTIONS (set out in Annex IV)

- (a) Measures related to cropland management such as:
- improving agronomic practices by selecting better crop varieties,
 - extending crop rotations and avoiding or reducing the use of bare fallow,
 - improving nutrient management, tillage/residue management and water management,
 - stimulating agro-forestry practices and potential for land cover/use change.
- (b) Measures related to grazing land management and pasture improvement such as:
- preventing the conversion of grassland to cropland and the reversion of cropland to native vegetation,
 - improving grazing land management by including changes to the intensity and timing of grazing, increasing productivity,
 - improving nutrient management, improving fire management,
 - introducing more appropriate species and in particular deep rooted species.
- (c) Measures to improve the management of agricultural organic soils, in particular, peat lands, such as:
- incentivising sustainable paludicultural practices,
 - incentivising adapted agricultural practices, such as minimising soil disturbance or extensive practices.
- (d) Measures to prevent drainage and to incentivise rewetting of wetlands.
- (e) Measures related to existing or partly drained mires, such as:
- preventing further drainage,
 - incentivising rewetting and restoration of mires, — preventing bog fires.
- (f) Restoration of degraded lands.
- (g) Measures related to forestry activities such as:
- afforestation and reforestation,
 - conservation of carbon in existing forests,
 - enhancing production in existing forests,
 - increasing the harvested wood products pool,
 - enhancing forest management, including through optimised species composition, tending and thinning, and soil conservation.
- (h) Preventing deforestation.
- Strengthening protection against natural disturbances such as fire, pests, and storms.
- (j) Measures to substitute greenhouse gas intensive energy feedstocks and materials with harvested wood products.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The LULUCF Decision sets requirements for monitoring including monitoring of soil organic matter, as set out in Article 4, para 4.

Implicitly: The LULUCF Decision aims to indirectly address changing practices in terms of nutrient management, which may contribute to address acidification and diffuse pollution.

Via the main objective of monitoring soil carbon content, the Decision may also contribute to address erosion by water and compaction, as increased SOM has potential benefits for soil structure.

Soil threats addressed by the policy

Explicitly: Loss of soil organic matter as a carbon pool

Implicitly: Acidification, compaction, diffuse pollution and erosion by water

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	Monitoring and reporting of soil organic content as a carbon pool may give indication of the extent to which soils act as carbon sinks.	The expectation is increased emission removals from soil, as a carbon sink.

Mandatory requirements and voluntary options for Member States (types of management measures)

The LULUCF Decision requires MSs to report on their carbon pools, SOM and flux between carbon pools. (Article 4) It also requires reporting on specific activities and the adoption (or plan for adopting) measures to promote carbon sequestration in soils (set out in Annex IV).

Although no voluntary measures are focused on soil, the emphasis on the list of measures within annex IV clearly highlights good soil management techniques both for agricultural and forestry land.

Key soil-relevant instruments

Mandatory

Reporting obligations on soil organic matter as a carbon pool and on specific activities to promote soil carbon sequestration

Voluntary

Good soil management techniques on forestry and agricultural land.

19 National Emission Ceilings Directive

Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants

Please note that the most recent revision of the Directive was formally adopted on 14 December 2016 and published on 17 December 2016. Reference to the changes has been made in the main report, however, further analysis would be needed to examine the full implications linked to the revisions and integrate these into this fiche. Key changes relate to the consideration of Mercury which will now be reported under the NEC and reviewed to identify if further action is needed. New text is available at:

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L2284&from=EN>

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Directive requires Member States to limit their annual national emissions of the pollutants sulphur dioxide (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOC) and ammonia (NH₃) to amounts not greater than the emission ceilings laid down in Annexes and that following the target date, emissions should not exceed the said ceilings.

The Directive is highly relevant to soil protection as sulphur dioxide, nitrogen oxides, VOC and ammonia emissions directly impact the quality of soils, lead to contamination and acidification and consequent loss of key soil functions including the ability for both natural and farmed biomass to thrive. The NEC Directive is also important in that it represents a key policy that is determined by the capacity of soils to deal with the contaminants and associated consequences of deposition. Importantly it also recognises the transboundary nature of air pollutants and the need to reduce emissions across Europe for the health of its population and the environment.

A revision of the NEC Directive was proposed by the Commission as part of the Clean Air Package. The proposal sets out national emission ceilings (for SO₂, NO_x, NMVOC and NH₃ for 2020 and establishes new national emission reduction commitments applicable from 2020 and 2030 for SO₂, NO_x, NMVOC, NH₃, fine particulate matter (PM_{2,5}) and methane (CH₄). There has also been discussions with the European Parliament regarding adding mercury emissions to the NEC Directive ceilings – see the fiche on the Mercury Regulation. A compromise agreement on the content of the revised Directive was reached between the Parliament and the Council and due for approval in autumn 2016. The level of ambition of targets in the revised Directive has been criticised by civil society.

While the NEC Directive is a highly important instrument for dealing with ongoing emissions and depositions of contaminants to soils it does not specifically address the question of historic emissions and the remediation of damage already caused. Moreover there are concerns regarding the speed at which reductions in ammonia are occurring in particular, which change in terms of agricultural emissions (amounting to 95% of emissions) being slower than in other sectors.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	E	The principle instrument directly addressing acidification	
Compaction			
Contamination - diffuse	E	A key instrument to tackle diffuse pollution from acidifying substances	
Contamination – point source	I	There is the potential to reduce emissions from a number of point sources as a consequence of the overarching ceilings.	
Desertification			
Erosion - water			
Erosion - wind			
Flooding/ landslides			
Loss of soil biodiversity	I	A key instrument to tackle diffuse pollution from acidifying substances and so may contribute to soil biodiversity protection	
Loss of soil organic matter			
Salinisation			
Soil sealing			

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	E	The key instrument controlling emissions of acidifying compounds which may negatively affect soil carbon capacity	The 7th EAP does not link the specific soil function with EU policies

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Platform for human activities			See above
Biomass production	I	Tackling diffuse pollution from acidifying substances will contribute to biomass production	See above
Hosting biodiversity	I	Tackling diffuse pollution from acidifying substances will contribute to soil biodiversity protection	See above
Providing raw materials	I	Important in controlling inputs of acidifying substances that may affect soil nutrient cycling as well inputs of nitrogen compounds which may disrupt soil nutrient cycles	See above
Storing, filtering and transforming nutrients and water			See above
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Sets national limits on emissions based on degree of impact on receiving soils
- Overall compliance is reasonable and limited non-compliance remains
- Covers all key acidifying and eutrophying substances affecting soil functions

Weaknesses - are there aspects limiting the protection afforded?

- Some remaining non-compliance
- Further reductions in NO_x needed.
- Significant problems in tackling ammonia emissions

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- NECD review has passed – revision currently in adoption process. Some amendments appear likely to limit ambition as currently proposed

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Adoption of new directive has led to provisions being watered down – particularly ammonia emissions from agriculture

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Binding on all Member States based on the emission ceilings determined for the different contaminants

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Details of the revision process for the Directive and the debate around the adoption of the Clean Air Package can be found at - http://ec.europa.eu/environment/air/pollutants/rev_nec_dir.htm

Based on MS reporting under the Directive the EEA regularly publish the NEC Directive status report – see <http://www.eea.europa.eu/publications/nec-directive-status-report-2009>

The most recent report highlights issues in terms of the implementation of the Directive:

- final 2010 emission data show that 12 Member States exceeded one or more of the emission limits set by the NECD;
- on the basis of the final 2011 data, 11 Member States reported emission data above the ceiling for at least one pollutant;
- final 2012 data show that 12 Member States exceeded the ceilings for at least one pollutant;
- provisional 2013 data show that 10 Member States exceeded the ceilings

Germany was the only Member State that exceeded three of the four emission ceilings under the directive in 2013 (for NO_x, NMVOCs and NH₃). Three Member States, Austria (NO_x and NH₃), Denmark (NMVOCs and NH₃) and Ireland (NO_x and NMVOCs) exceeded two ceilings in 2013.

Agriculture dominates emissions of NH₃, amounting to almost 95% of the total emissions in the EU-27. Compared with the other pollutants addressed in the NECD, emissions from agriculture have not decreased to the same extent since 1990.

Section 3 - Base Information

Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants

Summary

Regulating emission ceilings for certain atmospheric pollutants.

Entry into Force

Day of its publication in the Official Journal (27.11 2001).

Policy Field

Integration/coordination issues with other related pieces of legislation

Mercury Regulation: Directive (2007/51/EC) relating to the restrictions on the marketing of certain measuring devices containing mercury (thermometers, barometers), amending Directive 76/769/EEC

Aims of the policy and its relevance to soil protection

Objectives

The policy aims to limit emissions to the atmosphere of sulphur dioxide (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOC) and ammonia (NH₃) and consequent deposition to land and soils and linked impacts to acidification of soils. It is the key policy for addressing the question of acidification of soil and acts across sectors. Each Member State must limit emissions of the relevant pollutant to their ceiling level originally by 2010. After 2010 emissions should not exceed this level moving forward.

Relevance to soil protection

The policy is highly relevant to the question of protection of soil functionality and reducing the threat of acidification – which can impact soils ability to support biodiversity or biomass for human consumption and also impact on water quality and wider questions of fertility.

Soil-focused aims and objectives (including those with potential negative impacts)

The measure reduces inputs from deposition to soils on an ongoing basis. The target setting process for the Directive is also linked to the soil quality and rates of acidification, i.e. it is required that areas where critical loads are exceeded shall be reduced by at least 50% compared to 1990 baselines.

However, it should be noted that the policy is about preventing future damage associated with additional depositions rather than rectifying historic damage and promoting soil functionality.

Soil threats addressed by the policy

Explicitly: soil acidification, diffuse pollution

Implicitly: soil biodiversity

Soil-focused targets and/or expected impacts

Under the Directive each Member State has a defined ceiling for emissions of the key pollutants i.e. SO₂, NO_x, VOCs and NH₃ to be obtained by 2010. There are also EU level overall ceilings for SO₂, NO_x and VOCs.

In addition criteria are also defined for:

Acidification - The areas where critical loads are exceeded shall be reduced by at least 50% (in each grid cell) compared with the 1990 situation.

Health-related ground-level ozone exposure - The ground-level ozone load above the critical level for human health (AOT₆₀=0) shall be reduced by two-thirds in all grid cells compared with the 1990 situation. In addition, the ground-level ozone load shall not exceed an absolute limit of 2,9 ppm.h in any grid cell.

Vegetation-related ground-level ozone exposure - The ground-level ozone load above the critical level for crops and semi-natural vegetation (AOT₄₀=3 ppm.h) shall be reduced by one- third in all grid cells compared with the 1990 situation.

In addition, the ground-level ozone load shall not exceed an absolute limit of 10 ppm.h, expressed as an exceedance of the critical level of 3 ppm.h in any grid cell.

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
Tackle diffuse pollution from acidifying substances: areas where critical loads are exceeded shall be reduced by at least 50% compared to 1990 status	N/A	N/A

Mandatory requirements and voluntary options for Member States (types of management measures)

<p>Key soil-relevant instruments</p> <p><u>Mandatory</u> Development of national programmes in 2002 and their revision in 2006 (if necessary), report on (annually updated) national emission inventories Setting national limits on emissions</p> <p><u>Voluntary</u> Implementing measures to comply with national emission ceilings at national level</p>
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20 Nitrates Directive

Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC) - the Nitrates Directive

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. The Nitrates Directive forms an integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures. The application of nitrate vulnerable zones (NVZs) and associated measures adopted to restrict nitrate application often encompass measures that are designed to manage soils in a more holistic way and so lead to the protection of soils. In surveys of key policies protecting soils the NVZs have been highlighted as important in pushing actors towards alternative strategies for nutrient management and land management.

The Nitrates Directive is an important tool for delivering soil protection on agricultural land. However, soil protection is not the aim of the policy, this is very clearly on the protection of vulnerable water bodies. NVZs are designated based on water quality parameters and cover only part of Europe’s agricultural land. Where NVZs exist they are an important tool for promoting and driving land manager interest in soil management, but where pollution of water courses with nitrogen is not highlighted as a key risk factor and an NVZ is absent soils are no longer protected as they are a beneficiary but not the goal of the policy.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	Likely to be reduced as certain fertiliser applications become more limited	I
Compaction	N/A		N/A
Contamination - diffuse	E	Key instrument tackling nitrogen pollution from agriculture applied directly to soils	E
Contamination – point source	I		I
Desertification	N/A		N/A

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Erosion - water	N/A		N/A
Erosion - wind	N/A		N/A
Flooding/ landslides	N/A		N/A
Loss of soil biodiversity	I	Key instrument tackling nitrogen pollution and so may contribute to soil biodiversity protection	I
Loss of soil organic matter	N/A		N/A
Salinisation	N/A		N/A
Soil sealing	N/A		N/A

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A		The 7th EAP does not link the specific soil function with EU policies
Platform for human activities	N/A		See above
Biomass production	I	Tackles nitrogen pollution and so may contribute to biomass production	See above
Hosting biodiversity	I	Tackles nitrogen pollution and so may contribute to soil biodiversity protection	See above
Providing raw materials	N/A		See above
Storing, filtering and transforming nutrients and water	E	A key instrument affecting nitrogen inputs to soils and, therefore, the function of the soil nitrogen cycle	See above
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Clear provisions on control nitrogen application in agriculture

- Accounting measures to support enforcement
- Extensive exchange of experience, e.g. on action plans
- Direct links to CAP provisions (cross compliance)
- Some activities addressed may contribute to other soil problems such as erosion

Weaknesses - *are there aspects limiting the protection afforded?*

- Controls only apply where waters are at specified risks – so not necessarily delivering soil protection
- Extensive use of derogations for some MS

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- Implementation of ND may not be sufficient to meet WFD objectives – so additional measures may be required
- ND requires its effectiveness to be assessed – may help inform its improvement

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- ND remains unpopular with some MS/farmers, so could be at risk if opened for review
- WFD review might raise questions on the ND.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

Applies consistently across MSs, although provisions apply to Nitrate Vulnerable Zones identified for each MS not the entire territory.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

According to analysis by the Commission the Directive is proving effective: Between 2004 and 2007, nitrate concentrations in surface water remained stable or fell at 70% of monitored sites. Quality at 66% of groundwater monitoring points is stable or improving. - <http://ec.europa.eu/environment/pubs/pdf/factsheets/nitrates.pdf>

The 4-yearly reports produced by the Member States are used as the basis for a 4-yearly report by the European Commission on the implementation of the Directive. - <http://ec.europa.eu/environment/water/water-nitrates/reports.html>

Linked to the resource efficiency action plan and wider agenda there has been a focus on nutrient surpluses in Europe – see link for information http://ec.europa.eu/environment/water/water-nitrates/index_en.html

Section 3 - Base Information

Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC) - the Nitrates Directive

Summary

The Nitrates Directive (1991) aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. The Nitrates Directive forms an integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures. The application of nitrate vulnerable zones and associated measures adopted to restrict nitrate application has been highlighted in surveys as important in pushing actors towards alternative strategies for nutrient management and land management.

Under the Directive Member States are required to designate Nitrate Vulnerable Zones i.e. “all known areas of land in their territories which drain into waters affected by pollution and waters which could be affected by pollution if action pursuant Article 5 (creating action programmes for NVZs) is not taken and which contribute to pollution’. The Member States also were required to set out their code(s) of good agricultural practice and action programme(s) following the designation of the NVZs. Every four years the Member States are required to report to the European Commission the results of their monitoring of nitrate concentrations in surface and ground waters, surface water eutrophication levels, impacts of the action programme(s) on water quality and agricultural practices and revisions made to the action programme(s), and estimations of future water quality trends.

Entry into Force

In December 1991. The Nitrates Directive was notified to the Member States on 19 November 1991. The Member States had two years following this notification to bring into force all laws, regulations, and administrative provisions necessary to comply with the Nitrates Directive and inform the Commission (Article 12.1).

Policy Field

Integration/coordination issues with other related pieces of legislation

Agriculture

Aims of the policy and its relevance to soil protection

Objectives

To “reduce water pollution caused or induced by nitrates from agricultural sources” and to “prevent further such pollution” of both ground and surface waters. (Article 1)

Member States must designate territories (land) draining into water bodies which are vulnerable to high nitrate levels or eutrophication as Nitrate Vulnerable Zones (NVZs) (Article 3.2). NVZ are designated based on whether surface waters (particularly those used for drinking water) and groundwaters contain or could contain more than 50 mg/l nitrates and whether freshwater bodies, estuaries, coastal waters, and marine waters are or could become eutrophic in the near future if an action programme is not applied to the contributing lands.

Either the entire territory of the land or only certain areas can be designated as NVZs, depending on differing intensity of agricultural production, climatic variables, soil type and topography. Revision of the NVZ designations is required at least every four years to take into account changes and factors unforeseen at the time of the previous designation (according to Article 3.4).

Relevance to soil protection

Addressing the Nitrates Directive's primary focus requires the implementation of soil management measures which contribute to soil protection. Thus, soil management measures are a tool to reach the objective, but not its primary focus. Soil risk assessment is not part of the process required under the Directive (though soil testing for remaining nutrient levels is recommended to develop tailored fertilisation management plans), but rather monitoring and reporting of water nitrate levels is required. Such reports indicate whether there are losses occurring from land surrounding a polluted water body so that land management measures can be changed or improved to lessen the amount of run-off or leaching. The focus is not on identifying which soils are at risk and changing the soil management practices to benefit soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The Nitrates Directive does not have any direct soil-focused aims and objectives.

Implicitly: One of the Directive's objectives is to promote good farming practices, e.g., improved fertilizer application and catch crops, in order to control pollution and contribute to the aim of improving water quality. The Directive applies different levels of recommendations and restrictions for lands in certain zones (NVZs) which drain into waters that are vulnerable to pollution from nitrogen compounds, requiring measures to be adopted to prevent run-off and leaching into groundwater or surface water. These measures can include: appropriate fertilisation balanced according to timing, crop needs, climate, etc.; bans/restrictions on application periods or levels of fertiliser; irrigation measures; drainage; cover/catch crops; terracing; dredging; and land-use conversion to grasslands or wetlands.⁴¹

⁴¹ DLO-Alterra Wageningen UR (2011) Recommendations for establishing Action Programmes under Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources. Part D: Recommendations for Measures, Final Report, Contract number No. 070307/2010/580551/ETU/B1.

Soil threats addressed by the policy

Explicitly: Soil threats are not directly addressed by the measures in the Nitrates Directive.

Implicitly: Soil erosion is indirectly addressed by the Nitrates Directive provisions because it includes maintaining minimum levels of vegetative cover during (rainy) periods as one of the measures which may be adopted by Member States in their codes of good agricultural practice and thereby made applicable to the NVZs as well. Reducing bare fallow land would reduce soil erosion levels and help to reduce phosphorus run-off (in addition to nitrogen losses) due to P becoming bound to soil particles, which would lower the risk of eutrophication in water bodies (Environment Agency 2006). Fewer nutrients need to be added to supplement the nutrients captured and made available by the catch/cover crops that provide the vegetative cover. Moreover, growing catch/cover crops, crop rotations and increasing the amount of land under permanent crops also increases the amount of soil organic matter and improves soil structure, which reduces the potential for soil erosion/run-off and leaching of nitrates that would lead to non-compliance with the maximum target levels of water pollution (Mudgal et al. 2010). Fertiliser plans and record-keeping of fertiliser use may have the potential to reduce soil contamination as well.

The Directive also sets restrictions on when the manure can be applied, thereby reducing traffic on soils during rainy season and lowering the risk of compaction. Maintaining soil structure and avoiding compaction also helps reduce the amount of N and P run-off from rainfall (Ulén et al. 2010). The limitation on animal manure application to land in NVZs, including by animals themselves, helps control stocking rates, which can also potentially reduce the risk of soil compaction due to livestock trampling and run-off to water bodies (DLO- Alterra Wageningen UR 2011).

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	<p>Nitrate Vulnerable Zones (land areas which drain into waters vulnerable to high nitrate levels or eutrophication) are designated based on whether surface waters (particularly those used for drinking water) and groundwater contain or could contain more than 50 mg/l nitrates if an action programme is not applied to the contributing lands, and whether freshwater bodies, estuaries, coastal waters, and marine waters are or could become eutrophic in the near future if an action programme is not applied to the contributing lands.</p> <p>In targeting this maximum level of allowable nitrates in the water bodies, a limitation was thereby set for the amount of livestock manure applied to land to 170 kg/ha. Additionally, measures were required in Annex III of the Nitrates Directive for implementation in the NVZ action programmes and some to be included for voluntary adoption under the code of good agricultural practice as specified in Annex I in order to contribute to meeting the nitrate limits. However, even with implementation of these measures, the 50 mg/l target may be exceeded, which could necessitate drastic changes such as reducing stocking rates to reduce the overall amount of manure needing to be applied to land and conversion of arable land to permanent grassland.</p>	<p>The required measures, while their economic consequences to the farmer's operation would likely serve as a barrier to uptake, would actually enhance soil protection due to lower stocking rates on land leading to less trampling so lower potential for compaction and less de-vegetation reducing soil erosion, as well as conversion from arable leading to less soil erosion due to permanent cover and potentially more soil organic matter and improved soil structure from less tillage.</p>

21 Pesticides Framework Directive

Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

Summary of the Relationship with and Relevance to Soil Protection of the Policy

The Directive's primary focus is to protect human health and the environment from possible risks associated with the use of pesticides, requires limitation or prohibition of pesticides use or use of non-chemical alternatives to pesticides. Implementing these obligations results in reduced amount of pesticides applied on plants and consequently pesticides reaching the soil. Thus, soil is affected, but is not a primary focus of these obligations and there are no specific soil aims or objectives. Soil risk assessment is not a specific part of the process required under the Directive, but a risk assessment of pesticide use for human health and the environment.

Soil protection is a beneficiary of action under the Directive rather than necessarily the primary intended output. Having said this important provision on controlling pesticide use, storage, management, awareness raising about appropriate practices and training, limits certain types of practices and links to drinking water quality will all result in positive outcomes both in terms of diffuse and point source emissions to soils. It should also be noted that soil quality and characteristics including the prevalence of key soil threats e.g. high soil erosion, compaction levels will also represent risk factors increasingly likely wider environmental impacts of pesticide use and are highlighted in the Directive's text.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

It should be noted that the pesticides framework regulates the use of pesticides to deliver better outcome for human health and the environment. As such specific references to soil are limited but there is clearly a strong link between rules limiting certain application approaches, requiring appropriate storage or training on pesticide use to the ultimate level of contamination and impacts on soils. Therefore links are not explicit but strong. In addition the nature of the soil and the likely characteristics e.g. poor management leading to extensive soil erosion and particulates along with contaminants entering water courses are also a risk factor under the Directive.

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	I	Key instrument tackling pesticide pollution from agriculture in particular provisions on appropriate approaches to application and awareness, limiting emissions to drinking water and applications in sensitive areas	
Contamination – point source	I	Key instrument tackling pesticide pollution from agriculture in particular provisions on handling, storage and training re-use are important	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	I	Key instrument tackling pesticide pollution and so may contribute to soil biodiversity protection	
Loss of soil organic matter	N/A		
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A		The 7th EAP does not link the specific soil function with EU policies
Platform for human activities	I	Controls biocide inputs to soils and so can contribute to maintain quality for different human activities	See above
Biomass production	I	Tackles pesticide pollution and so may contribute to biomass production	See above

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Hosting biodiversity	I	Tackles pesticide pollution and so may contribute to soil biodiversity protection	See above
Providing raw materials	N/A		See above
Storing, filtering and transforming nutrients and water	N/A		See above
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Provides clear regulatory framework for pesticides – marketing and use
- Emphasis is on health and environmental protection including soils
- Direct links to CAP provisions (cross compliance and RD)

Weaknesses - are there aspects limiting the protection afforded?

- Enforcement is difficult as users can avoid provisions and this can be difficult to detect

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Strong lobby from water companies keeps pressure on (due to costs to these companies)
- WFD review might increase emphasis on addressing pesticides

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Strong industry lobby supporting pesticide use

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The Directive applies community wide with implementation focused around National Action Plans and is strongly linked to other key policies such as requirements under the CAP

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Information on the implantation of the Directive and Member State National Action Plans can be found at http://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides/index_en.htm

Section 3 - Base Information

Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides

Summary

The Directive establishes the EU framework for the sustainable use of pesticides. The Framework Directive on Sustainable Use of Pesticides (FDSUP) was originally one of two legislative proposals accompanying a Thematic Strategy on the Sustainable Use of Pesticides (COM(2006) 372). The other legislative proposal led to the adoption of the Regulation (EC) No 1107/2009 concerning the placing of plant protection products on the market. The FDSUP applies on the national level for ‘professional users’, ‘distributors’ and ‘advisors’ (as defined in the Directive) of pesticides that are plant protection products.

As mandated in Art. 4, Member States have to adopt in three years (by December 2012) their National Action Plans (NAPs) to reduce risks and impacts of pesticide use on human health and the environment. The NAPs are the key instrument of the Directive, consisting of all measures prescribed in the Directive (Art. 5-15), and describing how these measure will be implemented to achieve the quantitative objectives and targets following the timetables set in the NAPs.

Entry into Force

The FDSUP came into force on 25 November 2009⁴² and had to be transposed by the Member States in two years, i.e. by 26 November 2011.⁴³

Policy Field

Integration/coordination issues with other related pieces of legislation

Agriculture

Aims of the policy and its relevance to soil protection

Objectives

According to Article 1, the overall objective of the FDSUP is to establish “... a framework to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides”.

Principles included in the legal text

- Integrated pest management

⁴² As mandated in Art. 24, following its publication in the Official Journal of the EU (L 309) on 24 November 2009.

⁴³ As mandated in Art. 23.1.

- Subsidiarity
- Proportionality
- Sustainable development
- Precautionary
- Organic farming

Spatial coverage and management unit

The FDSUP does not refer to any ‘operational management unit’ as such. The Directive applies to ‘professional users’, ‘distributors’ and ‘advisors’ (as defined in the Directive) of pesticides that are plant protection products at the national level.

The NAPs must contain quantitative objectives, targets, measures of risk-reduction and timetables for the reduction of risks and adverse impacts of the use of plant protection products on human and animal health and also on the environment. The target requirements relate to the area of plant protection, operator protection, consumer protection and protection of the environment. In Germany, for example, the plant protection products may be used if they are approved and in the respective valid areas of application stated in the approval.⁴⁴ Pesticide application areas can be agricultural and non-agricultural, i.e. public use areas, for example, parks. See examples of the targets set in the German NAP below under the section on ‘Examples of implementation approaches’.

Relevance to soil protection

Addressing the Directive’s primary focus to protect human health and the environment from possible risks associated with the use of pesticides, requires limitation or prohibition of pesticides use or use of non-chemical alternatives to pesticides. Implementing these obligations results in reduced amount of pesticides applied on plants and consequently pesticides reaching the soil. Thus, soil is affected, but is not a primary focus of these obligations. Soil risk assessment is not part of the process required under the Directive, but the risk assessment of pesticide use for human health and the environment. For this purpose, Member States can use harmonised risk indicators established at the Community level and national indicators.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The FDSUP does not have any direct soil-focused aims and objectives.

Implicitly: The overall objective of the FDSUP seeks to achieve a sustainable use of pesticides and to reduce their impacts on human health and the environment. The FDSUP promotes the use of IPM and alternative approaches or techniques such as non-chemical alternatives to pesticides. Such reduced pesticide-inputs or non-chemical alternatives reduce the risk of soil contamination, as chemicals used in pesticides are persistent and may stay in the soil for decades affecting adversely soil conservation. Furthermore, use of pesticides reduces activity of soil microorganisms, which results in reduced soil biodiversity and thus soil organic matter

⁴⁴ The Federal Ministry of Food, Agriculture and Consumer Protection (BMELV, 2012). National Action Plan on Sustainable Use of Plant Protection Products, http://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides/national_action_plans_en.htm

content, and lower soil quality in general. This may result in lower water retention and reduced yields especially for farms in drought years.

Soil threats addressed by the policy

Explicitly: Soil threats are not directly addressed by measures in the FDSUP

Implicitly: soil contamination and soil biodiversity are indirectly addressed by the FDSUP, in particular by the measures focusing on the protection of the aquatic environment and drinking water (Art. 11), protection of sensitive areas (Art. 12) and the IPM (Art. 14).

Appropriate measures taken to avoid pollution of surface water and groundwater include, for example, the establishment of buffer and safeguard zones or planting hedges along surface waters to reduce exposure of water bodies to spray drift of pesticides, drain flow and run-off. This, in addition, reduces the accidents of soil erosion from the banks of water bodies. Other measures give priority to the use of the least toxic products and in this way reduce the contamination of soil and a negative impact on soil biodiversity (i.e. microbial activity in soil).

Furthermore, to protect certain sensitive areas (as defined in the WFD, or in the areas requiring conservation measure in line with the Birds and Habitats Directives), the FDSUP prohibits or strictly limits the use of pesticides. This reduces the contamination of soil and a negative impact on soil biodiversity (i.e. microbial activity in soil).

The FDSUP promotes low pesticide-input pest management, giving priority to non-chemical methods. This includes the IPM as well as organic farming. The IPM prioritises the least dangerous solutions for health and the environment, in particular, to agricultural ecosystems and encourages natural pest control mechanisms. A negative impact of pesticides on the microorganisms in soil consequently affects the content of soil organic matter, reducing it. Soil organic matter binds to and helps to break down pesticides, therefore a smaller content of organic matter in soil increases the amount of pesticide that leave the area of application.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	The NAPs of the Member States shall define quantitative objectives, targets, measures and timetables to reduce risks of pesticide use on human health and the environment and include indicators to monitor the use of plant protection products containing active substances of particular concern. The target requirements relate to the area of plant protection, operator protection, consumer protection and protection of the environment. (See, for example, the targets set in the German NAP, as described above).	None

22 Renewable Energy Directive

Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

Section 1 - Gap Analysis - Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

The Directive on the promotion of the use of energy from renewable sources (2009/28/EC, RED) sets the objective of reaching 20% of the EU's energy consumption through renewable energy sources by 2020. It sets mandatory and legally binding national targets for the overall share of renewable energy in gross final consumption of energy (ranging from 10% in Malta to 49% in Sweden including "indicative trajectory targets" for progress until 2020) It also sets a binding target of 10% RES in transport in each Member State by 2020. The Directive also establishes a set of sustainability criteria to be applied to biofuels or bioliquids used to deliver the 2020 targets.

All renewable energy expansion, if it implies land take or change in land management, has a potential impact on soil protection. However, the RED is most relevant to soil in the context of the expansion in bioenergy and biofuel use associated with the delivery of the targets – within their national renewable energy action plans many MSs have set out that a high proportion of RES would be sourced from biomass. This has implications potentially for the land use and land management on existing farmed or forested areas. The nature of the impact for soil protection will depend on the specific change in use and management at a given local.

The sustainability criteria for bioliquids and biofuels set limits on material being used from high biodiversity (including highly biodiverse grasslands) and high carbon stock land for their production. However, while this is positive it only offers protection from expansion of biofuel use specifically.

If severely degraded land or heavily contaminated land is used for biomass production then a 'bonus' in terms of GHG savings associated with a biofuel can be received, potentially offering an incentive for using and managing such land in a different way.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat i.e. How does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of the soil threats
Acidification			
Compaction	I	Change in intensity and approach to land management potentially impacting on compaction.	
Contamination - Diffuse			
Contamination - point source	E	Explicit link to use of contaminated sites for biomass production for energy specifically biofuels	
Desertification			
Erosion - water	I	Change in intensity and approach to land management potentially impacting on erosion susceptibility.	
Erosion - wind			
Flooding/landslides			
Loss of soil biodiversity	I	Change in intensity and approach to land management potentially impacting on soil biodiversity.	
Loss of soil organic matter	E	Explicitly addressed in terms of avoidance of high carbon stock lands for biofuels. Although wider potential consequences linked to changing levels of SOM under different management and cropping regimes.	
Salinisation			
Soil sealing			

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon Pool	E	The RED is specifically aimed at GHG emission reduction. Moreover, there are specific provisions in place aimed at limiting the consequences of biofuel use at least for high carbon stock land.	
Platform for Human Activities			

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Biomass production	I	The link between renewable energy and biomass production is strong under the existing RED. The reliance on both solid and liquid forms of biomass is high in many MS.	
Hosting biodiversity			
Providing raw materials	I	The link between renewable energy and biomass production is strong under the existing RED. The reliance on both solid and liquid forms of biomass is high in many MS.	
Storing, filtering and transforming nutrients and water			
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

The policy is not directly targeted at soils, however, it does in theory offer some protection of particularly vulnerable and carbon rich soils linked to sustainability both on high carbon stock lands and land with high biodiversity. However, this protection is only offered in terms of expansion for biofuel feedstocks linked to the expansion of biofuels linked to the EU target. Not to the wider expansion of the sector per se. There have, however, been initiatives linked to the RES compliance process and the voluntary schemes set up to deliver 'sustainable' feedstocks that have led to wider promotion of sustainability parameters.

Weaknesses - are there aspects limiting the protection afforded?

The protection linked to the RED is only linked to feedstocks for liquid biofuels not wider bioenergy, moreover there are no specific requirements linked to the NREAP process that requires land use/land protection for other RES development (see <http://www.ieep.eu/publications/2015/11/a-new-vision-for-responsible-renewable-energy-with-a-clear-european-dimension>)

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

There are potential opportunities for soil management linked to the RED in particular the potential changes in crop patterns to more perennial crops – assuming this is linked to wider improvements in management. There are also potential opportunities linked to intercrops/catch crop use. Finally, the criteria on use of degraded land is a potential opportunity, however, one that has been little taken up to date.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

There are potential threats to soil protection linked to the expanded use of biomass for energy linked to both the increased intensity of land management, expansion in certain types of land use and the potential change in cropping patterns and management practices. The nature of the threat is linked strongly to the types of feedstocks being promoted for renewable energy use and the scale of this use.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

MS apply the RED in line with their NREAP and approaches may therefore vary. However, NREAP coverage is set out in a series of guidelines.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

The proposals for action on renewable energy and bioenergy post 2020 are due to be published in December 2016. Information on the implementation of the existing RED including MSs national renewable energy action plans can be found at - <https://ec.europa.eu/energy/en/topics/renewable-energy>

Section 3 - Base Information

Summary

The Directive on the promotion of the use of energy from renewable sources (2009/28/EC, RES Directive) sets the objective of reaching 20% of the EU's energy consumption through renewable energy sources by 2020. It sets mandatory and legally binding national targets for the overall share of renewable energy in gross final consumption of energy (ranging from 10% in Malta to 49% in Sweden including "indicative trajectory targets" for progress until 2020), as well as a mandatory share of 10% RES in transport for each Member State. In order to ensure the sustainability of biofuels, the Directive also establishes a set of biofuel sustainability criteria.

Article 4 of the Directive requires Member States to submit National Renewable Energy Action Plans, NREAP)⁴⁵ by 2010, explaining their implementation of the Directive and their progress towards its targets.

The NREAPs submitted by Member States are based on a compulsory EU Commission template. The action plans include e.g. individual renewable energy targets for all energy sectors, the planned mix of different renewables technologies, national policies to develop biomass resources and measures to ensure that biofuels used to meet renewable energy targets are in compliance with the EU's sustainability criteria. With regard to the latter, Member States often describe the institutions responsible for the monitoring and reporting of sustainability information.

⁴⁵ All national plans can be downloaded at the EU Commissions website: <http://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans>

Biofuel policies

Under the Renewable Energy Directive biofuels and bioliquids are required to meet certain 'sustainability' criteria before they are allowed to be counted towards a MSs achievement of the 10% RES in transport target. This includes:

- delivering a specified level of GHG emission reductions;
- that biofuels are not made from raw materials obtained from land with high biodiversity (including primary forest, areas designated for nature protection and highly biodiverse grasslands);
- that biofuels are not made from raw materials obtained from land with high carbon stocks.

The requirements placed on biofuels were updated in 2015 with the adoption of rules intended to limit GHG emissions associated with indirect land use change linked to potential expansion in farmed area associated with biofuel driven demand. Directive (EU) 2015/1513 sets out a series of measures aimed at limiting the consequences of ILUC this includes: limiting the contribution to the 2020 target of crop based biofuels to 7 per cent, promoting advanced biofuels, introducing stronger incentives for use of electricity in transport and requiring biofuels from new installations to emit at least 60% fewer GHG emissions than the fossil fuel equivalent.

Entry into force - 25 June 2009

Spatial coverage and management unit: The EU in general is required to meet 20% energy supply from renewables by 2020, but it varies from Member State to Member State with regards to the individual national targets⁴⁶. Each MS is required to meet the 10% target for renewable energy in transport fuel. The management units are the Member States and the various renewable energy sources within their territory contributing to their national target or joint projects agreed between Member States.

Relevance to soil protection

The particular relevance of the RED for soil protection stems from the objectives it established around bioenergy, as biomass production for energy generation has impacts on land and soil. This applies to solid, liquid and gaseous uses of biomass for energy production. Depending on the cropping system and the bio- material made use of there are potential impacts on the use of land and its management. This range from:

- promotion of specific crops known to be problematic in terms of soil protection e.g. row crops
- changes in preferred cropping patterns and rotations
- promotion of use of residues and wastes that might otherwise be used for soil improvement
- intensification of land use and management with consequent impacts on the soil management regime

⁴⁶ Ibid.

- promotion of perennial crops compared to annual crops
- changes in import patterns promoting management change in other countries beyond the EU in particular Indonesia, Malaysia, Argentina, Brazil

It should also be noted that solar power (in particular solar farms) installations, wind power plants and the use of geothermal energy as promoted by the RED can have a direct impact on land and soil through facilities and the necessary power distribution infrastructure. However, these impacts and how they can be avoided are not in the scope of the RED, but are rather tackled within other Directives, such as the EIA Directive (Environmental Impact Assessment) and SEA Directive (Strategic Environmental Assessment).

Soil-focused aims and objectives

Article 17 (4) of the Renewable Energy Directive requires that “Biofuels and bioliquids (...) shall not be made from raw material obtained from land with high biodiversity.... or high carbon stock”. It further specifies land with high carbon stocks, as “land that had one of the following statuses in January 2008 and no longer has that status:

- wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year;
- continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ;
- land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in part C of Annex V is applied, the conditions laid down in paragraph 2 of this Article would be fulfilled.

The RED also applies a GHG ‘bonus’ saving where there is evidence that biofuel feedstocks have been obtained from ‘severely degraded land’ or ‘heavily contaminated land’ The categories are defined as:

- ‘severely degraded land’ means land that, for a significant period of time, has either been significantly salinated or presented significantly low organic matter content and has been severely eroded;
- ‘heavily contaminated land’ means land that is unfit for the cultivation of food and feed due to soil contamination.

Soil threats addressed by the Renewable Energy Directive

Explicitly: Soil threats are not directly addressed by the measures in the Renewable Energy Directive.

Implicitly: As first generation biofuels are produced from food and feed commodities and with similar production methods (e.g. monocultures of maize, rapeseed, row crops, etc.), impacts are comparable to other agricultural activities in the food and feed system (i.e. possible soil erosion, soil compaction, decline of organic matter, threats to soil biodiversity, etc.). Mandatory sustainability criteria require that biofuels should not be made from raw material obtained from land with high carbon stock, hence addressing loss of soil organic matter indirectly. Biofuels also must reduce GHG emissions, cannot be derived from highly biodiverse grassland, nature protection areas and forest/ woodlands – requirements that indirectly address also the following soil threats: soil erosion, soil compaction, threats for soil biodiversity.

The RED's biofuel support policies can also result in the intensification of production, potentially focusing less on crop diversification/cover crops and threatening soil erosion, organic matter loss, compaction from heavy machinery use, salinisation from intensive irrigation, etc. Increased use of agricultural or forestry residues for biofuels contains the risk to deplete the organic matter content.

Soil-focused targets and/or expected impacts

Direct soil-focused targets	Indirect soil-focused targets	Soil-focused expected impacts
There are no direct quantitative targets within the RED.	The 10% target renewable energy in transport until 2020 puts pressure on soil and land to produce biofuel feedstocks.	<p>The 10% target renewable in transport until 2020 puts pressure on land and soil and leads to potential direct and indirect land use change, increased use of agricultural and forestry residues, potentially negatively impacting soil organic matter, soil biodiversity and – depending on feedstock and management practice – potentially leading to soil erosion and compaction.</p> <p>There is the potential to change the use framework for degraded soils under the Directive; however, there is little evidence that this has been taken up by producers.</p>

23 Sewage Sludge Directive

Council Directive on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (86/278/EEC) - the Sewage Sludge Directive

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Sewage Sludge Directive puts in place provisions for and places limits upon the use of sewage sludge on agricultural land. The aim of the Directive is to ‘prevent harmful effects on soil, vegetation, animals and man thereby encouraging the correct use of such sewage sludge’ but also to set out the conditions under which sewage sludge can be used as a soil additive. The Directive sets out rules relating to the heavy metal concentrations of sewage sludge and limit values for the agricultural land to which it is applied.

The Directive is directly relevant to soil both in terms of maximising the soil improver resource in Europe to deliver biomass production and making use of organic material that can also improve soil carbon, which is linked to improving other key soil parameters. However, the Directive has been scheduled for revisions for over 9 years and revisions have stalled. It is potentially complemented by clauses within the Waste Framework Directive and proposed revision to the Fertiliser Directive both related to the management of biowaste as a soil improver, however, these do not replace or repeal the Directive’s requirements.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	E	Key instrument tackling pollution from sludge use in agriculture applied directly to soils	
Contamination – point source	E	Key instrument tackling pollution from sludge use in agriculture applied directly to soils	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Flooding/ landslides	N/A		
Loss of soil biodiversity	N/A		
Loss of soil organic matter	I	Sludge has the potential to add organic carbon to the soils as well as nutrients	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	E	Sludge is a potential source of some carbon in agricultural soils, so the Directive can contribute to this	The 7th EAP does not link the specific soil function with EU policies
Platform for human activities	I	Controls toxic inputs in sludge to soils and so can contribute to maintain quality for different human activities	See above
Biomass production	I	Tackles pollution from sludge use and so may contribute to biomass production	See above
Hosting biodiversity	I	Tackles pollution from sludge use and so may contribute to soil biodiversity protection	See above
Providing raw materials	I	Contributes to allowing sludge use, as an alternative source of nutrients and so offering a source of raw materials as an alternative to inorganic fertilisers	See above
Storing, filtering and transforming nutrients and water	I	Contributes to allowing sludge use, as source of nutrients and so interacting with soil nutrient cycles	See above
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The directive sets clear standards for quality of sludge applied to soils

- Standards are achievable

Weaknesses - are there aspects limiting the protection afforded?

- The Directive is old and revision has stalled – revision was originally anticipated in 2007 as linked both the Thematic Strategy on waste prevention and recycling and the Thematic Strategy on soil protection, this was anticipated to reap maximum benefit from the reintroduction of nutrients while further limiting release of dangerous substances into the soil.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- The Directive is overdue for revision – so could be revised to update standards and address additional soil protection measures if needed
- The new fertiliser Directive sets an increased precedent for increasing protection of soil from materials added as nutrient enrichment. It specifically states in the proposal that the new Fertiliser Regulation should not prejudice the implementation of the sewage sludge Directive. It does however, offer a potential renewed impetus.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- There has been consideration to repeal the directive. It is not clear what would replace the level of protection to soils it provides

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Applies to agricultural land in the EU where sludge may be applied.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Reports and consultations around the question of sewage sludge can be found at <http://ec.europa.eu/environment/waste/sludge/> this includes several studies linked to the Directive's implementation and stakeholder consultations in relation to potential improvements.

Section 3 - Base Information

Council Directive on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (86/278/EEC) - the Sewage Sludge Directive

Summary

The Sewage Sludge Directive seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. To this end, it regulates the use of sludge considering different types of agricultural land

use as well as soil and sludge quality.⁴⁷ It sets rules about when and under what circumstances sludge can be applied to agricultural crops including grassland or forage land. It requires a regime of sludge and soil monitoring. Limit values for concentrations of heavy metals in sewage sludge intended for agricultural use and in sludge-treated soils are in Annexes I A, I B and I C of the Directive.

Entry into Force

12 June 1986. It requires the Member States to “bring into force the laws, regulations and administrative provisions necessary to comply with this Directive” within three years after entering into force of this Directive.

Policy Field

Integration/coordination issues with other related pieces of legislation

Agriculture

Aims of the policy and its relevance to soil protection

Objectives

Sewage sludge may be used in agriculture provided that the Member States concerned regulates its use: “The purpose of this Directive is to regulate the use of sewage sludge in agriculture in such a way as to prevent harmful effects on soil, vegetation, animals and man thereby encouraging the correct use of such sewage sludge.” (Art. 1).

Spatial coverage and management unit

Agricultural land across the EU. The Member States are the management units which must prohibit the use of sludge when the soil has a concentration of heavy metals over the limit in Annex I A and regulate sludge use so that heavy metal accumulation does not lead to limits being exceeded (Article 5).

Relevance to soil protection

Soil and its protection against harmful effects that are caused by using sewage sludge in agriculture are directly addresses in the purpose of the Directive.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The Directive “aims at establishing certain initial Community measures in connection with soil protection” and emphasises that “the use of sewage sludge must not impair the quality of the soil and of agricultural products” (Preamble).

Implicitly: The Directive seeks to encourage the use of sewage sludge in agriculture due to its agronomic properties (Preamble) as “Sludge is [...] rich in nutrients such as nitrogen and phosphorous and contains valuable organic matter that is useful when soils are depleted or subject to erosion. The organic matter and nutrients are the two main elements that make the spreading of this kind of waste on land as a fertiliser or an organic soil improver suitable.”⁴⁸

⁴⁷ <http://ec.europa.eu/environment/waste/sludge/>

⁴⁸ European Commission web-site, Sewage Sludge <http://ec.europa.eu/environment/waste/sludge/>

Soil threats addressed by the policy

Explicitly: prevents against soil contamination (Art. 5 and 8 are of particular importance in this context – see soil focused targets below): (1) Soil contamination with heavy metals (HMs) and pathogenic organisms is directly addressed by the Sewage Sludge Directive as it sets maximum values of concentrations of HMs and bans the spreading of sewage sludge when the concentration of certain substances in the soil exceeds these values, as well as sets time restrictions for the sludge application (with regard to the pathogenic organisms). (2) The Directive is complemented by the Pesticide and Biocidal Product Regulation.⁴⁹

Implicitly: contributes to reducing soil erosion and increasing soil organic matter (see above the text on indirect soil-focused aims and objectives) and to agronomic properties. The literature also shows that application of sewage sludge could support soil organic matter content and reduction of soil erosion (see implementation examples under Point 10). The literature review also shows that application of sewage sludge to agricultural land contributes to improved soil physical and chemical properties. This leads normally to general improvement of soil health and thus to improvement of soil biodiversity.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
<p>The Directive foresees different types of emission limit values (LVs) to provide guidance to the Member States against soil contamination – regulated by Art. 5; as well as determines the rules applicable to the use of sludge in Art. 8:</p> <p>The Directive (Art. 4) sets LVs for concentrations of seven HMs in sewage sludge intended for agricultural use and in soil to which sludge is applied as listed in Annexes I A, I B and I C of the Directive.</p> <p>The Directive requires the Member States to prohibit the use of sludge when the concentration of one or more HMs in the soil exceeds these LVs set in Annex I A” (Art. 5.1 and Preamble). Member States must take the necessary steps to ensure that those LVs are not exceeded as a result of using sludge.</p> <p>“Member States shall lay down the maximum quantities of sludge expressed in tonnes of dry matter which may be applied to the soil per unit [ha] of area per year while observing the LVs for HM concentration in sludge which they lay down in accordance with Annex IB” (Art. 5.2(a)).</p> <p>“Member States shall ensure observance of the LVs for the quantities of metals introduced into the soil per unit of area and unit of time as set out in Annex I C.” (Art. 5.2(b)).</p> <p>The Directive also requires that sludge should be used in such a way that account is taken of the nutrient requirements of plants and that the quality of the soil and of the surface and groundwater is not impaired (Art. 8).</p> <p>Member States must, if necessary, reduce the LVs they have laid down in accordance with Annex I A, where sludge is used on soils of which the pH is below 6 (to consider the increased mobility and availability of HMs to</p>		<p>The expected outcome of setting the above soil-focused limits in terms of sewage sludge use for agricultural purposes is avoided contamination of the soil, and indirect reduction of soil erosion, benefits to SOM and soil biodiversity as well.</p>

⁴⁹ Susanne Altvater, Elizabeth Dooley, and Ennid Roberts (2014). Legal Instruments to implement the objective “Land Degradation Neutral World” in International Law. Final Report, 1 December 2014.

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
<p>the crop) (Art.8).</p> <p>“Where conditions so demand, Member States may take more stringent measures than those provided for in this Directive.” (Art. 12). Several Member States followed this provision and set stricter LVs for HMs as well as requirements for other contaminants.</p>		

24 Strategic Environmental Assessment Directive

Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The SEA Directive 2001/42/EC establishes a legislative framework to assess the environmental effects of selected plans and programmes by requiring that these include information on likely significant effects on soil, among others. The Directive's requirements may therefore indirectly contribute to all soil threats and functions.

Although the SEA Directive sets no mandatory or voluntary soil-relevant requirements, Member States can decide to select appropriate remedial actions in response to any likely significant effects on the soil of implementing a plan or a programme. It is likely that the range of approaches may vary significantly among countries and be plan or programme-dependent, as well as it is likely that the degree of soil protection is strictly related to individual choices by developers of plans and programmes.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	Through the mandatory undertaking of a Strategic Environmental Assessment (SEA) for selected plans and programmes, which includes a description of the likely significant impacts on the environment, including on soil (threats).	
Compaction	I	As above	
Contamination - diffuse	I	As above	
Contamination – point source	I	As above	
Desertification	I	As above	
Erosion - water	I	As above	
Erosion - wind	I	As above	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Flooding/ landslides	I	As above	
Loss of soil biodiversity	I	As above	
Loss of soil organic matter	I	As above	
Salinisation	I	As above	
Soil sealing	I	As above	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	Through the mandatory undertaking of a Strategic Environmental Assessment (SEA) for selected plans and programmes, which includes a description of the likely significant impacts on the environment, including on soil (functions).	
Platform for human activities	I	As above	
Biomass production	I	As above	
Hosting biodiversity	I	As above	
Providing raw materials	I	As above	
Storing, filtering and transforming nutrients and water	I	As above	
Storing geological and archeological heritage	I	As above	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The SEA Directive establishes a legislative framework to assess environmental effects of selected plans and programmes undertaken by Member States. The related report must contain information about the likely significant effects, among others, on soil.

Weaknesses - are there aspects limiting the protection afforded?

- The SEA Directive does not explicitly set soil-relevant mandatory requirements or outcomes. There is no mechanism set by the Directive to impede further degradation of soil due to certain plans or programmes, beyond monitoring.

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- Member States can decide to select appropriate remedial actions to protection soil, in response to any likely significant effects on the environment of implementing a plan or a programme.

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- Not in the Directive itself, but from the non-implementation of its requirements by Member States

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

It is likely that the approaches may vary significantly among countries and be plan or programme-dependent, as well as the likely impact on soil protection.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Information about the application and implementation of the EIA and SEA Directives is available under this link: http://ec.europa.eu/environment/eia/index_en.htm

The below documents provide an overview of the application of the two directives:

Study concerning the preparation of the report on the application and effectiveness of the SEA Directive (Directive 2001/42/EC)

DG Environment, Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment
http://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf

COWI (2009) Study concerning the report on the application and effectiveness of the EIA Directive http://ec.europa.eu/environment/archives/eia/pdf/eia_study_june_09.pdf

Environmental Impact Assessment of Projects - Rulings of the Court of Justice

Interpretation of definitions of project categories of annex I and II of the EIA Directive

Commission guidance document on streamlining environmental assessments conducted under Article 2(3) of the EIA Directive

IMPEL (2012) The implementation of the Environmental Impact Assessment on the basis of precise examples <http://ec.europa.eu/environment/eia/pdf/IMPEL-EIA-Report-final.pdf>

Section 3 - Base Information

Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment

Summary

The Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (commonly referred to as the Strategic Environmental Assessment (SEA) Directive) was passed in 2001 and needed to be transposed into Member States' legislative structures by July 2004. The Member States must implement the SEA and assess environmental effects of certain plans and programmes within their jurisdictions.

Entry into Force

Signed on 27 June 2001; entered into force on the day of its publication in the Official Journal of the European Communities, which was 21 July 2001.

Policy Field

Integration/coordination issues with other related pieces of legislation

The SEA Directive sets out that an environmental impact from public plans and programmes is mandatory for the following sectors: "agriculture, forestry, fisheries, energy, industry, transport, waste/ water management, telecommunications, tourism, town & country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive; or have been determined to require an assessment under the Habitats Directive".⁵⁰

Aims of the policy and its relevance to soil protection

Objectives

The aim of the SEA Directive is: "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment". (Article 1)

Spatial coverage and management unit

The spatial coverage includes all Member States' environment that is likely to incur significant environmental effects from plans and programmes proposed in those Member States. Not every plan or programme is covered or must have a SEA conducted for it, but those that do are covered under Article 3(2-4). See Section 2.

Relevance to soil protection

The SEA Directive is relevant to soil protection is that the plans and programme prepared and adopted "by an authority at national, regional or local level or which are prepared by an

⁵⁰ DG Environment, Strategic Environmental Assessment – SEA, <http://ec.europa.eu/environment/eia/sea-legalcontext.htm>.

authority for adoption, through a legislative procedure by Parliament or Government, and which are required by legislative, regulatory or administrative procedures” could have an effect on or be implemented using soil as a natural resource, e.g. agricultural (CAP), industry, transport, waste, etc. The plans or programmes could present soil threats (e.g. contamination, sealing).

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: No direct soil-focused aims or objectives

Implicitly: Indirectly the SEA Directive aims to reduce environmental impacts from plans and programmes, including negative impacts on soil, by requiring an assessment of the likely significant effects prior to adoption of the plans and programmes.

<p>Soil threats addressed by the policy</p> <p>Explicitly: No soil threats are directly addressed by the SEA Directive</p> <p>Implicitly: An environmental report must contain information about the likely significant effects to soil, which could touch upon multiple different soil threats (e.g. erosion, contamination, salinization, loss of biodiversity and/or soil organic matter, etc).</p>

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	Generally, the target to reduce environmental impacts from plans and programmes includes soil as a natural resource potentially affected by them.	None

Mandatory requirements and voluntary options for Member States (types of management measures)

No The SEA Directive requires plans and programmes which the Member States determine are likely to have significant effects on the environment based on criteria in Annex II to complete a SEA. This determination of likelihood of significant effects either requires or does not require a SEA. If it does not require one, reasons must be provided publicly as to why it was not.⁵¹ Once the determination has been made that a SEA is required, “an environmental report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated”.⁵²

The information which must be provided in the SEA in Annex I includes the likely significant effects on soil, which should outline “secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects”.⁵³ Public consultations are required within the plan and programme development process, with the additional requirement for transboundary consultations if the likely significant effects are potentially

⁵¹ SEA Directive, Article 3.

⁵² SEA Directive, Article 5(1).

⁵³ SEA Directive, Annex I.

transboundary.⁵⁴ Finally, all of the information in the SEA and the consultations prior to adoption must be taken into consideration during the decision-making process and accompanying information about the decision must inform the public and authorities consulted about the adoption of the plan/programme and a public record of the various environmental considerations integrated into the final version along with the comments from the consultations and why the final version was chosen as it was.⁵⁵

Monitoring is required during the early stages of the plan/programme implementation are in place as well to discover adverse unforeseen impacts.⁵⁶ Reporting requirements are described below.

The Member States were required to bring laws, regulations and administrative provisions into force to implement the Directive before 21 July 2004 and inform the Commission (Art 13(1)).⁵⁷ By that date the Member States also had to communicate to the Commission the types of plans and programmes which would be subject to SEAs according to Art. 3 (Art 13(4)).

Key soil-relevant instruments

Mandatory

Determine whether a SEA is required (Annex II criteria), consult the public and authorities, a SEA report prepared outlining the mandatory elements (Annex I), and a final plan/programme with an accompanying explanation as to how the information revealed during the SEA was taken into consideration / environmental aspects were integrated into the final adopted output. This process is relevant to soil protection since that is one of the natural resources on which the SEA is focused in identifying likely significant effects (Annex I). Monitoring is also required to gauge unintended impacts as well as reporting on implementation to the Commission. The Commission must also report on the Directive to the Parliament and Council every 7 years.

Voluntary

There are no voluntary soil-relevant provisions.

⁵⁴ SEA Directive, Articles 6 and 7.

⁵⁵ SEA Directive, Articles 8 and 9.

⁵⁶ SEA Directive, Article 10.

⁵⁷ As of that date, only 9 MS had transposed the Directive, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52009DC0469>. Conformity checking was completed in October 2008 for 14 MS. As of 14 October 2008, 23 open cases with the ECJ related to the SEA Directive, such as for non-conformity or non-communication, existed, <http://ec.europa.eu/environment/eia/pdf/study0309.pdf>.

25 Waste Framework Directive

DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

This Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use. It is complemented by other key pieces of waste legislation that more directly limit emissions from key waste management activities to land and soil i.e. the Landfill Directive and the Mining Waste Directive.

Specifically it is relevant to soil protection as it states that ‘Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular.....without risk to water, air, soil, plants or animals.’ Member States must ensure that when disposal activities occur on sites handling and processing wastes (including hazardous wastes) these provisions are abided by. There is also a potential additional link in that the Directive also promotes the separate collection of biowastes with a view to composting or anaerobic digestion of the materials. Both processes potentially result in material that can be used to improve the soil organic matter of soils, and promoting collection should make these materials more easily available.

Any facilities undertaking waste treatment are required under the Directive to obtain a permit from the relevant competent authority. This includes setting provisions around the types of activities permitted on a site and also the safety and precautionary measures applied. The stringency of protection of the soil etc from emissions is therefore bound up with the permitting process, which is controlled by the relevant competent authorities.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Contamination - diffuse	E	Waste management measures should take account of soil protection	
Contamination – point source	E	Waste management measures should take account of soil protection	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	I	Waste management measures should take account of soil protection and so may contribute to soil biodiversity protection	
Loss of soil organic matter	I	Provisions around biowaste have the potential to promote alternative solutions for soil fertility that offer greater potential to address issues of SOM.	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	N/A	N/A	The 7th EAP does not link the specific soil function with EU policies
Platform for human activities	E	Controls pollutant inputs from waste management activities to soils and so can contribute to maintain quality for different human activities.	See above
Biomass production	N/A	N/A	See above
Hosting biodiversity	I	Waste management measures should take account of soil protection and so may contribute to soil biodiversity protection	See above
Providing raw materials	N/A	N/A	See above

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Storing, filtering and transforming nutrients and water	N/A		See above
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Contains clear provision for waste management facilities to operate taking account of soil protection
- Standards may be set to ensure soil protection

Weaknesses - are there aspects limiting the protection afforded?

- It is unclear if the soil protection provisions have been taken into account in regulatory decisions at MS level or the consistency with which they are treated as part of the permitting process.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- The provisions could be used to develop guidance (or similar) at EU level to drive soil protection.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- None? The current legislative review in the circular economy package does not affect the soil protection provisions

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Binding on all Member States based on the requirements to managing waste without harming the environment

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

The Directive on waste was adopted in 2008 repealing historic key waste legislation. Hence, the current Directive has yet to be evaluated. However, information on the implementation of community waste legislation can be found at <http://ec.europa.eu/environment/waste/reporting/index.htm>

Section 3 - Base Information

DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives

Summary

The Waste Framework Directive (2008/98/EC) aims to reduce the negative impact of waste generation and management on the environment and to increase the efficiency of resource use.

Entry into Force

22.12.2008

Policy Field

Integration/coordination issues with other related pieces of legislation

Waste

Aims of the policy and its relevance to soil protection

Objectives

The aim of the policy is to control potential environmental and health impacts associated with the management of waste. In so doing the Directive addresses this in a number of ways:

Promoting the waste hierarchy and the reuse and recovery of materials before disposal through specific targets for paper, metal, plastics and glass;

Requiring that waste treatment and storage facilities for waste and hazardous waste are permitted and operated in a way that protects the environment and explicitly soils;

Setting out provisions on the collection and processing of biowaste and that material emerging is environmentally safe – leading to potential opportunities for alternative sources of organic matter for soil improvement

Relevance to soil protection

Uncontrolled waste management facilities have been a historic, significant source of local soil contamination – both sites for disposal and sites involved in treating the waste or extracting components. The Environmentally Liability Directive identified waste sites as remaining a key source of cases where preventative measures had to be taken to protect land from damage. Therefore, the control of waste facilities is important for both local contamination and diffuse contamination through deposition from water courses etc.

The provisions of the Waste Framework Directive are also relevant to other aspects of soil protection including the potential use of biowaste on land and the quality and quantity of material available.

More generally, the emphasis on the prevention of waste generation, would also potentially impact on the likelihood of damage to soils reducing demands for waste management and disposal.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Contamination

Implicitly: N/A

Soil threats addressed by the policy

Explicitly: It explicitly addresses soil, as it requires Member States to ensure that waste management activities do not contaminate the environment, including soil. It sets requirements for waste treatment that contribute to reducing soil contamination. Through promoting the prevention of waste, the directive contributes to reducing soil contamination. By incentivising the recycling of waste materials, the directive could reduce the pressure on soils as a resource (e.g. from the construction sector).

Implicitly: N/A

Soil-focused targets and/or expected impacts

There are no specific soil targets set out; however, control of waste is specifically designed to protect soils under the Directive.

26 Water Framework Directive and Linked Measures (Groundwater and Drinking Water Directives)

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The WFD is a measure which is aimed at protecting and improving the qualitative and quantitative status of water bodies. While it does not have soil protection as a specific objective, many aspects of the WFD can contribute to positive soil outcomes. This is principally in two ways:

Many of the threats to water (nutrient, pesticide, sediment pollution, etc.) arrive in water bodies via soils (agricultural, urban, etc.). Therefore, many of the measures to reduce these pressures can have positive impacts on those soils.

The management framework of the WFD (comprehensive River Basin Management Plans with assessment of status, pressures, adoption of measures, monitoring, etc.) encourages wider catchment integrated planning (e.g. for floods, etc.). Such integrated planning can provide a platform for taking soil protection objectives into account.

However, while there are these potentially positive outcomes for soils, it is important to stress that the WFD sets obligations on Member States for water protection and if these can be achieved without additional soil protection, a Member State would be compliant.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	E	Addressed by WFD to the extent that acidification is a threat to water bodies	E
Compaction			
Contamination - diffuse	E	Key instrument to control diffuse pollution in water (incl. routes to water). Also contributed to by the Groundwater and Priority substances Directives (daughter directives to the WFD)	E
Contamination –	I	By controlling inputs to water courses potentially	I

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
point source		point sources would be addressed as far as they impact water bodies. They are also strongly the focus of other measures (e.g. UWWTD, IED)	
Desertification			
Erosion - water	E	WFD treats sediments in water as a pollutant and so, if these affect water body status, they should be controlled, helping to reduce erosion.	E
Erosion - wind			
Flooding/ landslides	E	WFD seeks to integrate flood management within wider river basin management (which is also encouraged by the Floods Directive)	E
Loss of soil biodiversity	I	Key instrument to control diffuse pollution in water and so may contribute to soil biodiversity protection	I
Loss of soil organic matter			
Salinisation			
Soil sealing	I	Where sealed land affects inputs of pollutants to water bodies affecting status, the WFD would seek to address this.	I

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	Meeting WFD objectives may address pollution and water table affecting soil carbon	I
Platform for human activities	I	Meeting WFD objectives may address pollution which affects soil quality and so affects the human activities supported	I
Biomass production	I	Controls diffuse pollution in water and so may contribute to biomass production	I
Hosting biodiversity	I	Controls diffuse pollution in water and so may contribute to soil biodiversity protection	I
Providing raw materials			
Storing, filtering and transforming	E	Key instrument addressing nutrient and water	E

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
nutrients and water		movements in so far that they affect water body status, so key in contributing to delivering this soil function	
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

Waster Framework Directive

- Encompasses all diffuse pollution which could affect water body status
- Requires adoption of measures necessary to tackle that pollution
- Strong monitoring, assessment and reporting provisions
- Cyclical adaptive management process
- Comprehensive in geographic scope

Groundwater Directive and Priority Substances Directive

- Sets additional substance standards to support WFD – clear and precise
- Easier to determine MS compliance

Weaknesses - are there aspects limiting the protection afforded?

- The objective of the WFD is water protection defined by water body status – soil protection is indirect
- MS implementation to date is not strong – so delivering water protection is proving difficult (let alone wider issues such as soil protection)
- Only a limited number of substances in the Groundwater Directive and Priority Substances Directive are of interest in soil protection

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Encourages integrated catchment management – so opportunity to bring in wider environmental thinking
- Encourages active stakeholder participation – useful for working with farmers and including soil protection
- The WFD 2018 review could provide an opportunity to address soil ‘thinking’ within water protection approaches

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Poor implementation by MS
- The WFD 2018 review might present a risk to the level of protection afforded by the WFD.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Applies consistently across MSs, at catchment level.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

The WFD is to be subject to a major review in the next 2-3 years (as timetabled in the directive itself). However, it has been subject to evaluation with respect to the extent of its implementation. The WFD operates on a six-year planning cycle. The first RBMPs were supposed to be adopted in 2009, running to 2015. The 2nd RBMPs were supposed to be adopted in December 2015.

For the first RBMPs, the Commission undertook extensive analysis of implementation and produced an implementation report in 2012 (COM(2012)670). This found that there were many challenges in delivering the WFD, including:

Several Member States were late (or very late) in adopting RBMPs.

The status of many water bodies across the EU was below the 'good status' objective of the WFD – thus the challenge facing Member States is significant. For example, the Commission concluded that in more than 90% of the RBMPs assessed, agriculture is a significant pressure in the basin, including diffuse or point source pollution by organic matter, nutrients, pesticides and hydromorphological impacts.

While Member States were assessing status, many had failed to provide clear analysis of how individual pressures affected status and programmes of measures were widely found to contain few additional compulsory measures other than what would otherwise have been the case.

As a result, while the implementation of the WFD had led to a much greater understanding of the state of Europe's waters and the pressures on them, progress towards addressing these problems was limited.

For the 2nd RBMPs, Member States are still providing data to the Commission and further analysis is expected in 2017. However, the Programmes of Measures in those plans were reported earlier and in 2015 the Commission published an assessment of these (COM(2015)120). This assessment confirmed the problems facing Europe's waters, e.g. that diffuse pollution significantly affects 90% of river basin districts, 50 % of surface water bodies and 33 % of groundwater bodies across the EU and that the agricultural sector is the primary source of diffuse pollution. It also found, again, few additional measures to tackle the pressures on water bodies.

There is, therefore, a significant implementation challenge for the WFD. Further, without addressing these implementation challenges, many of the knock-benefits for soils will also not be delivered.

Section 3 - Base Information

Water Framework Directive – 200/60/EC

Summary

With the Water Framework Directive (WFD, 2000/60/EC),⁵⁸ the European Union has established a common framework for water protection and management, which aims to protect and restore aquatic ecosystems, and to guarantee long-term, sustainable water use.

The WFD requires Member States to set “river basin districts” (RBD), which are the main management unit of river basins (Art. 3.1), and to identify an appropriate competent authority by the end of 2003 (Art. 24). It further requires to develop and publish a river basin management plan (RBMP) for each RBD by the end of 2009, and to review and updated it every six years afterwards (Art. 13). It requires to accompany the RBMP by programmes of measures (PoMs) (Art. 11) which are envisaged as necessary to bring the water bodies progressively to the required status by the deadline. The measures foreseen in the PMs depend on the initial status of the water bodies, characteristics of the RBD and the pressures and impacts of human activities. The Directive requires Member States to establish PMs by the end of 2009 and make all the measures operational by the end of 2012 (Art. 11.7); to review and if necessary update by the end of 2015 and every six years afterwards. Furthermore, it requires to make operational any new or revised measures established under an updated programme within 3 years of their establishment (Art. 11.8). 1. Under Article 8, the WFD requires Member States to establish monitoring programmes in order to gain a coherent and comprehensive overview of water status within each river basin district. These programmes shall be made operational at the latest by the end of 2006 or as it is specified.

Entry into Force

Signed on 23 October 2000, the WFD entered into force on the same day of its publication in the Official Journal (OJ L 327) of the European Union, which was 22 December 2000.

Policy Field

Integration/coordination issues with other related pieces of legislation

Water

- Integration/coordination issues with other related pieces of legislation
- Annex VI of the WFD provides a list of directives and requires to include measures under these directives within the WFD PoMs in RBMPs⁵⁹:

⁵⁸ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

⁵⁹ Note that since adoption of the WFD, several of these directives have been amended, codified, etc.

- Bathing Water Directive (76/160/EEC);
- Birds Directive (79/409/EEC);
- Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC);
- Major Accidents (Seveso) Directive (96/82/EC);
- Environmental Impact Assessment Directive (85/337/EEC);
- Sewage Sludge Directive (86/278/EEC);
- Urban Waste-water Treatment Directive (91/271/EEC);
- Plant Protection Products Directive (91/414/EEC);
- Nitrates Directive (91/676/EEC);
- Habitats Directive (92/43/EEC);
- Integrated Pollution Prevention Control Directive (96/61/EC).

Aims of the policy and its relevance to soil protection

Objectives

The main aim of the WFD is to achieve a good status for all European Union waters by 2015 (Art. 4). The WFD establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. The framework has several objectives such as protecting and improving the state of aquatic ecosystems, promoting sustainable water use and protecting available water resources, preventing and reducing pollution, and reducing the effects of floods and droughts (Art. 1) in order to achieve its ultimate aim.

Principles included in the legal text:

- Precautionary
- Preventive action
- Polluter-pays
- Subsidiarity

Spatial coverage and management unit

The WFD covers all surface and groundwater in the European Union. A 'river basin district' (RBD) is a natural geographical and hydrological unit and is the main unit for management of river basins as it is indicated in Article 3.1.

Relevance to soil protection

Addressing the WFD's primary focus requires (among other measures) the implementation of soil management measures which contribute to soil protection. Thus, soil management measures are a tool to reach the objectives, but not its primary focus of the WFD.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: WFD does not have any direct soil-focused aims and objectives.

Implicitly: One of the Directive's objectives is to "protect and enhance the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands

directly depending on the aquatic ecosystems” (Art. 1a). However, the WFD does not set specific objectives to protect the terrestrial ecosystems.

WFD identifies the urban and industrial installations and agricultural activities as the main sources of point and diffuse pollution. Agriculture is identified as a major source of water pollution, thus the RBMP and respective PoMs have to address agricultural pressures to ensure the full implementation of the WFD. The PoMs must include relevant measures from other directives, for example to the Nitrates Directive, and in this way contribute to the primary objective of good water status and indirectly to the soil-relevant aims and objectives. However, the list of ‘basic’ measures required in each PoM is much greater than this and needs to address the key pressures affecting water bodies.

Soil threats addressed by the policy

Explicitly: Soil threats are not directly tackled by the measures in the WFD.

Implicitly: Soil erosion, pollution (contamination), salinisation, SOM increase as well as improvement of the soil biodiversity (as directly linked to the increase of SOM) are indirectly addressed by the WFD provisions, as the WFD refers to other Directives that enhance or hinders soil management and protection.

- The main pressures caused on water by agriculture are nutrient and pesticide loads, abstraction of water for irrigation (particularly in Southern Europe) and the hydro-morphological changes, which are associated with the soil threats such as soil pollution/contamination (with pesticides), soil salinisation (from waters with high salt levels, poor application techniques or drainage, and abstraction practices in coastal areas leading to potential salinisation of groundwater through seawater intrusion), and poor soil drainage due to the hydro-morphological changes.⁶⁰

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
There are no direct or specific soil targets in the WFD.	The aim of the WFD to reduce water pollution and use relates indirectly to the treatment of the soil through the various measures required by the WFD PoMs. The activities set in the RBMPs and the respective PoMs in all the RBDs differ depending on the characteristics of the RBD and pressures and impacts of human activities. Thus each PoM sets different measures in achieving good status of water bodies and might contribute to different soil threats.	The RBD could have agriculture as the major activity impacting surface waters and/or ground waters and need to incorporate measures into the RBMP that address the soil management measures, etc. to reduce these impacts. Impacts on soil depend on the selected soil management measures.

⁶⁰ Strosser, P., Pau Vall, M., Plötscher, E., Water and agriculture: contribution to an analysis of a critical but difficult relationship, European Commission, available at http://ec.europa.eu/agriculture/envir/report/en/eau_en/report.htm. See also European Commission (2009) Salinisation and sodification. Sustainable agriculture and soil conservation (SoCo) Fact sheet no. 4, available at <http://eusoiils.jrc.ec.europa.eu/projects/SOCO/FactSheets/ENFactSheet-04.pdf>.

27 Cohesion Fund (Regulation (EU) No 1300/2013) – 2014 to 2020

Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund and repealing Council Regulation (EC) No 1084/2006

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

Summary of the Relationship with and Relevance to Soil Protection of the Policy

As for other funding instruments, the Cohesion fund offers the opportunity to invest in soils, however, in the absence of specific policy drivers demanding soil protection and also given the choice within the instrument regarding prioritising spending there is a question over how much support is actually delivered for soil protection. The funding does offer a potentially important source of funding to enact positive change in soil condition but soil issues and their importance would need political support. The funding is not accessible by all Member States, which limits opportunities in some countries.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	N/A		
Contamination – point source	E	<p>'taking action to improve the urban environment (c,iv) which includes decontaminating brownfield sites potentially reducing localised soil contamination and associated problems.'</p> <p>Annex I of the Regulation sets out common output indicators for the Cohesion Fund including land rehabilitation which measures the hectares of surface area rehabilitated.</p>	
Desertification	N/A		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	I	The fund allows investment to address specific risks, ensuring disaster resilience and developing disaster management systems.	
Loss of soil biodiversity	N/A		
Loss of soil organic matter	N/A		
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	The fund supports actions both to adapt to and mitigate against climate change, both would potentially relate to promotion of the Carbon Pool.	
Platform for human activities			
Biomass production			
Hosting biodiversity	E	The policy specifically supports actions to promote biodiversity and links soil, biodiversity and delivery of ecosystem services.	
Providing raw materials			
Storing, filtering and transforming nutrients and water	I	The fund allows investment to address specific risks, ensuring disaster resilience and developing disaster management systems. This would include potentially issues of water storage and filtration in relation to floodings.	
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The policy provides a potential opportunity to provide funding to improve soil status both through addressing contamination and through ‘promoting protecting and restoring biodiversity and soil and promoting ecosystem services (c,iii) which is directly relevant to a wider range of soil threats and functions’.

Weaknesses - are there aspects limiting the protection afforded?

- The policy only applies to certain Member States and also while for soil in particular contamination restoration is highlighted, in the absence of a clear policy or political driver, it is likely that other demands on funding may be prioritised. There is no requirement to use the funding for soils. Moreover, there is a risk that infrastructure promoted through the policy may lead to further damage to soils and their functionality.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- This is an opportunity to provide funding for positive change in soil status.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- There might be threats in infrastructure promoted that might damage soils further.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The Cohesion Fund is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average. It aims to reduce economic and social disparities and to promote sustainable development. It specifically targets the following Member States for environmental and transportation infrastructure development: BG, CZ, EL, ES, HR, CY, LV, LT, HU, MT, PL, PT, RO, SI, SK. Therefore funding is only available related to the priorities for a limited number of MSs.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Details of funding spending for the current period can be found at http://ec.europa.eu/regional_policy/en/funding/available-budget/; however, no specific details on spending on soil related issues could be identified.

Section 3 - Base Information

Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund and repealing Council Regulation (EC) No 1084/2006

Summary

The Cohesion policy's aim of decreasing differences between the EU's regional economic development was included in the Single European Act of 1987. The Cohesion Fund (current version Regulation (EU) No 1300/2013)⁶¹ was developed in 1994 and is intended to contribute to environmental and transport infrastructure development between the EU regions by promoting economic and social cohesion and sustainable development.⁶² It "is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average".⁶³

Entry into Force

Signed on 17 December 2013, it entered into force one day following publication in the Official Journal of the European Union, which was on 20 December 2013. Thus, entry into force was on 21 December 2013.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Cohesion Fund Regulation (EU) No 1300/2013 cites the following legal instruments related to environmental issues and funds: Regulation (EU) No 1303/2013 laying down common and general provisions on different Communities funds such as ERDF, ESF, CF, EAFRD etc. (Common Provisions Regulation), Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and Regulation (EU) No 1315/2013 on Union guidelines for the development of the trans-European transport network.⁶⁴

Aims of the policy and its relevance to soil protection

Objectives

Aimed at "strengthening the economic, social and territorial cohesion of the Union in the interests of promoting sustainable development".⁶⁵ It specifically targets the following Member States for environmental and transportation infrastructure development: BG, CZ, EL, ES, HR, CY, LV, LT, HU, MT, PL, PT, RO, SI, SK.

Spatial coverage and management unit

For the 2014-2020 programming period, the Cohesion Fund focuses on Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.

⁶¹ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R1300>

⁶² European Commission, Regional Policy: Cohesion Fund, http://ec.europa.eu/regional_policy/index.cfm/en/funding/cohesion-fund/.

⁶³ European Commission, Regional Policy: Cohesion Fund, http://ec.europa.eu/regional_policy/index.cfm/en/funding/cohesion-fund/.

⁶⁴ "Instruments cited" under the Cohesion Fund Regulation, <http://eur-lex.europa.eu/legal-content/EN/LKD/?uri=CELEX:32013R1300&qid=1450266148029>

⁶⁵ Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund and repealing Council Regulation (EC) No 1084/2006, Article 1.

Relevance to soil protection

The Cohesion Fund seeks to take action under a number of investment priorities with several potentially of relevance to soil protection, limiting of soil threats and promotion of soil function. These are as follows (as set out under Article 4, Investment Priorities):

- Article 3b focuses on promoting climate change adaptation, risk prevention and management and includes supporting investment in adaption action and promoting investment in disaster resilience, both elements could potentially result in action to better protect soil functionality in particular water filtration and counteracting threats such as compaction, soil erosion by water and landslides;
- Article 3c focuses on preserving and protecting the environment and promoting resource efficiency with elements relating to:
 - the waste sector (c,i) potentially relevant to localized soil contamination prevention
 - investment in the water sector (c,ii) to meet EU requirements might include soil management; in line with action to improve river basin management (Water framework Directive); or limit diffuse pollutants (Drinking water or Nitrate Directives);
 - protecting and restoring biodiversity and soil and promoting ecosystem services (c,iii) which is directly relevant to a wider range of soil threats and functions;
 - taking action to improve the urban environment (c,iv) which includes decontaminating brownfield sites potentially reducing localised soil contamination and associated problems.

However, it should be noted that the Cohesion fund is an investment vehicle and as such is promoting development, albeit 'sustainable'. There is a potential for investments supported by the fund to have a negative impact on soil in particular those related to transport infrastructure. Annex I of the Regulation sets out common output indicators for the Cohesion Fund and several relate indirectly or directly to soil protection.

- Risk prevention and management, for which one measure relates to population benefitting from additional flood protection measures;
- Land rehabilitation which measures the hectares of surface area rehabilitated;
- Nature and biodiversity which measures the hectares of land supported to attain better conservation status.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Soil protection and restoration (e.g. through green infrastructure). Contamination.

Implicitly: Soil sealing

Soil threats addressed by the policy

Explicitly: Soil protection and restoration (Article 3 ecosystem services (c,iii)): *'promoting protecting and restoring biodiversity and soil and promoting ecosystem services (c,iii) which is directly relevant to a wider range of soil threats and functions'*.

Implicitly: Contamination diffuse (Article 3, waste sector (c,i), water sector (c,ii), urban environment (c,iv)),

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
<p>Contains clauses on both protecting and restoring soil and on decontaminating brownfield sites</p>		<p>The soil impact will depend on the projects put forward and the selection process that follows. Soil protection or related projects are potentially eligible but their funding will depend on the alternative competing projects. A rapid review of the 2007 – 2013 project database delivered a limited list that arose when searching for soil as a key word.</p>

28 Greening Direct Payments for agricultural practices beneficial for the climate and the environment under Pillar 1 of the CAP

Regulation (EU) No 1307/2013 on direct payments under the CAP (the basic 'horizontal' regulation), in conjunction with

Delegated Regulation (EU) No 639/2014 on direct payments under the CAP

Implementing Regulation (EU) No 641/2014 on direct payments under the CAP

Section 1 - Gap Analysis - Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

Pillar 1 greening payments are a new element of CAP direct payments, compulsory for both managing authorities and farmers, although significant numbers of farmers are exempt from some of the Pillar 1 greening requirements, particularly if they already have large areas of grassland. Pillar 1 greening requirements fall into three groups: crop diversification; Ecological Focus Areas (EFAs); and the maintenance of permanent grassland, including the designation and protection of environmentally sensitive permanent grassland (ESPG). Of these, EFAs and the protective designation of permanent grasslands on carbon rich soils have the greatest potential for soil protection, particularly in relation to erosion and soil carbon. Both management authorities and farmers have a degree of choice in how they implement Pillar 1 greening requirements for EFAs and permanent grassland, particularly in choosing between EFA types with differing degrees of benefits for soils (e.g. green cover or nitrogen fixing crops).

Description of the Pillar 1 greening measure

Member States must use 30 per cent of their national allocations of EAGF funding for direct payments under Pillar 1 to make an annual 'greening' payment to farmers for specific, compulsory, non-contractual farming practices that go beyond cross-compliance and address climate and environment policy goals.

There are some general exemptions to the Pillar 1 greening requirements, notably for farmers who receive their direct payments through the Small Farmers' Scheme (for administrative and proportionality reasons), and for organic farmers who automatically receive the Pillar 1 greening payment because organic farming is considered to provide environmental benefits ipso facto. There are also individual exemptions from particular requirements, depending on farmers' situations (see below).

Within the specifications for Pillar 1 greening requirements in the basic Regulation, Member States must define how each of the three 'greening' measures - crop diversification, maintenance of permanent pasture and Ecological Focus Areas - applies in their territory. Member States may allow farmers to meet one or more of the Pillar 1 greening requirements through 'equivalent' or alternative practices, which must be based on national/regional agri-environment schemes or certification schemes. The Regulations require managing authorities to make sure that at farm level Pillar 1 greening obligations are not double-funded by both the Pillar 1 greening payments and Pillar 2 agri-environment-climate payments. In practice

this means reducing the payment rate for any agri-environment-climate sub-measures that are also offered as options for meeting Pillar 1 greening obligations.

Crop diversification

This requirement applies only to farms with more than 10 ha of arable land:

- farmers with up to 30 ha of arable land have to grow at least 2 crops, and the main crop cannot cover more than 75% of the land;
- farmers with more than 30 ha of arable land have to grow at least 3 crops, the main crop covering no more than 75% of the land and the 2 main crops no more than 95%.

What counts as a 'crop' in this context is defined in the Regulation. Some farmers are exempt from the crop diversification requirement, including those who already have a significant amount of their overall land in grassland or fallow, or in crops that are grown under water for a significant part of the year.

Permanent grassland

Permanent grassland is defined as grassland that has not been included in the crop rotation of the holding for at least five years, but a Member State may choose to widen this definition to areas of predominantly herbaceous vegetation used for grazing.

Member States have two Pillar 1 greening obligations for the maintenance of permanent grassland.

Within Natura 2000 areas Member States must designate environmentally sensitive grasslands (ESPG) which need protection to meet the objectives of the Birds and Habitats Directives (including grasslands on peat and wetlands). For grassland in these ESPG areas the 'greening' requirement for farmers is to not convert or plough the grassland. Member States can choose to apply ESPG designations and protection to other environmentally important grasslands outside Natura 2000 areas. Additional ESPG areas outside Natura 2000 can be designated each year.

The second obligation for Member States applies at a more general level. It is to ensure that the ratio of permanent grassland to the total agricultural area (compared to a specified, earlier reference year) does not fall by more than 5 per cent. Member States can choose to apply this requirement nationally, regionally or at an appropriate sub-regional level. Specific restrictions are applied to individual farmers only if there is a risk that the permanent grassland ratio is likely to exceed the 5 per cent threshold, or has already done so. If it has done so the Member State must take action, prohibiting further conversions and requiring farmers who have previously converted permanent grassland to other uses to restore it to grassland. The exception to this is where the drop below the threshold resulted from afforestation, provided such afforestation is compatible with the environment.

Ecological Focus Areas

Farms with more than 15 hectares of arable land must ensure that an area equivalent to 5% of their arable land is an Ecological Focus Area (EFA). The Regulation defines 10 types of EFA, and Member States had to select one or more to compile their own national list, from which farmers can choose how to meet their individual EFA requirement.

The ten types of Ecological Focus Area (EFA) listed in the Regulation are:

- Land lying fallow;
- Terraces;
- Landscape features, including hedges or wooded strips, isolated trees and trees in lines or groups, field margins, ponds, ditches and traditional stone walls (these features can be within or adjacent to the arable land) (EU 1659/2014 Article 45 (4));
- Buffer strips, including buffer strips covered by permanent grassland provided these are distinct from adjacent eligible agricultural area;
- Areas of agro-forestry that receive(d) support under the forestry measures of the 2007-13 or 2014-20 RDPs;
- Strips of eligible hectares along forest edges;
- Areas with short rotation coppice with no use of mineral fertilizer and/or plant protection products (these do not have to be located on the arable land of the farm);
- Afforested areas that receive(d) support under the forestry measures of the 2000-2006, 2007-13 or 2014-20 RDPs and which are still eligible for direct payments (these do not have to be located on the arable land of the farm);
- Areas with catch crops, or green cover established by the planting and germination of seeds;
- Areas with nitrogen fixing crops.

Annex X to Regulation (EU) No 1307/2013 defines a series of weighting factors for each of these, which may affect the area needed under different practices to meet the 5% EFA requirement. For example, the weighting factor for groups of trees is 1.5, so a group covering 100m² would count as 150m² for the farmer's EFA calculation, but for catch crops or green cover the factor is 0.3, so 1ha of a catch crop would count as just 0.3 ha of EFA. Managing authorities must apply the weighting factors with a value of <1, but can choose whether or not to apply the higher factors.

Relevance to soil protection

Of the three main elements of Pillar 1 greening:

- The objective of the crop diversification requirement is the improvement of soil quality (EU 1307/2013, Recital (41)), but in practice any soil protection benefits will depend entirely on the way in which individual farmers implement the requirements. For example, increasing the area of land under leguminous crops (which fix nitrogen in the soil) may reduce the levels of mineral nitrogen fertiliser required, and have an indirect benefit on diffuse pollution.
- The potential soil benefits of EFAs depend on Member States' decisions on which of the ten EFA types to include in their national list and how they define them, and on farmers' choice of EFA type and location. Potential soil benefits could include improved soil cover and other anti-erosion effects.
- Designation of Environmentally Sensitive Permanent Grassland (ESPG) has potential to address the risks of loss of organic matter and erosion, and offers potential benefits for the carbon pool, especially on carbon-rich soils. The requirement to maintain the ratio of permanent grassland to UAA ensures that at national level grassland cover is maintained on an area equivalent to 95% of the reference level, with potential benefits for soil erosion and protection of soil organic matter. However, within the EU rules these soils may still be ploughed, not just on the 5% which may be converted, but also other areas of permanent grassland (if for example, these are converted to arable and

replaced elsewhere to keep within the ratio, or are ploughed up and reseeded in situ at intervals of more than 5 years).

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of the soil threats
Acidification	N/A		
Compaction	I	Fallow, buffer strips, agroforestry, afforested areas, short rotation coppice (SRC)	
Contamination - Diffuse	I	Fallow, buffer strips, landscape features, afforested areas, short rotation coppice (SRC)	
Contamination - point source	N/A		
Desertification	N/A		
Erosion - water	I	Fallow, terraces, landscape features, buffer strips, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC), ESPG	
Erosion - wind	I	Fallow, terraces, landscape features, buffer strips, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC), ESPG	
Flooding/landslides	I	Terraces, buffer strips, landscape features, agroforestry, afforested areas, short rotation coppice (SRC), ESPG	
Loss of soil biodiversity	X or I	Fallow, buffer strips, landscape features, afforested areas, short rotation coppice (SRC), ESPG	
Loss of soil organic matter	I	Fallow, buffer strips, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC), ESPG	
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Function - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon Pool	I	Buffer strips, landscape features, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC), ESPG, permanent grassland ratio.	
Platform for Human Activities	N/A		
Biomass production	I	Agroforestry, afforested areas, short rotation coppice (SRC)	
Hosting biodiversity	X or I	Fallow, buffer strips, landscape features, afforested areas, short rotation coppice (SRC)	
Providing raw materials	?		
Storing, filtering and transforming nutrients and water	I	Buffer strips, catch crops/green cover, agroforestry, afforested areas, short rotation coppice (SRC)	
Storing geological and archaeological heritage	I	ESPG	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Obligatory for all farmers who are eligible, and EFAs will apply to many large arable farms;
- The EFA options have the potential to reduce the threat of soil erosion and/or benefit soil carbon;
- Option for Member States to use equivalent agri-environment-climate sub-measures, which can define specific soil management requirements, or certification schemes, as an alternative to the standard Pillar 1 greening requirements;
- Opportunity for Member States to protect ESPG and wetland/carbon rich soils outside Natura 2000 areas, if these have not already been ploughed.

Weaknesses- are there aspects limiting the protection afforded?

- Crop diversification requirement does not require crop rotation
- Questionable additionality of EFA options for landscape features and terraces, which allow Member States to include those already protected under GAEC 7; and also the additionality of agroforestry and afforested areas that were already established (with RDP funding) before Pillar 1 greening requirements were introduced;

- Potential soil benefits could depend on which types of EFA Member States choose to offer farmers (the minimum is one).
- Some EFAs allow Member States to choose whether farmers may use fertilisers and PPP, which may limit some of the soil benefits.

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- Raise requirements for minimum number of options chosen by both Member States and farmers;
- Make EFA options distinct from and additional to cross-compliance requirements;
- Limit agroforestry and afforestation to 'new since 2015';
- Improve protection for carbon rich soils and wetlands outside Natura 2000 areas.

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- Mainly from weak implementation;
- Risks to wetlands and/or carbon-rich soils outside Natura 2000 areas) that have not been designated as ESPG.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

- Wide choice between and within options for both Member States and farmers;
- Can lead to 'race to the bottom' to offer/choose the options with least impact on the farm business e.g. N-fixing crops (questionable environmental benefit and widely offered).

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

No evaluation reports are available at the time of writing but DG Agriculture plans to evaluate the EFA requirement in 2016 (the Direct Payments Regulation requires the Commission to present an evaluation report on the implementation of the EFA element Pillar 1 greening by 31 March 2017 pursuant to Article 46(1) third subparagraph of Regulation (EU) No 1307/2013).

The **planned studies and evaluation reports 2016-20** by DG Agriculture that may be relevant to some aspects of Pillar 1 greening implementation include the following (for more information see http://ec.europa.eu/agriculture/evaluation/plan_en.pdf)

2015:

A study (not an evaluation) 'mapping and analysis of the implementation of the CAP'

2016:

Framework contract for the evaluation studies of CAP measures contributing to the general objective "sustainable management of natural resources and climate action"

Evaluation of the forestry measures under the rural development policy

2017:

Evaluation on Pillar 1 greening

Evaluation of the impact of the CAP on climate change and greenhouse gas emissions

2018:

Evaluation of the impact of the CAP on habitats, landscapes and biodiversity (under FC-2)

Evaluation of the impact of the CAP on water

A study (not an evaluation) 'mid-term review of the EU Forest Strategy'

2019-2020:

Evaluation of the impact of the CAP towards the general objective "sustainable management of natural resources and climate action"

Mapping and analysis of the implementation of the CAP

Section 3 - Base Information

Greening Direct Payments under Pillar 1 of the CAP (Payment for agricultural practices beneficial for the climate and the environment)

Regulation (EU) No 1307/2013 on direct payments under the CAP (the basic 'horizontal' regulation), in conjunction with

Delegated Regulation (EU) No 639/2014 on direct payments under the CAP

Implementing Regulation (EU) No 641/2014 on direct payments under the CAP

Summary

Please see summary in Section 1 for description.

Entry into Force

Regulation 1307/2013 signed on 17 December 2013, but entered into force on the day of its publication in the Official Journal of the European Union – 20 December 2013. Applicable from 1 January 2015.

Policy Field

Integration/coordination issues with other related pieces of legislation

CAP cross-compliance GAEC standards 1,2, 4, 5 6 and 7 (and through SMR 1 and 10 also Nitrates Directive and Plant Protection Directive 1107/2009)

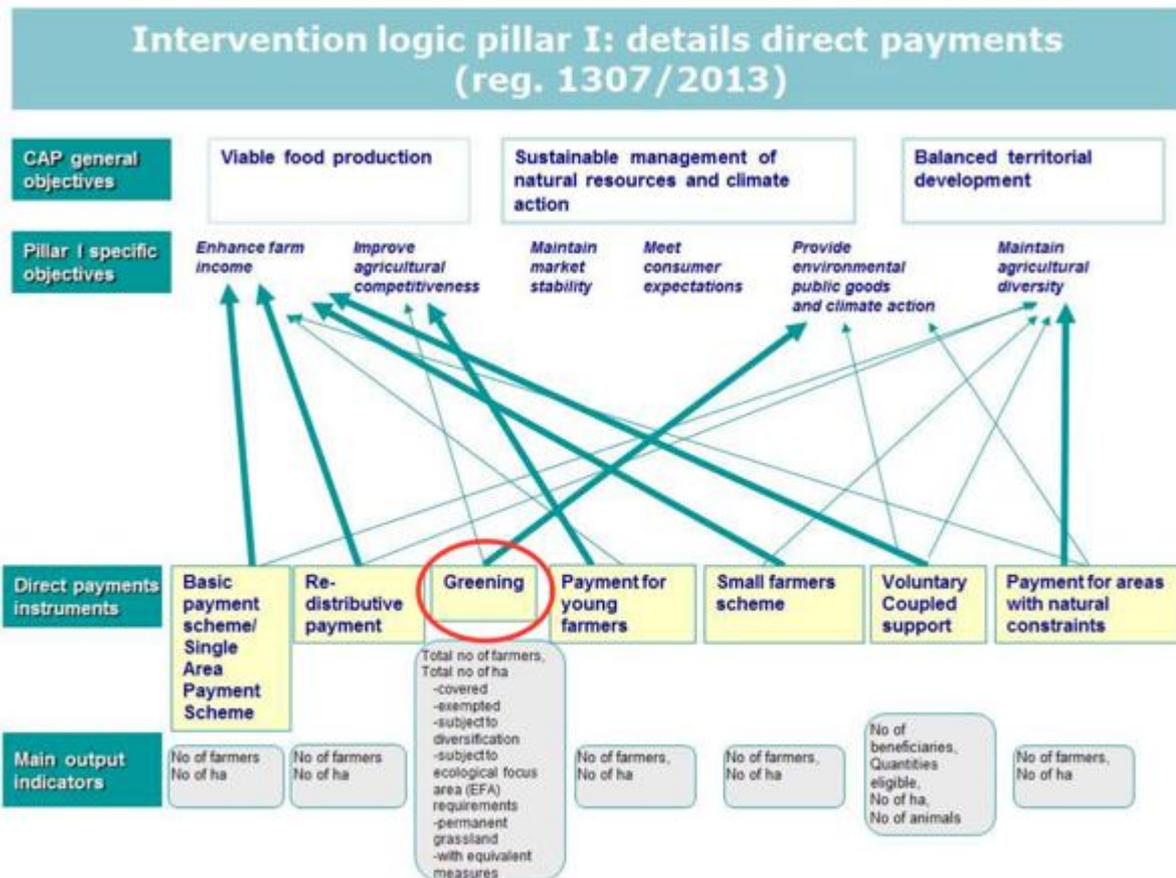
CAP Rural Development Programmes 2014-20

Habitats and Species Directives (ESPG requirements only)

Aims of the policy and its relevance to soil protection

Objectives

To enhance the environmental performance of the CAP by paying farmers for agricultural practices beneficial for the climate and the environment (intervention logic is shown below).



Spatial coverage and management unit

All Member States, applied at the level of the farm holding to those farms with eligible land. Pillar 1 greening is an obligatory element of CAP Pillar 1 direct payments.

Relevance to soil protection

Please see summary section above

Soil-focused aims and objectives (including those with potential negative impacts)

Direct: (considered to be some form of explicit reference to soil or land)

Although there is no specific reference to soil, the intervention logic clearly refers to the sustainable management of natural resources (which includes soil) and all three Pillar 1 greening requirements refer to the management of agricultural land and/or landscape features and trees planted on agricultural land.

Indirect: (Considered to be implicit links to soil)

Soil threats addressed by the policy

Explicitly:

Subject to the choice made by Member States in implementing Pillar 1 greening, and the choices made by farmers, it is considered that the EFA requirements and the designation of ESPG areas where ploughing and conversion is prohibited could address directly the threats of:

- soil erosion
- loss of organic matter

Implicitly:

Some of the EFA requirements and the designation of ESPG areas where ploughing and conversion is prohibited could address directly the threats of:

- compaction
- contamination - diffuse
- desertification
- erosion - water
- erosion - wind
- flooding/landslides
- loss of soil biodiversity

Soil-focused targets and/or expected impacts

Direct soil-focused targets	Indirect soil-focused targets	Soil-focused expected impacts
None	None	Not possible to estimate because impacts depend on the way in which Member State define the requirements, the extent of additionality of some Pillar 1 greening requirements and the choices made by the individual farmers who have to make changes to their farm management to meet the requirements (significant numbers of farmers will not have change their current management).

Mandatory requirements and voluntary options for Member States

Please see synopsis above for mandatory requirements and voluntary options relevant to soils that are available to Member States/regions in designing and implementing their Pillar 1 greening requirements.

Key soil-relevant instruments

Mandatory

- Ensure that those farmers to whom it applies (mostly arable farms) implement the three elements of Pillar 1 greening.
- Choose and define at farm-level at least one of the ten EFA types defined in the EU legislation.
- Within Natura 2000 areas designate permanent grasslands in need of strict protection as environmentally sensitive permanent grassland (ESPG), where no ploughing or conversion is permitted.

Voluntary

- Choose and define more than one type of EFA, from the list of ten, and decide what production methods may be used.
- If landscape features and terraces are on the Member State's list as EFAs, choose whether to define 'other' (i.e. in addition to those already protected under cross-compliance, GAEC standard 7).
- Outside Natura 2000 areas designate permanent grasslands (including those on carbon-rich soils) as ESPG, where no ploughing or conversion is permitted.

29 CAP cross-compliance rules - GAEC Standards for soils (GAEC 4, 5, 6 and 7)

The detailed rules for the cross-compliance system are set out in European Parliament and Council Regulation (EU) No 1306/2013 (Articles 93, 94 and Annex II), Commission Delegated Regulation (EU) No 640/2014 and Commission Implementing Regulation (EU) No 809/2014.

The EU legislation describes CAP cross-compliance as follows: ‘the cross-compliance system incorporates in the CAP basic standards concerning the environment, climate change, good agricultural and environmental condition of land, public health, animal health, plant health and animal welfare. Cross-compliance aims to contribute to the development of sustainable agriculture through better awareness on the part of the beneficiaries of the need to respect those basic standards. It aims also to contribute to make the CAP is more compatible with the expectation of society’⁶⁶.

Section 1 - Gap Analysis - Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

Compliance with the GAEC standards for soil and carbon is a requirement across the whole of all holdings which benefit from direct payments under CAP Pillar 1 and/or land management payments under RDPs - this is the majority of farmland in the EU. The framework for the standards is set out in Regulation (EU) No 1306/2013 while the farm level requirements are defined by individual Member States (or in some cases regions) in line with their scope set in the Regulation. Together with the GAEC standard 7, for the protection of landscape features, these soil standards have the potential to contribute to a wide range of soil protection measures, without necessarily addressing all relevant soil threats. For most of the standards the EU legislation does not define minimum requirements, nor require Member States to address all soil threats. The Commission checks that Member States comply with the EU framework in defining their standards, and also that they follow CAP rules for implementation and payment controls.

Description of the GAEC standards 4, 5, 6 and 7

Farmers receiving direct payments under Pillar 1 and area-based payments under Pillar 2⁶⁷ must comply with CAP cross-compliance requirements across the whole farm holding, or risk penalties applied as percentage reductions to their CAP payments. Cross-compliance rules are of two types:

- SMRs, which are existing basic requirements under sectorial EU legislation in the areas of water, biodiversity, public, animal and plant health, and animal welfare,

⁶⁶ According to recital 54 of Regulation (EU) No 1306/2013.

⁶⁷ These include payments under the RDP measures for: agri-environment-climate, areas with natural constraints, Natura 2000 and WFD, afforestation, forest-environmental, agroforestry, organic farming and animal welfare, and also two payments in the **wine sector** ("Restructuring and conversion of vineyards" and "Green harvesting").

which apply to all farmers disregarding of whether they are CAP beneficiaries or not; and

- GAECs, which are defined by individual Member States.

The CAP cross-compliance requirements have been subject to several revisions since their introduction, and the last change took effect in 2015. Inter alia, the list of Statutory Management Requirements (SMRs) and Standards for Good Agricultural and Environmental Condition (GAEC) was shortened and presented in a single list comprising three groups: environment, climate change, good agricultural condition of land; public, animal and plant health; and animal welfare.

Because the SMRs refer to EU legislation that also applies to farmers not receiving the CAP support payments, they are not reviewed as part of the CAP cluster, but where relevant will be referenced in other policy clusters (diffuse pollution/ water management; and nature, land and soil sealing).

Member States must define their own verifiable GAEC standards for farmland, within the framework set out in the EU legislation, and in doing so they must take into account the specific characteristics of the areas concerned, including soil and climatic condition, existing farming systems, land use, crop rotation, farming practices and farm structures⁶⁸.

The framework for GAEC standards is shown in the Table below. Three standards (GAEC 4, 5 and 6) directly address the issue of the soil and carbon stocks, while a fourth standard, GAEC 7 for the retention of landscape features, is also relevant to soil protection. These four standards are reviewed as part of this cluster (the GAEC standards for water will be referenced in policy cluster diffuse pollution/ water management).

Cross-compliance rules from 2015 for environment, climate change, good agricultural condition of land

Main issue	Requirements and standards		
Water	SMR 1	Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L375, 31.12.1991, p.1)	Articles 4 and 5
	GAEC 1	Establishment of buffer strips along water courses (1)	
	GAEC 2	Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures	
	GAEC 3	Protection of ground water against pollution: prohibition of direct discharge into groundwater and measures to prevent indirect pollution of groundwater through discharge on the ground and percolation through the soil of dangerous substances, as listed in the Annex to the Directive 80/68/EEC in its version in force on the last day of its validity, as far as it relates to agricultural activity	
Soil and	GAEC 4	Minimum soil cover	

⁶⁸ Defined in Regulation (EU) No 1306/2013 Articles 93-94 and Annex II

Main issue	Requirements and standards		
carbon stock	GAEC 5	Minimum land management reflecting site specific conditions to limit erosion	
	GAEC 6	Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons (2)	
Biodiversity	SMR 2	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L20, 26.1.2010, p.7)	Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)
	SMR 3	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L206, 22.7.1992, p.7)	Article 6(1) and (2)
Landscape, minimum level of maintenance	GAEC 7	Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species	
<p>Notes</p> <p>(1) The GAEC buffer strips must respect, both within and outside vulnerable zones designated pursuant to Article 3(2) of Directive 91/676/EEC, at least the requirements relating to the conditions for land application of fertiliser near water courses, referred to in point A.4 of Annex II to Directive 91/676/EEC to be applied in accordance with the action programmes of Member States established under Article 5(4) of Directive 91/676/EEC.</p> <p>(2) The requirement can be limited to a general ban on burning arable stubble, but a Member State may decide to prescribe further requirements.</p> <p>Source: Compiled using Regulation (EC) No 73/2009, Annex III and Regulation (EU) No 1306/2013, Annex II.</p>			

Relevance to soil protection

GAEC 4 and 5 have the potential to address several soil threats and functions, including risks of erosion and loss of organic matter and compaction, through measures such as use of cover/catch crops, reducing bare fallow and creating permanent green cover on slopes and under permanent crops. The GAEC 6 standard minimum requirement is to prohibit burning of arable stubble; where the crop residues are incorporated in the soil there will be more benefit for soil organic matter than if they are removed for other, non-agricultural uses. The retention of landscape features under GAEC 7 has the potential to reduce the risk of soil erosion by disrupting the flow of wind and water, while the retention of woody features such as hedges, trees and ponds will reduce the risk of loss of organic matter, and contributes to the carbon pool by the sequestration of soil carbon.

The extent of the actual benefit to soils depends on how rigorously Member States define their GAEC standards.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text

- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the policies coverage of the soil threats
Acidification	N/A		
Compaction	I	GAEC 5 land management conditions to limit erosion could be defined in a way that would limit compaction	
Contamination - Diffuse	N/A for soil GAECs (but SMR 1 and GAEC 1 are relevant)		Mention this in water policy cluster
Contamination - point source	N/A for soil GAECs (but GAEC 3 is relevant)		Mention this in water policy cluster
Desertification	N/A for soil GAECs (but GAEC 7 is relevant)		
Erosion - water	E	GAEC 5 standards are specifically to limit erosion. GAEC 4 standards for soil cover, depending on when and where they apply, could also contribute to limiting erosion	No distinction between water and wind erosion in the Regulation
Erosion - wind	E	GAEC 5 standards are specifically to limit erosion. GAEC 4 standards for soil cover, depending on when and where they apply, could also contribute to limiting erosion	No distinction between water and wind erosion in the Regulation
Flooding/landslides	I	Indirectly, by reducing soil erosion (which reduces the capacity of drainage channels), by slowing run-off (maintaining soil OM and soil cover) and by retaining landscape features	
Loss of soil biodiversity	I	GAEC 4 maintaining soil cover and GAEC 6 maintaining soil OM may reduce the loss of soil biodiversity but other factors (for example use of PPP) may affect this	
Loss of soil organic matter	E	GAEC 6 standards are specifically to maintain soil OM. GAEC 4 standards for soil cover, depending on how the cover is managed, could also contribute to maintaining soil OM (e.g. if the green cover is permanent, or is incorporated in the soil before the next crop is established)	
Salinisation	N/A for soil GAECs (but GAEC 2 is relevant)		

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the policies coverage of the soil threats
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Any issues, comments or questions you have regarding the policies coverage of the soil threats
Carbon Pool	I	GAEC 6 standards are specifically to maintain soil OM. GAEC 4 standards for soil cover, depending on how the cover is managed, could also contribute to maintaining soil OM (e.g. if the green cover is permanent, or is incorporated in the soil before the next crop is established)	
Platform for Human Activities	I	GAEC standards are intended to protect soils on agricultural land	
Biomass production	N/A		
Hosting biodiversity	I	GAEC 4 maintaining soil cover and GAEC 6 maintaining soil OM may reduce the loss of soil biodiversity but other factors (for example use of PPP) may affect this	
Providing raw materials	N/A		
Storing, filtering and transforming nutrients and water	N/A for soil GAECs (but SMR 1 and GAEC 1, 2 and 3 are relevant)		
Storing geological and archeological heritage	I	Landscape features protected under GAEC 7 may be of historic or archaeological interest	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Applies to agricultural land on almost all farms that benefit from CAP Pillar 1 direct payments and/or agricultural land management payments under RDPs;
- Two of the four GAEC standards considered here directly address the need to limit soil erosion and to maintain soil organic matter, and the remaining two have potential benefits for these needs;

- In defining the standards for each GAEC a Member State is required to take into account the specific characteristics of the areas concerned, including soil and climatic conditions;
- Member States are required to set up a Farm Advisory Service (FAS) which must cover inter alia 'the standards for GAEC' (Article 12 of Regulation 1306/2013). In case of non-compliance with cross-compliance rules, Member States may give beneficiaries concerned preferential access to the FAS (Article 99 of Regulation 1306/2013).

Weaknesses - are there aspects limiting the protection afforded?

- Of the four GAEC standards considered here, the EU framework defines minimum requirements only for GAEC 6 (where the minimum requirement for maintenance of soil organic matter is a ban on burning arable stubbles);
- The farmer or land manager who is the beneficiary of the CAP payments bears the financial risk of non-compliance.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Implementation of 'best practice' standards appropriate to their soils and conditions, by all Member States;
- Define minimum requirements for all GAEC soil standards and strengthen GAEC 6 the soil organic matter standard. (The draft legislative texts for the 2013 CAP Regulations included another GAEC soil standard for the 'protection of wetland and carbon rich soils including a ban of first ploughing⁶⁹ which would have applied to non-arable agricultural land, but this proposed standard was rejected during negotiations. It was to some extent replaced by the greening requirements for designating ESPG but this is discretionary for Member States on land outside Natura 2000 areas, and therefore weaker than the original proposal.)

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the policy itself, the risks are mainly in Member State implementation.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Significant, justified variation can be expected when Member States:

- define standards suited to the soil, climatic and farming conditions of their area
- choose to implement soil protection mainly through greening and/or RDP measures, and to define minimal GAEC standards
- Other variations may occur as a result of CAP implementation choices made by Member States, unrelated to the risks of and need for soil protection.

⁶⁹ Ploughing of wetland and carbon rich land which has been defined in 2011 at the latest as arable land in accordance with Article 2 point (a) of Regulation (EC) No 1120/2009 and which complies with the definition of arable land as laid down in Article 4 point (f) of the Regulation (EU) No DP/xxx shall not be considered as first ploughing.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

None found.

Some of the planned studies and evaluation reports 2016-20 by DG Agriculture that may be relevant to some aspects of GAEC implementation include the following (for more information see http://ec.europa.eu/agriculture/evaluation/plan_en.pdf)

2015:

A study (not an evaluation) 'mapping and analysis of the implementation of the CAP'

2016:

Framework contract for the evaluation studies of CAP measures contributing to the general objective "sustainable management of natural resources and climate action"

Evaluation of the forestry measures under the rural development policy

2017:

Evaluation of the impact of the CAP on climate change and greenhouse gas emissions

2018:

Evaluation of the impact of the CAP on habitats, landscapes and biodiversity (under FC-2)

Evaluation of the impact of the CAP on water

A study (not an evaluation) 'mid-term review of the EU Forest Strategy'

2019-2020:

Evaluation of the impact of the CAP towards the general objective "sustainable management of natural resources and climate action"

Mapping and analysis of the implementation of the CAP

Section 3 - Base Information – Effort Sharing Decision

European Parliament and Council Regulation (EU) No 1306/2013 (Articles 93, 94 and Annex II), Commission Delegated Regulation (EU) No 640/2014 and Commission Implementing Regulation (EU) No 809/2014.

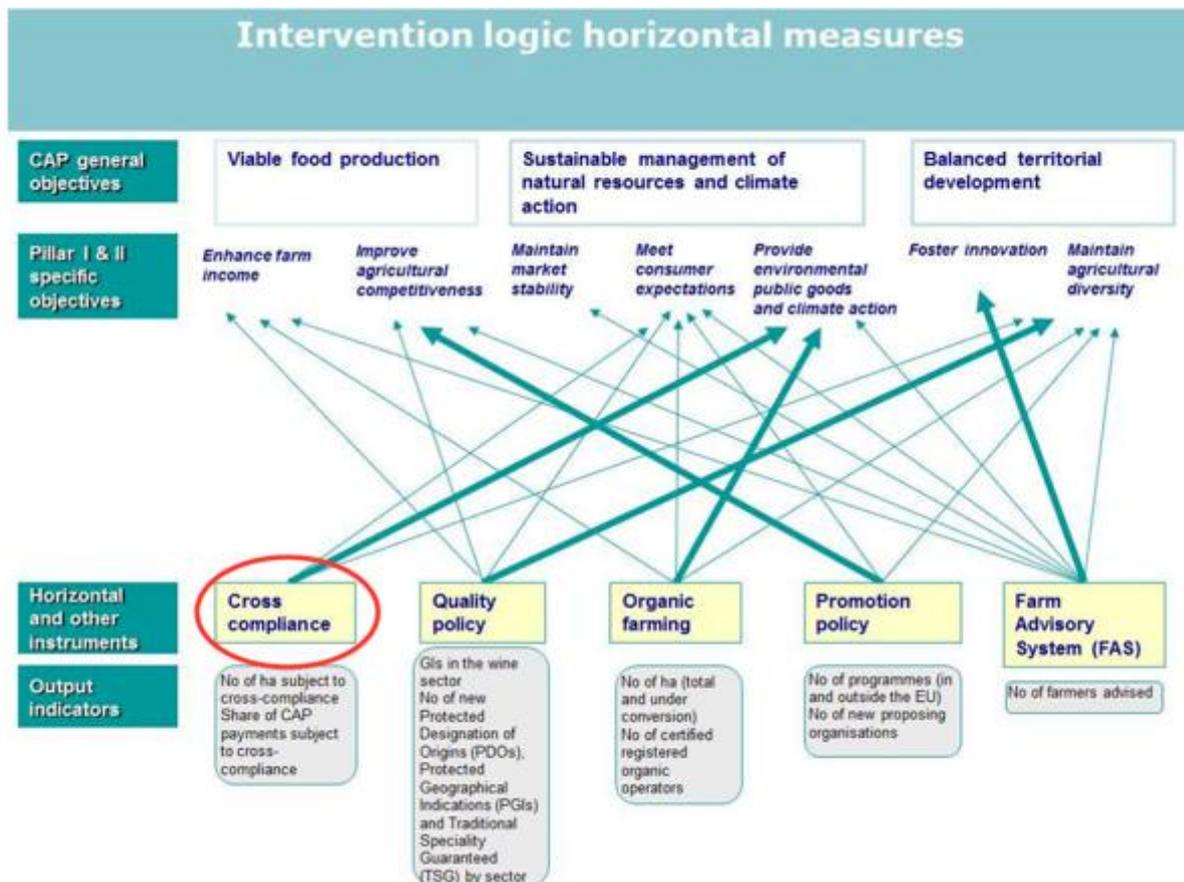
Entry into force

18 March 2014 (Regulation 1306/2014) but applies to aid applications or payment claim relating to claim years or premium periods starting from 1 January 2015.

Aims of the policy and its relevance to soil protection

Objectives

To ensure that all of the agricultural area, including land which is no longer used for production purposes, is maintained in good agricultural and environmental condition.



Spatial coverage and management unit

EU-28 agricultural land managed by farmers receiving certain CAP payments. The basic management unit is the farm holding defined as “all the units used for agricultural activities and managed by a farmer situated within the territory of the same Member State” (in Article 4 Regulation 1307/2013).

Relevance to soil protection

The policy is relevant to soil protection because the framework for the seven GAEC standards in Annex II to Regulation 1306/2013 includes three standards specifically for soil protection and a further standard for landscape features that can also be relevant to soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Direct: (considered to be some form of explicit reference to soil or land)

There are three specific GAEC standards for ‘soil and carbon stock’ in the cross-compliance framework in Annex II to Regulation 1306/2013 for the system. GAEC 4: Minimum soil cover; GAEC 5: Minimum land management reflecting site specific conditions to limit erosion; and GAEC 6: Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons.⁷⁰

⁷⁰ The requirement can be limited to a general ban on burning arable stubble, but a Member State may decide to prescribe further requirements.

Indirect: (considered to be implicit links to soil)

A fourth standard GAEC 7 for the retention of landscape features, including where appropriate hedges, ponds, ditches, trees in line, in group or isolated, Field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species.

Soil threats addressed by the policy

Explicitly: Subject to Member States’ and regions’ definition of GAEC standards, these could address directly the threats of:

- soil erosion
- loss of organic matter

Implicitly: Subject to Member States and regions’ definition of GAEC standards, these could address indirectly the threats of:

- compaction
- contamination - diffuse
- desertification
- erosion - water
- erosion - wind
- flooding/landslides
- loss of soil biodiversity
- loss of soil organic matter
- salinisation
- soil sealing

Soil-focused targets and/or expected impacts

Direct soil-focused targets	Indirect soil-focused targets	Soil-focused expected impacts
Not applicable	Not applicable	Not applicable

Such direct soil-focused targets cannot be expected from cross-compliance as they go beyond the scope of this CAP instrument (see recital 54 of Regulation (EU) No 1306/2013).

Mandatory requirements and voluntary options for Member States

As stated in the Regulation ‘Member States must ensure that all the agricultural area, including land which is no longer used for production purposes, is maintained in good agricultural and environmental condition. Member States shall define, at national or regional level, minimum standards for beneficiaries for good agricultural and environmental condition of land on the basis of Annex II, taking into account the specific characteristics of the areas concerned, including soil and climatic condition, existing farming systems, land use, crop rotation, farming practices, and farm structures. Member States shall not define requirements outside the scope of Annex II.’ (Article 94, Regulation 1306/2013).

Key soil-relevant instruments

Mandatory

All Member States must define GAEC standards 4, 5, 6 and 7 for agricultural land and must apply penalties to direct and other land management payments under the CAP if the beneficiaries fail to comply with the GAEC standards on their whole holding. While GAECs have to be defined taking into account specific local conditions, Member States have a margin of manoeuvre on how to meet this obligation.

Voluntary

Set up a Farm Advisory Service which covers GAEC obligations.

30 Rural Development support under the CAP

REGULATION (EU) No 1305/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) [and related acts – see section 3]

Section 1 - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

All Member States must prepare for Commission approval, then implement and monitor, a seven-year rural development programme for 2014-20 at national and/or regional level, which will be partly funded by the EAFRD and co-financed by the Member State's national and/or regional authorities. The EAFRD Regulation defines six EU level priorities (each with several focus areas) of which an RDP must address at least four. The relationship with soil protection is potentially strong because two focus areas are specifically relevant to soil protection: 4C 'preventing soil erosion and improving soil management and 5E 'fostering carbon conservation and sequestration in agriculture and forestry'. There are 19 RDP measures from which Member States may choose (only the agri-environment-climate measure and the Leader approach are compulsory), and at least 30 per cent of the EAFRD contribution to each RDP must be reserved for measures relevant to climate change mitigation and adaptation and the environment. Member States can design and target sub-measures to suit their specific circumstances.

This is one of the most flexible of all EU policies with a high degree of subsidiarity which enables a Member State or region, if it considers soil protection to be a priority, to choose and tailor measures specifically addressing soil threats and needs. These can include for example environmental land management for both agriculture and forestry; support for afforestation, agroforestry, investments in carbon-saving technologies and equipment; as well as 'soft' measures such as advice, training, information and innovation.

The flexibility of the RDP legislation is therefore both a strength and a potential weakness, depending on how Member States choose to implement it and which needs they consider as their priority. However, this potential weakness is limited by the fact that Member States have to respond to at least some of the EU rural development priorities and that their selection of priorities is solidly based in the assessment of the problems and needs identified in the territory concerned. In practice, Member States and regions have a wide variety of demands on their RDP funding which they must prioritise within a pre-set allocation of EAFRD support. The extent to which an individual RDP provides real soil benefits will depend not just on the choice of focus areas and allocation of budgets, but also on the extent to which measures and sub measures are specifically designed and targeted to address identified threats and priorities.

Description of the RDP support

EU rural development policy forms Pillar 2 of the CAP and is funded via the EAFRD. Its overall aim is to promote sustainable rural development in a way that contributes to the development of a more territorially and environmentally balanced, climate-friendly and resilient, competitive and innovative agricultural sector and of overall rural areas. All Member

States must prepare for Commission approval, implement and monitor a rural development programme (RDP) at national and/or regional level – there are 118 RDPs in total in the period 2014-2020. In contrast to Pillar 1 of the CAP, which is wholly financed by the EAGF, RDPs are partly funded by the EAFRD and co-financed by the Member State's national and/or regional authorities.

The EAFRD Regulation defines six EU level priorities of which the RDP must address at least four, and within each priority there are several focus areas (18 in total). There are 19 measures from which Member States may choose (only the agri-environment-climate measure and the Leader approach are compulsory), and at least 30 per cent of the EAFRD contribution to each RDP must be reserved for measures relevant to climate change mitigation and adaptation and the environment.

This is one of the most flexible EU policies with a high degree of subsidiarity which enables Member States to choose and tailor measures specifically addressing soil threats and needs. These can include for example environmental land management for both agriculture and forestry; support for afforestation, agroforestry, investment in carbon-saving technologies and equipment; and 'soft' measures including advice, training, information and innovation. All of these have the potential to address soil issues, but there is no obligation to do so, although during the process of approving the RDP the European Commission is likely to question the absence of soil relevant measures if the Member State has identified soil needs in the SWOT analysis.

The relationship with soil protection is potentially strong because the legislation defines two focus areas specifically relevant to soils: 4C 'preventing soil erosion and improving soil management and 5E 'fostering carbon conservation and sequestration in agriculture and forestry'. If these are chosen, the RDP must define target indicators for the amount of land under 5-year contracts aiming to achieve these two focus areas and, in the case of 5E (but not 4C), allocate indicative total RDP expenditure to the focus area for the seven-year period. However, the relationship of land management contracts and budgets to specific priorities and focus areas is not necessarily clear-cut in practice. There are several reasons for this, because expenditure under specific measures and sub-measures could be designed to deliver benefits against several different focus areas (e.g. an agri-environment contract for converting arable land to grassland, or an investment in new agroforestry systems, would be likely to benefit not just focus areas 4C (soil management) and 5E (carbon conservation and sequestration) but also biodiversity (4A) and water quality (4B). Similarly, the area of land under contract in these examples could be attributed to several different target indicators. These decisions are a matter of judgement for the management authority, and anecdotal evidence suggests that this may also be influenced by the relative difficulty of monitoring different RDP indicators. In practice, Member States and regions have a wide variety of demands on their rural development funding which they must prioritise. The extent to which an RDP can provide real soil benefits will depend not just on the choice of focus areas and allocation of budgets, but also on the extent to which measures and sub-measures are specifically designed and targeted to address identified threats and priorities. Also, the flexibility of the legislation allows managing authorities to design a coherent package of different measures to address specific needs and, if necessary, to target this at particular land management systems or geographical areas. Although each RDP identifies which measures will be used for each focus area it is not clear to what extent, if at all, these are offered to land managers as coherent package 'at the farm or forest gate'. The flexibility of the RDP

legislation is therefore both its strength and its weakness, depending on how (or if) Member States choose to implement it in a way that gives priority to soil protection. However, this potential weakness is limited by the fact that Member States have to respond to at least some of the EU rural development priorities and that their selection of priorities is solidly based in the assessment of the problems and needs identified in the territory concerned.

Relevance to soil protection

Of the 19 measures in the EAFRD Regulation the following are judged to have the greatest potential to address soil threats (it is possible that actions under other measures could be relevant too):

M1: Knowledge transfer and information actions

Optional: can support vocational training, demonstration activities, Information provision, farm and forest management exchanges and visits.

M2: Advisory services, farm management and farm relief services

Partly obligatory: this measure funds part of the cost of the CAP Farm Advisory Service (FAS) which Member States must provide, covering at least one of the following: cross compliance; greening requirements; RDP measures to improve economic performance; obligations under the WFD; requirements for integrated pest management; farm safety; advice for first-time farmers.

Optional: can support additional advisory services helping farmers, forest holders and other land managers to improve the economic and environmental performance as well as climate friendliness and resilience of their holding or enterprise; can also support training of advisors.

M4: Investments in physical assets

Optional: can support tangible and intangible investments aimed at improved performance and sustainability of farms, processing and marketing, farm and forest infrastructure, energy and water supply/saving and non-productive environmental investments linked to agri-environment-climate objectives, Natura 2000 or other high nature value systems.

M5: restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention

Optional: can support investments in preventive actions to reduce consequences of probable natural disasters and adverse climatic events as well as investments to restore agricultural land damaged by such disasters and events.

M6: Farm and business and development

Optional: investment support and other payments aimed at young farmers, small farms and setting up non-agricultural businesses.

M7: Basic services and village renewal

Optional: a wide range of support including investment in small-scale renewable energy, energy saving environmental performance and awareness and protection and management plans for Natura 2000 and other high nature of value areas.

M8: Investment in the forest area development and improvement of the viability of forests

Optional: support for wide range of investments for inter alia: afforestation and creation of woodland; establishing new agroforestry systems; prevention and restoration of damage to

forests from fires, natural disasters and climate related threats; and improving the resilience, environmental value and mitigation potential of forest ecosystems. For holdings above a certain size a forest management plan is required, in line with the principles of sustainable forest management (see also the fiche on the EU Forest Strategy).

M10: Agri-environment-climate

Compulsory; this is the only measure that must be made available throughout the Member State's territory, in accordance with national, regional or local specific needs and priorities. It offers farmers and other land managers multi-annual contracts for agricultural practices that make a positive contribution to the environment and climate. The baseline above which payments are calculated includes CAP cross-compliance requirements, and there are strict rules to avoid double funding of actions that are also greening options, such as grass buffer strips on arable land.

M11: Organic Farming

Optional: offers annual payments through multi-annual contracts for conversion to and/or maintenance of organic farming methods.

M12: Natura 2000 and Water Framework Directive

Optional: basic compensatory payments applying to an area where there are restrictions on land management related to farm-level requirements under the WFD river basin management plans or under Natura 2000 designations on agricultural and forest areas.

M13: Areas facing Natural Constraints (ANC)

Optional: basic payments for farmers in mountain and areas in other areas where there are natural constraints on agricultural production.

M15: Forest-environment-climate

Optional: similar to M10, offers multi-annual land management contracts to improve environmental and climate management of forests and other wooded land

M16: Cooperation

Optional: support for a wide range of cooperative activities by different actors and sectors, new clusters and networks; supports the establishment of operational groups linked to the work of the European Innovation Partnership for agricultural productivity and sustainability (EIP-Agri). At EU level EIP-Agri has set up a number of Focus Groups relevant to soil protection, including those on: agroforestry, Ecological Focus Areas, fertiliser efficiency, forest biomass, organic farming, permanent grassland, precision farming and soil organic matter. Each group explores practical innovative solutions to problems or opportunities in the field, and draws on experience derived from related useful projects. The EIP-AGRI Focus Groups also discuss and document research results, best practices and identify the implications for further research activities that will help to solve practical problems in the sector. These may be related to production, processing, consumption, transport or other issues. Each EIP-AGRI Focus Group meets twice and produces a recommendations and outcomes report.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threats	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of the soil threats
Acidification	I	M1, M2, M10 and M11	
Compaction	I	M1, M2, M4, M6, M8, M10, M15 and M16	
Contamination – Diffuse	I	M1, M2, M4, M6, M10, M15 and M16	
Contamination - point source	I	M1, M2, M4, M6, M8, M10, M15 and M16	
Desertification	I	M1, M2, M4, M6, M8, M10, M12, M13 M15 and M16	
Erosion - water	E	M1, M2, M4, M6, M8, M10, M12, M15 and M16	No distinction between water and wind erosion in the Regulation
Erosion - wind	E	see above	see above
Flooding/landslides	I	M1, M2, M4, M6, M8, M10, M12, M15 and M16	
Loss of soil biodiversity	I	M1, M2, M4, M6, M8, M10, M11, M15 and M16	
Loss of soil organic matter	I	M1, M2, M4, M6, M8, M10, M11, M15 and M16	
Salinisation	I	M1, M2, M4, M6, M10, M15 and M16	
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Functions	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil functions
Carbon Pool	I	M1, M2, M4, M6, M8, M10, M11, M15 and M16	
Platform for Human Activities	I	M1, M2, M4, M6, M8 and M16	
Biomass production	I	M1, M2, M4, M6, M8 and M16	
Hosting biodiversity	I	M1, M2, M4, M6, M8, M10, M11, M15 and M16	
Providing raw materials	?	M1, M2, M4, M6, M8 and M16	
Storing, filtering and transforming nutrients and water	I	M1, M2, M4, M6, M8, M10, M12, M15 and M16	
Storing geological and archaeological heritage	I	M1, M2, M4, M10, M15 and M16	

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Member States/regions have a wide choice of EU priorities, focus areas and measures, which allows them the flexibility to address their specific soil needs in a targeted way;
- If chosen, priorities 4C (preventing soil erosion and improving soil management) and 5E (fostering carbon conservation and sequestration in agriculture and forestry) are directly relevant to soil threats and functions, and the RDP has to set targets for land under contract to address these focus areas;
- If 4C and 5E are not specifically chosen all priorities must contribute to cross-cutting objectives of environment and climate-change mitigation and adaptation, and at least 30% of the EAFRD contribution to the RDP must be reserved for M4 (environment and climate investment only); for M8, M10, M11 M12 (Natura 2000 only), M13 and M15;

Offers scope to tailor and target soil measures very specifically to needs and opportunities within the Member State or region, including multi-annual land management contracts with individual land managers, investment support and knowledge transfer and advisory services;

- EU wide implementation of RDPs on 7-year cycles;
- Additional CAP funding can be transferred by the Member State from its Pillar 1 direct payments budget to the RDP budget.

Weaknesses - are there aspects limiting the protection afforded?

In contrast to CAP Pillar 1 direct payments, the EU funding contribution to RDPs has to be co-financed by the national and /or regional government of each Member State;

- Member States can choose to move CAP funding from RDPs to Pillar 1 direct payments;
- No obligation for Member States to use focus areas 4C or 5E to address soil needs; but they have an obligation to respond to the needs and problems identified in their SWOT analysis

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- Opportunity to use EIP focus areas and operational groups for soil-relevant innovation in agriculture and forestry.
- Member States and regions could choose to 'soil and carbon-proof' all RDP investments

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Investment in equipment or infrastructure for other purposes that could damage soils;
- Afforestation of wetlands or carbon-rich soils (outside Natura 2000 areas) that have not been protected by greening
- Limited resources to design, fund and implement well-targeted and effective RDP measures for soil protection
- The implementation gap left by weakly defined Pillar 1 greening measures and GAEC standards having to be filled by RDP funding.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Very significant variation because the policy is designed to be capable of targeting the most important rural development issues within a Member State. This could be highly beneficial for soil protection or have limited impact, depending on the local circumstances and the choices made by Member States/regions of EU priorities and focus areas, measures, targeting and budget allocations.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Monitoring and evaluation

The CMEF requirements of the CAP 2014-20 have specific requirements that apply to RDPs. http://ec.europa.eu/agriculture/cap-post-2013/monitoring-evaluation/index_en.htm

The planned studies and evaluation reports 2016-20 by DG Agriculture that may be relevant to some aspects of RDP implementation include the following (for more information see http://ec.europa.eu/agriculture/evaluation/plan_en.pdf)

2015:

A study (not an evaluation) 'mapping and analysis of the implementation of the CAP'

2016:

Framework contract for the evaluation studies of CAP measures contributing to the general objective "sustainable management of natural resources and climate action"

Evaluation of the forestry measures under the rural development policy

2017:

Evaluation of the impact of the CAP on climate change and greenhouse gas emissions

2018:

Evaluation of the impact of the CAP on habitats, landscapes and biodiversity (under FC-2)

Evaluation of the impact of the CAP on water

A study (not an evaluation) 'mid-term review of the EU Forest Strategy'

2019-2020:

Evaluation of the impact of the CAP towards the general objective "sustainable management of natural resources and climate action"

Mapping and analysis of the implementation of the CAP

Synthesis of ex ante evaluations of rural development programmes 2014 – 2020

http://ec.europa.eu/agriculture/evaluation/rural-development-reports/ex-ante-rdp-synthesis-2014-2020_en.htm

Abstract: This evaluation study concerns the analysis and synthesis of the ex-ante evaluations of Rural Development Programmes and National Rural Network Programmes 2014-2020, with a focus on four evaluation themes: a) process of the ex-ante evaluations, b) intervention logic and internal coherence, c) external coherence and added value and d) six thematic clusters including (i) investments, (ii) knowledge transfer, advisory services and European Innovation Partnership, (iii) agri-environment-climate, (iv) forestry, (v) young farmers, small farmers and areas with natural constraints, and (vi) risk management. The findings incorporated in the study are based on evidence obtained by geographic experts through a) desk research, b) interviews with representatives from the Managing Authorities and c) a survey addressed to Managing Authorities and key stakeholders. The study concludes that the process of the ex-ante evaluations and the external coherence of the RDPs are well documented and satisfactory, while the internal coherence, in terms of needs' prioritisation and description of links between the planned actions - outputs and expected outputs - results, needs to be further enhanced. The dissemination of good practices, especially regarding new measures and co-ordination mechanisms, is highlighted as the key recommendation.

Although the evaluation questions do not specifically address soil protection, some of the conclusions may be relevant to RDP design and implementation.

Section 3 - Base Information

Summary

Please see synopsis above for summary of coverage and implementation requirements.

Entry into Force

Applicable from 1 January 2014.

EU Legislation

Main Acts

The basic act that sets out the specific rules relating to the EAFRD for rural development programming.

- Regulation (EU) n° 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

The "Common Provisions" Regulation provides for a shared set of basic rules applying to all European Structural and Investments Funds (ESIFs) including the EAFRD.

- Regulation (EU) No 1303/2013 of the European parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006

The so-called "Horizontal" Regulation provides the financial management rules for the two CAP funds, the European Agricultural Guarantee Fund (EAGF) which finances market measures and direct payments, and the EAFRD which finances support to rural development. It brings together the rules on cross compliance, farm advisory systems and monitoring and evaluation of the CAP.

- Regulation (EU) n° 1306/2013 of the European Parliament and of the Council on the financing, management and monitoring of the common agricultural policy.

Delegated acts and implementing acts

Delegated acts supplement or amend legislative acts in relation to elements that are not considered essential, while implementing acts are adopted by the Commission to ensure that legislative acts are applied in a uniform way in all Member States.

- Commission Delegated Regulation (EU) No 807/2014 of 11 March 2014 supplementing Regulation (EU) No 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and introducing transitional provisions
- Commission Implementing Regulation (EU) No 808/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)
- Commission Delegated Regulation (EU) No 640/2014 of 11 March 2014 supplementing Regulation (EU) No 1306/2013 of the European Parliament and of the Council with regard to the integrated administration and control system and

conditions for refusal or withdrawal of payments and administrative penalties applicable to direct payments, rural development support and cross compliance

- Commission Implementing Regulation (EU) No 809/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1306/2013 of the European Parliament and of the Council with regard to the integrated administration and control system, rural development measures and cross compliance

Policy Field

Integration/coordination issues with other related pieces of legislation

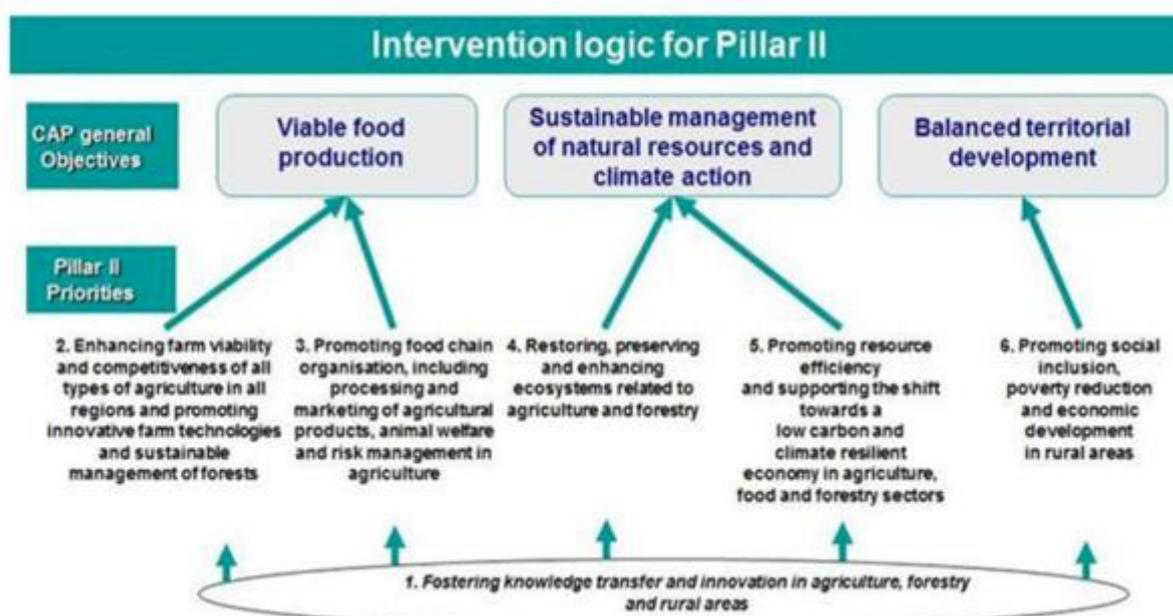
Linked to:

- CAP cross-compliance, which applies to environmental land management payments on farm holdings (M10, 11, 12 and 13) and forms the baseline for calculating these payments;
- CAP greening payments are linked to M10 (agri-environment-climate payments), which may be used as equivalence to greening payments but must be designed to ensure that there is no double funding of greening and measure 10 payments;
- Water Framework Directive river basin management plans through M12;
- Habitats and Species Directives through M12;
- EU Forest Strategy (indirectly) through M8 and M15;

Aims of the policy and its relevance to soil protection

Objectives

The EAFRD aims to provide “within the overall framework of the CAP, support for rural development, including for activities in the food and non-food sector and in forestry, shall contribute to achieving the following objectives: (a) fostering the competitiveness of agriculture; (b) ensuring the sustainable management of natural resources, and climate action; (c) achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment”.



Spatial coverage and management unit

The overall implementation of RDPs is either at national or regional level (usually NUTS 2). The federal Member States of Germany, Italy, Spain, the UK and Belgium all have regional RDPs (and in the case of Germany, Spain and Italy national RDPs too). France also has both national and regional RDPs.

Each RDP is designed, implemented and monitored by a Managing Authority, and has a Payment Agency that administers CAP and RDP payments and checks compliance (although some of these functions may be delegated to other government agencies).

Relevance to soil protection

Please see synopsis above for relevance to soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

There are six priorities which have been determined for rural development in the EU, and the Member States must include at least 4 of the 6 in their RDPs. They are:

- fostering knowledge transfer and innovation in agriculture, forestry, and rural areas;
- enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and the sustainable management of forests;
- promoting food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture;
- restoring, preserving and enhancing ecosystems related to agriculture and forestry;
- promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors; and
- promoting social inclusion, poverty reduction and economic development in rural areas.

Direct: (considered to be some form of explicit reference to soil or land)

Within Priority 4 “restoring, preserving and enhancing ecosystems related to agriculture and forestry” the Focus Area C “preventing soil erosion and improving soil management”

Within Priority 5 “promoting resource efficiency in supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors” the Focus Area E “fostering carbon conservation and sequestration in agriculture and forestry” is considered directly relevant soil because it would promote the use of practices or changes in land use which increase soil carbon sequestration.

Indirect: (Considered to be implicit links to soil)

Focus Area 4C “Restoring, preserving, and enhancing biodiversity, including in Natura 2000 areas, and in areas facing natural or other specific constraints, and high nature value farming, as well as the state of European landscapes” could indirectly protect or enhance of soil biodiversity and organic matter.

Focus Area 4B “improving water management, including fertiliser and pesticide management” could have indirect soil benefits for reduced erosion and diffuse pollution, retention of organic matter and flood prevention.

Soil threats addressed by the policy

Explicitly: Subject to Member States and regions' choice of priorities, focus areas and their design and targeting of specific measures, RDPs could address directly the threats of:

- soil erosion
- loss of organic matter

Implicitly: Subject to Member States and regions' choice of priorities, focus areas and their design and targeting of specific measures, RDPs could address directly the threats of: compaction, contamination – diffuse, contamination - point source, desertification, flooding/landslides, loss of soil biodiversity, salinisation

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None at EU level, but if RDPs include 4C and 5E in their priorities and use land management contracts to deliver these, then they must set indicative targets for uptake area.	None at EU level, but if RDPs include 4C and 5E in their priorities and use land management contracts to deliver these, then they must set indicative targets for uptake area.	None at EU level

Mandatory requirements and voluntary options for Member States (types of management measures)

Please see synopsis above for mandatory requirements and voluntary options relevant to soils that are available to Member States/regions in designing, implementing and monitoring their RDPs.

Key soil-relevant instrumentsMandatory (at MS level)

M10 for agri-environment-climate contracts

M2 (Farm Advisory Service only)

Voluntary

M1: Knowledge transfer and information actions

M2: Advisory services, farm management and farm relief services

M4: Investments in physical assets

M6: Farm and business and development

M7: Basic services and village renewal

M8: Investment in the forest area development and improvement of the viability of forests M10: Agri-environment-climate

M11: Organic Farming

M12: Natura 2000 and Water Framework Directive

M13: Areas facing Natural Constraints (ANC)

M15: Forest-environment-climate

M16: Cooperation

31 European Regional Development Fund

Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

As for other funding instruments the ERDF fund offers the opportunity to invest in soils, however, in the absence of specific policy drivers demanding soil protection and also given the choice within the instrument regarding prioritising spending there is a question over how much support is actually delivered for soil protection. The funding does offer a potentially important source of funding to enact positive change in soil condition but soil issues and their importance would need political support.

Funding is available in all Member States and the link to low carbon economy priorities is potentially important in terms of soils' role as a carbon pool. However, given that there are targets in relation to other low carbon priorities at EU level, in particular for renewable energy, it is less likely that soil will receive support. In the future, as land use and agricultural emissions are prioritised in the post 2020 climate targets, there is a possibility that funding priorities may alter in future funding periods.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

Note that the fund references soil protection generically both in terms of protecting and restoring biodiversity and soil and promoting ecosystem services and through promoting innovative technologies with regard to soils. Therefore while limited explicit references are made there is a potential for the fund to support action on soil protection.

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification			
Compaction			
Contamination - diffuse	I	There is a potential link made between support to limit urban air pollution and deposition on soils	
Contamination – point source	E	Formal reference is made to the decontamination of brownfield sites linked to urban regeneration	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Desertification			
Erosion - water			
Erosion - wind			
Flooding/ landslides	I	The fund allows investment to address specific risks, ensuring disaster resilience and developing disaster management systems. This is linked to climate adaptation and potentially to floods/landslide events	
Loss of soil biodiversity			
Loss of soil organic matter			
Salinisation			
Soil sealing			

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and functions, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of soil functions
Carbon pool	I	The fund supports actions both to adapt to and mitigate against climate change, both would potentially relate to promotion of the C Pool	
Platform for human activities			
Biomass production			
Hosting biodiversity	E	The policy specifically supports actions to promote biodiversity and links soil, biodiversity and delivery of ecosystem services	
Providing raw materials			
Storing, filtering and transforming nutrients and water	I	The fund allows investment to address specific risks, ensuring disaster resilience and developing disaster management systems linked to climate adaptation. This would include potentially issues of water storage and filtration in relation to floodings	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The policy provides an opportunity to provide funding to improve soil status both through addressing contamination and through 'promoting protecting and restoring biodiversity and soil and promoting ecosystem services (c,iii) which is directly relevant to a wider range of soil threats and functions'. It also promotes urban brownfield decontamination and other actions that may reduce soil contamination specifically in urban areas. Moreover the emphasis on climate action and the emphasis on low carbon economy projects in the balancing of the budget may also promote improvements of soils by supporting carbon sequestration.
- The fund is available across all MS, although focuses more on less developed regions and the emphasis on low carbon investment is increased in more developed regions.

Weaknesses - are there aspects limiting the protection afforded?

- As for other funding streams soil protection projects are competing for funding against a large number of other priorities. Moreover the lack of policy driver or target might mean that action may be deprioritised compared to other issues for example there is a current target for renewable energy, and an indicative target for energy efficiency therefore there is a potential driver to use investment allocated to climate to fulfil these priorities rather than more complex questions of securing soil sequestration, SOM and soil carbon.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- This is an opportunity to provide funding for positive change in soil status in particular linked to provision of ecosystem services. There are clear opportunities for addressing some urban contamination and also potentially issues linked to flooding through adaptation disaster prevention activities. Shifts towards taking more account of land use/agricultural emissions within EU policy may be reflected in funding decisions moving forward pushing more investment towards positive soil outcomes.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- There is a clear competition for potential funds with other priorities. The lack of a clear soil priority at EU level means soil issues may be overlooked or soil solutions will always be framed to deliver other policy priorities meaning that the needs of good soil quality may not always be met.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

The Cohesion Fund is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average. It aims to reduce economic and social disparities and to promote sustainable development. It specifically targets the following Member States for environmental and transportation infrastructure development: BG, CZ, EL,

ES, HR, CY, LV, LT, HU, MT, PL, PT, RO, SI, SK. Therefore funding is only available related to the priorities for a limited number of MSs.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Details of funding spending for the current period can be found at http://ec.europa.eu/regional_policy/en/funding/available-budget/; however, no specific details on spending on soil related issues could be identified.

Section 3 - Base Information

Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal

Summary

The European Regional Development Fund is dedicated to the sustainable development and structural adjustment of regional economies.

Entry into Force

17. December 2013

Policy Field

Integration/coordination issues with other related pieces of legislation

"The ERDF focuses its investments on several key priority areas. This is known as 'thematic concentration':

- innovation and research;
- digital agenda;
- support for small and medium-sized enterprises (SMEs); and
- low-carbon economy.

The ERDF resources allocated to these priorities will depend on the category of region:

- in more developed regions, at least 80 % of funds must focus on at least two of these priorities;
- in transition regions, this focus is for 60 % of the funds;
- this is 50 % in less developed regions.

Furthermore, some ERDF resources must be channeled specifically towards low-carbon economy projects:

- More developed regions: 20%;
- Transition regions: 15%; and
- Less developed regions: 12%.”⁷¹

Aims of the policy and its relevance to soil protection

⁷¹ http://ec.europa.eu/regional_policy/en/funding/erdf/

Objectives

Aims to “contribute to the financing of support which aims to reinforce economic, social and territorial cohesion by redressing the main regional imbalances in the Union through the sustainable development and structural adjustment of regional economies, including the conversion of declining industrial regions and regions whose development is lagging behind”.⁷² There are Thematic Objectives set out in the Common Provisions Regulation (EU, 1303/2013) applicable to the Structural Funds which support the investment priorities. They include:

- strengthening research, technological development and innovation;
- enhancing access to, and use and quality of, ICT;
- enhancing the competitiveness of SMEs;
- supporting the shift towards a low-carbon economy in all sectors;
- promoting climate change adaptation, risk prevention and management;
- preserving and protecting the environment and promoting resource efficiency;
- promoting sustainable transport and removing bottlenecks in key network infrastructures;
- promoting sustainable and quality employment and supporting labour mobility;
- promoting social inclusion, combating poverty and any discrimination;
- investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure; and
- enhancing institutional capacity of public authorities and stakeholders and efficient public administration.

Spatial coverage and management unit

Covers the whole EU territory, but the allocations differ based on the development level of the region (more developed, transition, and less developed). The Member State managing authorities as well as urban authorities (e.g., with whom consultation must take place under Article 7(5)) represent the management units.

Relevance to soil protection

The ERDF Regulation explicitly mentions soil protection, restoration and promotion of (soil) resource efficiency in the investment priorities (Art. 5(6)d and f). Moreover, (Art. 5(6)e) and (Art. 5(5)a) may indirectly promote soil protection through preserving and protecting the environment and promoting resource efficiency. However, some investments could potentially also be damaging to soil, if sustainability criteria are not considered (see a detailed explanation below in Section 7).

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Two provisions of the ERDF Regulations are directly relevant to soil protection under the thematic objective of preserving and protecting the environment and promoting resource efficiency and can be supported through the ERDF investments: d) “protecting and restoring biodiversity and soil and promoting ecosystem services, including through Natura

⁷² Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006.

2000, and green infrastructure” and f) “promoting innovative technologies to improve environmental protection and resource efficiency in the waste sector, water sector and with regard to soil, or to reduce air pollution” (Art. 5(6)).

Implicitly: Another provision which could indirectly result in soil protection under the thematic objective of preserving and protecting the environment and promoting resource efficiency is “taking action to improve the urban environment, to revitalise cities, regenerate and decontaminate brownfield sites (including conversion areas), reduce air pollution and promote noise-reduction measures” (Art. 5(6)e). Decontaminating brownfield sites could lead to less toxic substances in the soil (after it has formerly been contaminated), and reduced air pollution (e.g., mercury, ammonia) could potentially less atmospheric deposition onto soils (resulting in contamination). The objective of “climate change adaptation, risk prevention and management” may be accomplished by “supporting investment for adaptation to climate change, including ecosystem-based approaches” (Art. 5(5)a), which may indirectly benefit soil protection through increased sustainable land management practices that support adaptation (e.g., cover crops).

Soil threats addressed by the policy

Explicitly: The soil threats of contamination and sealing are addressed by the investment priority objectives outlined above in the ERDF.

Implicitly: The threat of soil sealing is indirectly addressed through the provisions for sustainable urban development (Articles 7-9), thereby potentially leading to less urban sprawl (paving over soils to convert to residential, infrastructure, commercial, etc). Article 10 may also indirectly address soil **erosion** and landslides in areas with natural handicaps, like mountainous areas, since agricultural production on steeply sloping land could be identified as a specific difficulty there and terracing installation and maintenance could be financed. Land abandonment leading to severe erosion can potentially be attributed to low employment/business opportunities in remote areas, so innovative financing could support new opportunities to maintain rural populations. Potentially some investments into regional areas could contribute to soil sealing, if they do not consider sustainability criteria.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	In Annex I, “Total surface area of rehabilitated land” in hectares is one of the “Common Output Indicators for ERDF Support under the Investment for Growth and Jobs Goal (Article 6)” as well as “Surface area of habitats supported in order to attain a better conservation status”. Both indicators are indirectly aimed at or measuring the extent to which soil (as a component of land and habitats) is either rehabilitated (so reducing degradation from one or multiple soil threats, e.g., loss of SOM and/or biodiversity) or conserved as habitats (e.g., preventing soil contamination, sealing, erosion from poor agricultural land management).

32 European Social Fund

Regulation (EU) No 1304/2013 of the European Parliament and of the Council of 17 December 2013 on the European Social Fund and repealing Council Regulation (EC) No 1081/2006

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The ESF is not focused on environmental issues per say, but the delivery of employment, equality and education, it is tangentially relevant to soil protection only in so much as it supports a ‘shift towards a low-carbon, climate-resilient, resource-efficient and environmentally sustainable economy, through the improvement of education and training systems necessary for the adaptation of skills and qualifications, the up-skilling of the labour force, and the creation of new jobs in sectors related to the environment and energy’. Potentially soil remediation and questions of soil protection, in particular in relation to adaptation skills linked to flood and water management and carbon sequestration in soils are potentially relevant.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	N/A		
Contamination – point source	N/A		
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	I	The fund emphasis on climate adaptation etc may lead to a focus on this	
Loss of soil biodiversity	N/A		
Loss of soil organic matter	N/A		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	The fund supports growth and jobs related to climate adaptation etc	
Platform for human activities	N/A		
Biomass production	N/A		
Hosting biodiversity	N/A		
Providing raw materials	N/A		
Storing, filtering and transforming nutrients and water	I	The fund supports education and employment in relation to climate adaptation	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Potentially offers improvement in education and support for jobs in key sectors related to soil protection – linking protection to economic activity and better understanding of soil's role in environmental protection.

Weaknesses - are there aspects limiting the protection afforded?

- Soil issues are not directly referenced and only tangentially relevant hence there is a risk that these will not be fully integrated.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- There is an opportunity for improved investment and the cyclical nature of funding may mean there are future opportunities. In particular soil decontamination and awareness of contamination issues might be an issue to explore in future

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- That in the absence of a clear soil narrative in policy the importance of soil and its role both in delivering environmental outcomes linked to employment and as a focus for education may be lost.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

It applies across all Member States

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Details of funding spending for the current period can be found at http://ec.europa.eu/regional_policy/en/funding/available-budget/; however, no specific details on spending on soil related issues could be identified.

Section 3 - Base Information

Regulation (EU) No 1304/2013 of the European Parliament and of the Council of 17 December 2013 on the European Social Fund and repealing Council Regulation (EC) No 1081/2006

Summary

The ESF is the European Union's main financial instrument for supporting employment in the EU Member States.

Entry into Force

17 December 2013

Policy Field

Integration/coordination issues with other related pieces of legislation

"For the 2014-2020 period, the ESF will focus on four of the cohesion policy's thematic objectives:

- promoting employment and supporting labour mobility;
- promoting social inclusion and combating poverty;
- investing in education, skills and lifelong learning; and
- enhancing institutional capacity and an efficient public administration.

In addition, 20 % of ESF investments will be committed to activities improving social inclusion and combating poverty. This is known as thematic concentration."⁷³

⁷³ http://ec.europa.eu/regional_policy/en/funding/social-fund/

Aims of the policy and its relevance to soil protection

Objectives

Aimed to “promote high levels of employment and job quality, improve access to the labour market, support the geographical and occupational mobility of workers and facilitate their adaptation to industrial change and to changes in production systems needed for sustainable developments, encourage a high level of education and training for all and support the transition between education and employment for young people, combat poverty, enhance social inclusion, and promote gender equality, non-discrimination and equal opportunities, thereby contributing to the priorities of the Union as regards strengthening economic, social and territorial cohesion”⁷⁴

Spatial coverage and management unit

Covers all EU regions.⁷⁵ The management unit is the MS managing authority (Articles 5, 14, 19).

Relevance to soil protection

The ESF is indirectly relevant to soil protection through the focus on education and employment under the objective below (supporting low-carbon, climate-resilient and an environmentally sustainable economy).

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: No direct soil-focused aims and objectives.

Implicitly: through the focus on education and employment under the objective above (supporting low-carbon, climate-resilient and a environmentally sustainable economy).

Soil threats addressed by the policy

Explicitly: Soil threats are not directly addressed by the measures in the ESF.

Implicitly: Investment under the ESF is intended to contribute to the thematic objectives under the 1303/2013 Common Provision Regulation, which have been integrated into the ESF objectives. One of the objectives is: “Supporting the shift towards a low-carbon, climate-resilient, resource-efficient and environmentally sustainable economy, through the improvement of education and training systems necessary for the adaptation of skills and qualifications, the up-skilling of the labour force, and the creation of new jobs in sectors related to the environment and energy”.⁷⁶ This could indirectly have a soil focus through improved education and training for climate-resilient and resource-efficient soil management. However, there is the potential that negative soil effects could result from increased jobs in and potential expansion of the energy sector, e.g., soil sealing.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	None

⁷⁴ Regulation (EU) No 1304/2013 of the European Parliament and of the Council of 17 December 2013 on the European Social Fund and repealing Council Regulation (EC) No 1081/2006.

⁷⁵ http://ec.europa.eu/regional_policy/en/funding/social-fund/

⁷⁶ ESF Regulation, Article 3(2)(a).

33 Horizon 2020 – EU framework programme for Research and Innovation

Horizon 2020 - The Framework Programme for Research and Innovation - Communication from the Commission – COM/2011/0808

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Horizon 2020 is the European Union programme for research and innovation for 2014-2020 with a budget of €77 billion. The programme provides funding support that may, directly or indirectly, address all EU soil threats and functions. This is done through financing research and innovation projects that contribute to further understanding on soil management practices and soil protection.

The Horizon 2020 programme is a comprehensive funding mechanism of pan-European research and innovation activities, taking place between 2014 and 2020. The budget available is very substantial and, overall, the programme supports also the nexus between research and use of findings on the ground. The outcome in terms of soil protection, however, is dependent upon the specific calls for projects and focus of the research calls. Given the variety of potential projects available, the approaches to soil protection are likely to vary significantly.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	I	By supporting projects to address the Societal Challenges (Part III) that may focus on better understanding of soil management, in relation to food security, sustainable agriculture, and the bio-economy, climate action, resource efficiency and raw materials. Projects in the above areas undertaken by JRC (Part IV) are also relevant. For example, under H2020, several soil-focused projects have been funded recently (i.e. RECARE, DESIRE, DE SURVEY) on Soil, Land Degradation and Management. These have received funding of approximately 31 € and producing several recommendations and best practices linking soil to land	
Compaction	I		
Contamination - diffuse	I		No distinction between diffuse and point source contamination
Contamination – point source	I		See above
Desertification	I		

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Erosion - water		degradation issues (including erosion, loss of soil organic matter, desertification etc.)	No distinction between erosion by water or by wind
Erosion - wind			See above
Flooding/ landslides			
Loss of soil biodiversity			
Loss of soil organic matter			
Salinisation			
Soil sealing			

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool		Through undertaking of projects with a focus on soil management in relation to food security, sustainable agriculture, marine and maritime research and the bio-economy, climate action, resource efficiency and raw materials. Projects in the above areas undertaken by JRC are also relevant	
Platform for human activities			
Biomass production			
Hosting biodiversity			
Providing raw materials			
Storing, filtering and transforming nutrients and water			
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Comprehensive funding mechanism providing support to research and innovation projects between 2014 and 2020, which may provide direct and indirect support to soil protection

Weaknesses - *are there aspects limiting the protection afforded?*

- The extent to which the project will have a positive impact on soil protection depends upon the specification of the project calls

Opportunities - *are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?*

- Very substantial budget available and over a long-term period of time (7 years). In total 77 billion Euro available (excluding EURATOM), whereas 38,5% (29,7 billion Euro) are earmarked to address the Societal Challenges as one of three priorities of the Programme.⁷⁷
- Opportunity to fund pan-European projects with a focus on applicable, technological development and research, which may directly and indirectly support soil protection

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- Not in the instrument itself. However, given the variety of projects that may be funded by it, it may be possible that some projects have a counteractive impact on soil protection.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

Given the variety of potential projects available, the approaches to soil protection are likely to vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

No evaluation reports have been produced as yet. A mid-term evaluation is currently ongoing and the report should be available in 2017. The following complementary documentation may be useful:

Proposal for a Regulation of the European Parliament and Council establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) COM/2011/809 final <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011PC0809>

Proposal for a Regulation of the European Parliament and Council laying down the rules for the participation and dissemination in Horizon 2020 COM/2011/810 <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011PC0810>

⁷⁷ http://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_horizon2020_budget.pdf

Proposal for a Council Decision establishing the Specific Programme implementing Horizon 2020 COM/2011/811 <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011PC0811>

Proposal for a Council Regulation on the research and training programme of the European Atomic Energy Community (2014-18) complementing Horizon 2020 COM/2011/812 <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011PC0812>

Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 294/2008 establishing the European Institute of Innovation and Technology (EIT) COM/2011/817 <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011PC0817>

Proposal for a Decision of the European Parliament and of the Council on the Strategic Innovation Agenda of the European Institute of Innovation and Technology (EIT): the contribution of the EIT to a more innovative Europe COM/2011/822 <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011PC0822>

Section 3 - Base Information

Horizon 2020 - The Framework Programme for Research and Innovation - Communication from the Commission – COM/2011/0808

Summary

Horizon 2020 is the EU Research and Innovation programme providing funding over the period 2014 and 2020. This financial instrument stems from the Innovation Union initiative, a Europe 2020 flagship initiative aimed at fostering Europe's global competitiveness. The overall goal is to ensure Europe produces world-class science, remove barriers to innovation and fosters cooperation between the public and private sector.

This overarching financial mechanism provides funding for research and innovation (see section 3), which can be directly and indirectly relevant to soil.

A work programme for 2016 and 2017 sets out topics, dates and budgets for the period 2016-2017.

Entry into Force

The Communication on the Horizon 2020 programme was published in November 2011, while the programme started in 2014.

Policy Field

Integration/coordination issues with other related pieces of legislation

The Horizon 2020 programme stems from the Europe 2020 flagship initiative and therefore the scope is coordinated with legislation referenced by the initiative.

Aims of the policy and its relevance to soil protection

Objectives

In relation to soil protection, the Horizon 2020 programme for research and innovation aims to contribute to the objectives of the Europe 2020 strategy and to the completion of the European Research Area by supporting projects on improving the understanding of soil management. See Section 4.

Spatial coverage and management unit

The Horizon 2020 programme covers the whole territory of the EU. Project proposals may be submitted by at least three independent legal entities from at least three different EU Member States or Associated countries.

Relevance to soil protection

The Horizon 2020 programme is relevant to soil protection in that it provides funding for research and innovation projects addressing ‘Societal Challenges’ (Part III, see 3.(3)) in the following clusters, as relevant to soil:

“Food security, sustainable agriculture, forestry, marine and maritime research and the bio-economy”

In the context of sustainable agriculture and forestry, due attention is given to increasing production efficiency and coping with climate change, while ensuring sustainability and resilience. To this end, activities in relation to on-farm soil management will be supported, with the aim of increasing soil fertility;

“Climate action, environment, resource efficiency and raw materials”

Soil is considered, inter alia, an environmental resource. Therefore with the aim to sustainably manage natural resources and ecosystems, funding is provided to increase knowledge in sustainable soil management, as part of ecosystems, as well as for effective decision-making and public engagement.

Funding under Part IV of the Horizon 2020 programme – Non-nuclear direct actions of the Joint Research Centre (JRC) – is also relevant to soil protection. Funding to address societal challenges on climate action, resource efficiency and raw material are provided for developing an integrated modelling framework for sustainability assessment based on thematic models including soil. In addition, monitoring of soil conditions as a means to mitigate climate change impacts is explicitly supported by the Horizon 2020 programme.

Depending on the focus of the specific projects, funding for ‘Excellent science (Part I)’ and ‘Industrial Leadership (Part II)’ of the programme may also indirectly contribute to soil protection. The extent of it depends on the individual calls.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The first Horizon 2020 work programme for 2014-2020 of Societal Challenge 2 and Societal Challenge 5 included several topics directly addressing soil-related issues, i.e. SFS-02b-2015: Assessing soil-improving cropping systems, SFS-04-2014: Soil quality and function, SC5-08-2014: Preparing and promoting innovation procurement for soil decontamination, SC5-10b-2014: Structuring research on soil, land-use and land management in Europe. Horizon 2020 supported the Co-Fund ERA-Net BiodivERA3 2015-2016 call on Understanding and managing the biodiversity dynamics of soils and sediments to improve ecosystem functioning and delivery of ecosystem services.

Implicitly: The scope of the Horizon 2020 programme is broad enough to have indirect impact on potentially all soil threats and functions. However this depends on the specifics call for projects.

Soil threats addressed by the policy
Explicitly: N/A
Implicitly: Potentially all

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	Depend on specific calls for projects

Mandatory requirements and voluntary options for Member States (types of management measures)

Multiannual work programmes allows the allocation of funds between the different Parts of the programme. The Multiannual work programme for 2016 and 2017 does not explicitly establish mandatory requirements in relation to soil and soil protection.

Key soil-relevant instruments
Mandatory
 None
Voluntary
 None

34 LIFE Programme

Regulation (EU) No 1293/2013 of the European Parliament and of the Council of 11 December 2013 on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007 Text with EEA relevance

2014/203/EU: Commission Implementing Decision of 19 March 2014 on the adoption of the LIFE multiannual work programme for 2014-17 Text with EEA relevance

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

The Regulation establishes the Environment and Climate Action sub-programmes of the LIFE Programme for the period 2014–2020. The LIFE programme 2014 – 2020⁷⁸ provides funding support to address, mainly indirectly, all EU soil threats and functions, except for acidification and desertification. This is done through financial support to:

- Projects that may focus on i) prevention and remediation actions for soil biodiversity and quality, as a component of the ecosystems; ii) actions for low-carbon and climate resilience / resource efficiency may have relevance to soil in relation to carbon sequestration, flood prevention, water retention and nutrient recycling, erosion;
- Projects aimed at furthering integration of environmental and climate considerations, including soil, into policies that are not explicitly environmentally focused;
- Action by civil society, NGOs and local actors in relation to soil protection.

The LIFE programme is a comprehensive funding mechanism for the support of soil related projects between 2014 and 2020. Member States are free to propose specific projects related to soil, depending on a number of criteria established at EU level. The outcome in terms of soil protection is dependent upon Member States' choice to propose and take forward projects aiming at implementing soil-relevant legislation. Given the variety of projects and activities that are available to Member States, the approaches to soil protection are likely to vary significantly.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

⁷⁸ http://ec.europa.eu/clima/policies/budget/life/index_en.htm

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction			
Contamination - diffuse	I	Under the sub-programme for Environment, the Thematic priorities for Waste (Annex III, letter b) require the European Commission to select projects for better waste management, which could indirectly contribute to reduce soil contamination.	
Contamination – point source	I	See above	
Desertification	N/A		
Erosion - water	I	Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III, (c) (i,ii,iii)) require the European Commission to select projects including activities on forest monitoring and information systems, as well as shifting the system to a green and circular economy. This could indirectly shift patterns of production and priorities impacting on soil erosion.	
Erosion - wind			
Flooding/ landslides	I	Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III (c) (i,ii,iii)) require the European Commission to select projects including activities on forest monitoring and information systems, as well as shifting the system to a green and circular economy. This could indirectly reduce food production and support soil protection through the reduction of floods and landslides.	
Loss of soil biodiversity	I	Under the sub-programme for Environment, the Thematic priorities for Nature and Biodiversity require the European Commission to select projects including activities for the implementation of the Birds and Habitats Directives. This could indirectly support soil protection through the reduction of soil biodiversity loss.	
Loss of soil organic matter	I	Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III (c) (i, ii,iii)) require the European Commission to select projects including activities on forest monitoring and information systems, as well as shifting the system to a green and circular economy. This could indirectly reduce food production and support soil protection through the reduction of soil organic matter loss.	
Salinisation	I	Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III (c) (i)) require the European Commission to select projects including activities shifting the system to a green and circular economy. This could indirectly reduce food production and related land management, contributing to the reduction of soil salinisation.	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		Annex III (a) (iv) of LIFE also highlights “activities to ensure safe and efficient use of water resources, improving quantitative water management, ... and avoiding misuse and deterioration of water resources.”	
Soil sealing	E	Under the sub-programme for Environment, the Thematic priorities for Resource Efficiency (Annex III (c) (ii)) require the European Commission to select projects with activities “for the Soil Thematic Strategy, with special emphasis on [...] compensation of soil sealing [...].”	

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	Through Member States’ undertaking of activities under sub-programme for Climate Action, priority area ‘Climate change mitigation’, this could indirectly contribute to actions for soil sequestration. This could also be supported by mitigation activities for the Soil Thematic Strategy, as well as for forest monitoring and information systems, under sub-programme for Environment, Thematic priorities for Resource Efficiency.	
Platform for human activities	I	Through Member States’ undertaking of activities under sub-programme for Environment, Thematic priorities for Waste and for Resource Efficiency, for the implementation of the Roadmap for a Resource-Efficient Europe and the 7th EAP.	
Biomass production	I	Through Member States’ undertaking of activities under sub-programme for Environment, Thematic priorities for Resource Efficiency, for the implementation of the Roadmap for a Resource-Efficient Europe and the 7th EAP.	
Hosting biodiversity	I	Through Member States’ undertaking of activities under sub-programme for Environment, Priority area Nature and Biodiversity, for the implementation of the Birds and Habitats Directive.	
Providing raw materials	I	Through Member States’ undertaking of activities under sub-programme for Environment, Thematic priorities for Resource Efficiency, for the implementation of the Roadmap for a Resource-Efficient Europe and the 7th EAP.	
Storing, filtering and transforming nutrients and	I	Through Member States’ undertaking of activities under sub-programme for Environment, Thematic priorities for Water, for the implementation of Water Framework	

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
water		Directive, the Floods Directive and the Marine Strategy Framework Directive.	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- Comprehensive funding mechanism providing financial support (approx. €3.4 billion Euro in total)⁷⁹ to priority areas for climate and the environment, including soil protection, between 2014 and 2020;
- The indicative national allocation of projects, including projects on soil, are based on agreed criteria in relation to the total population, population density, as well as total area of Natura 2000 sites in a specific Member State and the overall proportion of a Member State territory covered by Natura 2000 sites.

Weaknesses - are there aspects limiting the protection afforded?

- Despite the European Commission strives to maintain a certain balance in terms of the number of projects and expected outcome for each thematic area, Member States are free to choose which area to focus on;

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- The LIFE 2014 - 2020 regulation provides for “a new category of projects, jointly funded integrated projects, which will operate on a large territorial scale. These projects will aim to implement environmental and climate policy and to better integrate such policy aims into other policy areas”, which may be relevant to soil protection;
- The overall financial envelope for the implementation of the LIFE Programme 2014-2020 is 3,4 billion Euro, 75% of which is allocated to the sub-programme for environment (2,6 billion Euro) and 25% to the sub-programme for climate (864 million Euro)⁸⁰ with opportunities to use a substantial amount for projects and activities supporting the implementation of EU legislation relevant to soil protection;

⁷⁹ <http://ec.europa.eu/environment/life/>

⁸⁰ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2014_116_R_0001 (see 2. Allocation of funds between priority areas and between different types of funding)

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- Not in the policy itself. However, given the variety of projects related to the implementation of EU policies, Member States may choose or implement projects having a counteracting impact on soil protection.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Given the variety of projects and activities that are available to Member States, the approaches to soil protection are likely to vary significantly.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

The LIFE 2014 – 2020 programme is currently ongoing and no evaluation has been carried out to date.

Evaluations of previous programmes can be accessed via: <http://ec.europa.eu/environment/life/publications/lifepublications/evaluation/>

Section 3 - Base Information

Regulation (EU) No 1293/2013 of the European Parliament and of the Council of 11 December 2013 on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007 Text with EEA relevance

2014/203/EU: Commission Implementing Decision of 19 March 2014 on the adoption of the LIFE multiannual work programme for 2014-17 Text with EEA relevance

Summary

The LIFE programme is the EU's funding instrument for the environment and climate action. "The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value. LIFE was launched in 1992 and has completed four programme phases and is currently running the fifth phase from 2014 to 2020.

The LIFE 2014-2020 programme was adopted under Regulation (EC) No 1293/2013⁸¹, which defines the Environment and Climate Action sub-programmes. The Environment sub-programme covers "environment and resource efficiency; nature and biodiversity; and environmental governance and information", and the Climate Action sub-programmes cover "climate change mitigation; climate change adaptation; and climate governance and information". New types of projects are eligible for funding under this programming period as well (jointly funded integrated projects that cover a large territorial area and support the

⁸¹ Regulation (EU) No 1293/2013 of the European Parliament and of the Council of 11 December 2013 on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007. (Further: 'Life Regulation No 1293/2013').

implementation of a targeted environmental plan required by specific Union environmental or climate legislation) and innovative financial instruments for projects.

The LIFE multiannual work programme for 2014 – 2017 was adopted in 2014 and sets out the framework for managing the programme up to 2020. It established a budget of 1.3 billion Euro under the sub-programme for Environment and 430 million Euro billion under the sub-programme for Climate Action⁸², alongside the selection methodology for projects and grants, and outcome indicators for both sub-programmes.

Entry into Force

The 2014 – 2020 LIFE programme entered into force on 1 January 2014.

Policy Field

Integration/coordination issues with other related pieces of legislation

The LIFE 2014 - 2020 regulation provides for “a new category of projects, jointly funded integrated projects, which will operate on a large territorial scale. These projects will aim to implement environmental and climate policy and to better integrate such policy aims into other policy areas.”

A wide body of environmental and related legislation is referenced in the LIFE 2014 – 2020 regulation:

- Habitats Directive Council Directive No 92/43/EEC
- Birds Directive No 2009/147/EC
- Water Framework Directive No 2000/60/EC
- Regulation (EC) No 1290/2005 on the financing of the CAP
- Marine Strategy Framework Directive No 2008/56/EC
- Regulation (EU) No 1291/2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)
- Cohesion Fund Regulation;
- Regulation (EU) No 1303/2013 laying down common and general provisions on different Communities funds such as ERDF, ESF, CF, EAFRD etc. (Common Provisions Regulation);
- Regulation (EU) No 1304/2013 on the European Social Fund.

Aims of the policy and its relevance to soil protection

Objectives

The LIFE programme is aimed at contributing to sustainable development and implementation of the Europe 2020 Strategy, the 7th AEP, and other environmental programmes. It aims to contribute to resource efficiency, low carbon and climate resiliency in the economy of the EU, protect and improve environmental quality and halt biodiversity loss (Art. 3).

Spatial coverage and management unit

⁸² http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2014_116_R_0001 (see 2. Allocation of funds between priority areas and between different types of funding)

The LIFE programme covers the whole of the EU, allocating funding nationally and per type of project in accordance with the criteria at Annex I of the regulation.

Relevance to soil protection

The LIFE programme is relevant to soil protection as it provides funding to projects that may focus on prevention and remediation actions for soil biodiversity and quality, as a component of the ecosystems. In addition, actions for low-carbon and climate resilience / resource efficiency may have relevance to soil in relation to carbon sequestration, flood prevention, water retention, nutrient recycling and erosion.

In relation to policy integration, the LIFE programme supports the further integration of environmental and climate considerations into policies that are not explicitly environmentally focused. This helps increasing the scope of protection and reducing the amount of regulatory conflicts that might arise between policies. However, soil relevance may vary in relation to this objective, depending on the extent to which the integration focuses on soil protection aspects (e.g., better regulation of soil management under building codes to avoid erosion, land use planning that specifically considers soil sealing when developing city zoning and infrastructure, etc.).

Finally, the programme also supports environmental and climate governance, including supporting civil society, NGOs and local actors' involvement in relevant debates. This objective could be relevant to soil protection if the abovementioned actors focus their activities on soil protection.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: The LIFE programme does not refer to specific soil-focused aims or objectives. However, the thematic priorities for Resource Efficiency, under the sub-programme for Environment (Annex III), explicitly include soil-related activities. In particular, it refers to "(ii) activities for the Soil Thematic Strategy [...] with special emphasis on mitigation and compensation of soil sealing, and improved land use."

Implicitly: Beyond the abovementioned, the objectives under the sub-programme for Environment may indirectly result in soil protection as funding is provided for:

- The development of innovative technologies reducing soil impacts, under the Environment and Resource Efficiency thematic area;
- The development of policy and legislation under the Nature & Biodiversity thematic area, as well as the implementation of the Natura 2000 network, with indirect results on soil protection;
- The Environmental Governance and Information priority area, which may also indirectly contribute to better soil protection through awareness raising about sustainable consumption and knowledge sharing on successful solutions and best practices.

As to the sub-programme for Climate Action, it could contribute to soil protection through priority areas:

- Climate change mitigation – plans may include soil carbon sequestration actions reducing soil impacts;

- Climate change adaptation – the use of ecosystem-based approaches for climate adaptation may indirectly result in the change and adaptation of soil management practices increasing water infiltration, soil moisture retention, soil structure and cover;
- Governance and information.
-

Soil threats addressed by the policy

Explicitly: According to the priority area for Environment and Resource Efficiency (Art. 9), the priorities include soil, especially activities contributing to mitigate soil sealing and better land use under the Soil Thematic Strategy (Annex III).

Implicitly: Recital 16 of LIFE regulation links the role of forests with soil impacts. It therefore encourages synergies between forest management and soils, as well as monitoring actions.

The Environment and Resource Efficiency priority area, under the sub-programme for the Environment, aims at preventing forest fires and at monitoring/providing information on forests, which would indirectly support the protection of soils from loss of organic matter, erosion, loss of biodiversity, floods and landslides.

The Circular and Green Economy priority area could also indirectly aim to protect soils (e.g., causing sealing, contamination, erosion, loss of soil organic matter and soil biodiversity) as well as reducing waste streams. Reduction of intensified food production could potentially reduce soil threats of salinisation from irrigation, compaction, soil organic matter loss, erosion, loss of soil biodiversity, and floods.

Better waste management planning as a priority area under the Environment sub-programme may also indirectly increase soil protection from contamination (Annex III).

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
80% of ongoing or finalized projects implementing the objectives of the Union’s policy in the areas of soil protection	Indirect soil-focused indicators may include: The percentage of the Natura 2000 network restored or managed; the amount and type of ecosystems restored and habitats/species conserved – it may benefits soils that are part of the Natura 2000 network, as well as related soil biodiversity; The number of interventions implementing the environmental and climate plans and policies – it may include soil-related projects and interventions; Amount of dissemination and awareness raising actions in relation to climate and the environment – it may include soil-related aspects.	None

Mandatory requirements and voluntary options for Member States (types of management measures)

There are no explicit soil-focused requirements.

In financing LIFE projects, the Member States must ensure complementarity with other policies and priorities of the EU, especially important is the requirement for coordination with the European Structural and Investment Funds to create synergies (particularly with integrated projects). This may benefit soil protection through integrated projects with the European Regional Development Fund (ERDF) on infrastructure development, for instance, while protecting habitats and perhaps soils within those ecosystems in particular. The types of funding which may be administered are grants, public procurement, and contributions to financial instruments, and projects which may be funded are confined to pilot,

demonstration, best practice, integrated, technical assistance, capacity-building, preparatory, and information, awareness and dissemination projects.

The Commission establishes multiannual work programmes that must allocate funds between the different priority areas and project topics to implement the thematic priorities; soil is one of them as included in Annex III. The LIFE multiannual work programme for 2014-2017, which has been adopted by a Commission Decision on 19 March 2014, sets the framework for the next four years for the management of the new LIFE Programme 2014-2020. It contains an indicative budget, explains the selection methodology for projects and for operating grants and establishes outcome indicators for both LIFE sub-programmes, the Environment sub-programme and the Climate Action sub-programme.

Knowledge sharing on experiences and best practices and dissemination is required by the Commission toward beneficiaries, particularly in Member States where there is low uptake of LIFE funds. Monitoring and evaluation of the LIFE programme implementation and synergies with other programmes. A mid-term evaluation report must be submitted by the Commission by 30 June 2017.

Key soil-relevant instruments

Mandatory

None

Voluntary

Thematic priorities for Resource Efficiency, under the sub-programme for Environment, receive financial allocations and should be prioritised in the project selection. In addition, complementary LIFE projects with other policies are supported, as well as knowledge sharing of best practices, monitoring and evaluation of implementation and review for synergies.

The Commission is required to establish multi-annual work programmes with thematic priorities, including soil (as per Annex III).

35 Guidelines for State Aid – Environmental Protection and Energy 2014-2020

COMMUNICATION FROM THE COMMISSION - Guidelines on State aid for environmental protection and energy

Section I - Gap Analysis – Synopsis

Summary of the Relationship with and Relevance to Soil Protection

State aid for the remediation of contaminated sites is positively identified as being compatible with the internal market (under certain conditions – remediation is subject only to the general compatibility provisions under Article 3.2). In line with the polluter pays principle, state aid is restricted to cases where the liable party cannot be identified or legally held responsible. Remediation activities can be funded to 100% of eligible costs.

The guidelines set out a definition for a contaminated site i.e. ‘a site where there is a confirmed presence, caused by man, of hazardous substances of such a level that they pose a significant risk to human health or the environment taking into account current and approved future use of the land’.

Separately state aid for resource efficiency and waste management is also permitted – under certain conditions. There is a potential that this might enable wider support for soil protection, however, rules around demonstrating a quantifiable benefit may be problematic for soil where monitoring can be a challenge and change in soil quality can occur over long time horizons.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

Resource efficiency and support for waste management actions supported by state aid are permitted under certain circumstances. Depending on the nature of the aid for resource efficiency this has the potential to relate to the protection of key soil functions. However, there are quite specific rules set out that Member States need to demonstrate quantifiable benefits in this policy area, particularly the amount of resources saved or the resource efficiency gains. For soils this can be a significant challenge given issues around soil monitoring and quality of soil monitoring across Europe/ the ability to identify improvement in soil condition and the long term nature of change for example linked to increasing the SOM.

- E - means there is an explicit or direct link between the policy and the threat, i.e. the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e. the policy does not explicitly refer to the threat but it can be assumed from the policy coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	I	Increased investment in local contamination reduction will decrease emissions to water courses and migration of contamination to other sites potentially reducing overall contamination levels in soils.	
Contamination – point source	E	Guidelines permit support explicitly for remediation of contaminated sites only when the polluter — i.e. the person liable under the law applicable in each Member State without prejudice to the Environmental Liability Directive (Directive 2004/35/EC) and other relevant Union rules in this matter — is not identified or cannot be held legally liable for financing the remediation in accordance with the ‘polluter pays’ principle	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	N/A		
Loss of soil organic matter	N/A		
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Resource efficiency and support for waste management actions supported by state aid are permitted under certain circumstances. Depending on the nature of the aid for resource efficiency this has the potential to relate to the protection of key soil functions. However, there are quite specific rules set out that Member States need to demonstrate quantifiable benefits in this policy area, particularly the amount of resources saved or the resource efficiency gains. For soils this can be a significant challenge given issues around soil monitoring and quality of soil monitoring across Europe/ the ability to identify improvement in soil condition and the long term nature of change for example linked to increasing the carbon pool.

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool	I	The fund supports actions both to adapt to and mitigate against climate change, both would potentially relate to promotion of the C Pool	
Platform for human activities	N/A		
Biomass production	N/A		
Hosting biodiversity	E	The policy specifically supports actions to promote biodiversity and links soil, biodiversity and delivery of ecosystem services	
Providing raw materials	N/A		
Storing, filtering and transforming nutrients and water	I	The fund allows investment to address specific risks, ensuring disaster resilience and developing disaster management systems linked to climate adaptation. This would include potentially issues of water storage and filtration in relation to floodings	
Storing geological and archeological heritage	N/A		

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- The guidelines permit action to remediate contaminated land, in particularly problematic cases i.e. where the liable party cannot be identified or held liable. The level of state aid permitted by MSs is high for remediation i.e. 100% eligible costs

Weaknesses - are there aspects limiting the protection afforded?

- State aid guidelines only permit support but don't attach money to support the change or dictate priorities to MS re spending. Therefore, there is an opportunity for support but no guarantee this will be taken up in particular given other pressures on national spending.

Opportunities - are there any potential opportunities linked to the legislation which could benefit soil protection (arising from, e.g., MS implementation, new proposals or improved use of existing legislation)?

- There is a potential opportunity to understand and elaborate further how soils can contribute to resource efficiency delivery to ensure wider actions (i.e. not just remediation) to protect and improve soil quality and understood to qualify for state aid.

Threats - are there any potential elements within the policy that might put at risk the protection of soils?

- The lack of a policy defining targets or applying pressure in the field of soil protection may mean that MSs overlook investment in favour of delivering other aspects. For example investment in renewable energy (within certain limits) is permitted and MSs also have a significant EU level binding target to deliver in this field.

Continuity of coverage - how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?

Applies to all MSs

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

Details on state aid cases can be found at

http://ec.europa.eu/competition/state_aid/register/

Section 3 - Base Information

COMMUNICATION FROM THE COMMISSION - Guidelines on State aid for environmental protection and energy

Summary

In order to prevent State aid from distorting competition in the internal market and affecting trade between Member States in a way which is contrary to the common interest, Article 107(1) of the Treaty on the Functioning of the European Union ('the Treaty') lays down the principle that State aid is prohibited. In certain cases, however, State aid may be compatible with the internal market under Articles 107(2) and (3) of the Treaty. The state aid guidelines 2014-2020 set out under what circumstances such support may be compatible with the internal market.

In the state aid guidelines a contaminated site is defined:

"contaminated site' means a site where there is a confirmed presence, caused by man, of hazardous substances of such a level that they pose a significant risk to human health or the environment taking into account current and approved future use of the land'

Aid for contaminated sites can be granted only when the polluter — i.e. the person liable under the law applicable in each Member State without prejudice to the Environmental Liability Directive (Directive 2004/35/EC) and other relevant Union rules in this matter — is not identified or cannot be held legally liable for financing the remediation in accordance with the 'polluter pays' principle.

Under the rules eligible costs for the remediation of contaminated sites are equal to the cost of the remediation work less the increase in the value of the land. For contamination 100% of eligible costs can be supported (where as for other state aids this is lower).

Entry into Force

28.6.2014 for 2014-2020

Policy Field

Integration/coordination issues with other related pieces of legislation

State aid for the remediation of contaminated sites is positively identified in the guidelines as being compatible with the internal market (under certain conditions – remediation is subject only to the general compatibility provisions under Article 3.2). So too is action on resource efficiency and waste management.

Aims of the policy and its relevance to soil protection

Objectives

The aim is not on supporting soil protection or other environmental goals but on the effective functioning of the internal market and MS support within this for activities.

Relevance to soil protection

Importantly for in particular soil contamination activities related to the remediation of contaminated sites is permitted to be supported by state aid, however, only where the liable party cannot be identified i.e. on sites often termed orphan sites.

Potentially soil activities could be considered under clauses on resource efficiency, and certainly actions supported may well impact on soil protection. The challenges for soil focused support are clauses specifying quantifiable benefits linked to the amount of resources saved or the resource efficiency gains. State aid is set out as permitted for resource efficiency in particular when this supports sustainable growth and innovation. It is unclear exactly how MS might seek to apply state aid to deliver resource efficiency, however, there is a potential link to soil protection both directly (as some actions might see to protect other elements of the soil resource) and also indirectly as actions for example to better manage waste in line with the hierarchy may also have consequences in terms of soil protection. For actions relating to soil protection, however, the rules set out around MSs being able to demonstrate a quantifiable benefits, particularly the amount of resources saved or the resource efficiency gains, may be problematic as demonstrating positive change in soil status can be difficult or require long time horizons to record a change.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: Contamination

Implicitly: N/A – the aim is not on supporting soil protection or other environmental goals but on the effective functioning of the internal market and MS support within this for activities.

Soil threats addressed by the policy

Explicitly: Soil contamination and remediation is explicitly listed as being eligible for MS state aid, however, this is only the case where the liable party cannot be identified or held liable.

Implicitly: Soil threats where resource efficiency action may be relevant may also be addressed potentially linked to state aid or other actions to promote resource efficiency may impact on soil threats both positively or negatively. However the type of issues supported is not clear but there are potential interactions.

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
None	None	None

36 Mercury Regulation

Regulation (EC) No 1102/2008 and proposal COM(2016)039 to repeal and replace the Regulation in line with the Minamata Convention

Section I - Gap Analysis - Synopsis

Summary of the Relationship with and Relevance to Soil Protection of the Policy

The Mercury Regulation (and proposed replacement in line with the Minamata Convention) seeks to manage both facilities dealing with mercury, storing mercury or disposing of it. The Regulation directly impacts on the emissions of mercury to the soil from specific facilities and should lead to more limited emissions and the ability to ensure that any emissions are dealt with and facilities are culpable (in line with the Environmental Liability Directive).

The Regulation also bans export of mercury, mercury compounds and mixtures outside of the EU. Given the historic importance of the EU in the production of mercury globally this potentially limits both the EU footprint and overall levels of mercury use. As a consequence there is likely to be an impact on soil and land contamination with mercury beyond the individual facilities managed in Europe. The Regulation should reduce the overall burden of mercury and implicitly, therefore, reducing diffuse soil pollution. However, the Regulation itself does not deal with some of the main emitters of diffuse mercury pollution in the form of emission limits for power stations and other facilities.

Coverage of Soil Threats - Conceptualising How the Measure Will Limit Key Soil Threats

- E - means there is an explicit or direct link between the policy and the threat, i.e., the threat is explicitly referred to in the policy's text
- I - means there is an implicit link or assumed link, i.e., the policy does not explicitly refer to the threat but it can be assumed from the policies coverage that it will help to address it

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
Acidification	N/A		
Compaction	N/A		
Contamination - diffuse	I	Controls of trade in mercury, compounds and mixtures limits placing of hazardous material on the market and the transfer from the EU to third countries potentially limiting the availability of mercury and reducing the likelihood of pollution events. Diffuse mercury pollution is a significant problem and associated with bioaccumulation in fish particularly.	Note that throughout the project the question of diffuse versus local becomes blurred in particular when dealing with policies to limit contamination from specific materials
Contamination - point source	E	Direct controls on sites holding, storing and disposing of mercury requiring certain	

Threat	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and threat, i.e. how does the policy interact with the threat, what specific aspects does it cover?	Comments regarding the coverage of soil threats
		management activities to limit contamination of land/soils	
Desertification	N/A		
Erosion - water	N/A		
Erosion - wind	N/A		
Flooding/ landslides	N/A		
Loss of soil biodiversity	N/A		
Loss of soil organic matter	N/A		
Salinisation	N/A		
Soil sealing	N/A		

Coverage of Soil Functions - Conceptualising How the Measure Will Help Protect and Promote Key Soil Functions

Function	Explicit reference or Implicit assumption (E, I, N/A or X)	Description of the context and relationship between the policy and function, i.e. how does the policy interact with the function, what specific aspects does it cover?	Comments regarding the coverage of the soil function
Carbon pool			
Platform for human activities	I	Mercury is an element toxic to the nervous system and kidneys, by reducing both point source and diffuse availability and is known to bio accumulate up the food chain i.e. with higher predators, especially fish, at risk.	
Biomass production	I		
Hosting biodiversity	I		
Providing raw materials			
Storing, filtering and transforming nutrients and water			
Storing geological and archeological heritage			

SWOT - Understanding the Policy's Relevance to Soil Protection

Strengths - what does the policy cover well in relation to soil protection?

- It deals with the question of the management of facilities managing, storing and disposing of mercury in the EU it also currently prohibits the export of mercury outside the EU and will in future be further strengthened. It, therefore, deals relatively robustly with the question of potential isolated emissions of mercury at the facility level and makes close links to other EU policy. It also seeks to limit mercury on the market, hence acting as a limit on likely incidents of pollution reducing the number of potential events.

Weaknesses - *are there aspects limiting the protection afforded?*

- One of the most significant sources of mercury emissions in Europe is associated with burning of coal and from certain other industrial facilities. Emissions from such facilities will impact in a diffuse way on soil and contamination levels with mercury. This issue is not addressed within the Regulation.

Opportunities - *are there potential opportunities for soil protection moving forward e.g. through MS implementation approaches or new proposals or clauses that might be used better?*

- There is currently a clear opportunity in line with the implementation of the Minamata Convention to strengthen protection of Europe's soils from mercury pollution and this is reflected not only in the debate over amending the mercury Regulation.

Threats - *are there any potential elements within the policy that might put at risk the protection of soils?*

- Arguably the greater threat to soil functionality i.e. in terms of biomass production, hosting biodiversity etc comes from diffuse sources of mercury pollution. The Regulation deals well with management of facility level protections but some of the broader functionality of Europe's soils is not the focus of current action and the important connection between point source emissions and diffuse pollution risks being lost.

Continuity of coverage - *how is the policy implemented is there likely to be significant variation in the approaches adopted by MS to implementation and what are the implications for soil protection?*

While the policy requirements are very clear the Regulation relies strongly on other existing policies to ensure its delivery, i.e. ensuring that waste and ELD rules are applied to sites managing, storing and disposing of mercury. Hence, it relies on the effective implementation of a number of different policies at Member State level.

Section 2 - Links and Summary of Key Messages from Relevant Evaluation Reports

A study was completed in 2015 on the implementation of the Minamata Convention in the EU - <http://ec.europa.eu/environment/chemicals/mercury/pdf/MinamataConventionImplementationFinal.pdf>

A review of the community mercury strategy was completed in 2010 - http://ec.europa.eu/environment/chemicals/mercury/pdf/review_mercury_strategy2010.pdf

Section 3 - Base Information

Regulation (EC) No [1102/2008](#) and proposal [COM\(2016\)039](#) to repeal and replace the Regulation in line with the Minamata Convention

Summary

The Regulation sets out prohibitions on the exporting of mercury, mercury compounds and mixtures. It also puts in place requirements around the disposal of such material in line with community waste law, the storage of waste material, permitting, inspection and reporting requirements for such facilities. It also requires the establishment by Member States of penalties for infringements under the Regulation. Industry actors that produce mercury as a bi-product, including the natural gas, mining and smelting sectors, have set data and reporting requirements both to the relevant Member State and the Commission.

The Proposal (COM(2016)39) seeks to enhance the Union acquis by filling regulatory gaps in relation to the Regulation's coverage of requirements under the Minamata Convention. The proposal seeks to address gaps in relation to: the import of mercury, export of mercury-added products, the use of mercury in manufacturing processes, new mercury uses and mercury use in dental amalgam.

Entry into Force: December 2008

Policy Field

Integration/coordination issues with other related pieces of legislation

Links to the Landfill Directive, Hazardous Waste Directive, Environmental Liability Directive in relation to the appropriate handling and disposal of hazardous material.

Aims of the policy and its relevance to soil protection

Objectives

Aims at reduced exposure of mercury by means of an export ban and a storage obligation, the subsequent proposal will take this further strengthening provisions and ratifying the Minamata Convention in the EU.

Spatial coverage and management unit

N/A

Relevance to soil protection

Relates to the control of the management and disposal of mercury limiting on site released of a potentially hazardous substance and reducing local contamination. It also limits the export (and in future wider trade) of mercury and mercury mixtures and compounds hence reduce the wider circulation of the hazardous substance and potential future instances of soil contamination.

Soil-focused aims and objectives (including those with potential negative impacts)

Explicitly: N/A

Implicitly: N/A

Soil-focused targets and/or expected impacts

Explicit soil-focused targets	Implicit soil-focused targets	Soil-focused expected impacts
Direct target of preventing contamination and ensuring appropriate management ⁸³	Indirect impact by limiting ongoing use and transfer across country boundaries hence limiting future potential emissions	Targeted reduction in soil contamination with a specific pollutant. Therefore impacts directly on local contamination and indirectly on diffuse pollution.

Mandatory requirements and voluntary options for Member States (types of management measures)

Key soil-relevant instruments

Mandatory

Banning of export/trade in mercury and mercury compounds/mixtures; imposing requirements for site management of facilities in line with the landfill/hazardous waste Directives and the Environmental Liability Directive dependent on the facility in question.

Voluntary

None

⁸³ Should be noted that the proposal to repeal and amend the Regulation does not contain a formal reference to soil (as is the case in the current regulation) although protection against anthropogenic emissions to land are