

Initial stocktaking report on existing policy measures

Catherine Bowyer, Clunie Keenleyside, Silvia Nanni, Anouchka Hoffmann,
Nathalie van Haren, Karin van Boxtel, Paul Wolvekamp



DOCUMENT SUMMARY	
Project Information	
Project Title	Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience
Project Acronym	iSQAPER
Call identifier	The EU Framework Programme for Research and Innovation Horizon 2020: SFS-4-2014 Soil quality and function
Grant agreement no:	635750
Starting date	1-5-2015
End date	30-4-2020
Project duration	60 months
Web site address	www.isqaper-project.eu
Project coordination	Wageningen University
EU project representative & coordinator	Prof. Dr. C.J. Ritsema
Project Scientific Coordinator	Dr. L. Fleskens
EU project officer	Ms Arantza Uriarte Iraola
Deliverable Information	
Deliverable title	Initial stocktaking report on existing policy measures
Author	Catherine Bowyer, Clunie Keenleyside, Silvia Nanni, Anouchka Hoffmann, Nathalie van Haren, Karin van Boxtel, Paul Wolvekamp
Author email	CBowyer@ieep.eu
Delivery Number	D8.1
Work package	8
WP lead	Institute for European Environmental Policy
Nature	Report; version 1
Dissemination	Public
Editor	Luuk Fleskens
Report due date	July, 2017
Report publish date	April, 2018
Copyright	© iSQAPER project and partners

partici- pants	iSQAPER Participant legal name + acronym	Country
1 (Coor)	Wageningen University (WU)	Netherlands
2	Joint Research Center (JRC)	Italy
3	Research Institute of Organic Agriculture (FiBL)	Switzerland
4	Universität Bern (UNIBE)	Switzerland
5	University of Évora (UE)	Portugal
6	Technical University of Madrid (UPM)	Spain
7	Institute for European Environmental Policy (IEEP)	UK and Belgium
8	Foundation for Sustainable Development of the Mediterranean (MEDES)	Italy
9	ISRIC World Soil Information (ISRIC)	Netherlands
10	Stichting Dienst Landbouwkundig Onderzoek (DLO)	Netherlands
11	Institute of Agrophysics of the Polish Academy of Sciences (IA)	Poland
12	Estonian University of Life Sciences, Institute of Agricultural and Environmental Sciences (IAES)	Estonia
13	University of Ljubljana (UL)	Slovenia
14	National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection (ICPA)	Romania
15	Agrarian School of Coimbra (ESAC)	Portugal
16	University of Miguel Hernández (UMH)	Spain
17	Agricultural University Athens (AUA)	Greece
18	Institute of Agricultural Resources and Regional Planning of Chinese Academy of Agricultural Sciences (IARRP)	China
19	Institute of Soil and Water Conservation of Chinese Academy of Sciences (ISWC)	China
20	Soil and Fertilizer Institute of the Sichuan Academy of Agricultural Sciences (SFI)	China
21	CorePage (CorePage)	Netherlands
22	BothEnds (BothEnds)	Netherlands
23	University of Pannonia (UP)	Hungary

24	Institute of Soil Science of the Chinese Academy of Sciences (ISS)	China
25	Gaec de la Branchette (GB)	France

INITIAL STOCKTAKING REPORT ON EXISTING POLICY MEASURES

Catherine Bowyer¹, Clunie Keenleyside¹, Silvia Nanni¹, Anouchka Hoffmann¹, Nathalie van Haren², Karin van Boxtel², Paul Wolvekamp²

Deliverable 8.1 – March 2018 - iSQAPER – Interactive Soil Quality Assessment in Europe and China for Agricultural Productivity and Environmental Resilience

¹ Institute for European Environmental Policy, <https://ieep.eu> - corresponding author cbowyer@ieep.eu

² BothENDS, <http://www.bothends.org/en>

Executive Summary

This report represents the collated outputs from the first phase of policy analysis under the iSQAPER project, considering the protection of agricultural soils in the context of emerging and existing international, EU and national policies. It is based on analysis of four key policy topics: the United Nation's Sustainable Development Goals (SDGs) and their role in promoting land and soil protection; EU level policies relevant to the protection of agricultural soils; the EU's Common Agricultural Policy (CAP) and its coverage and associated national implementation of provisions relevant to soil protection; and policies relevant to soil protection initiated at the national level by EU Member States. The analysis within this report will, in future, be complemented by a review of Chinese policies relevant to soil protection on agricultural land, and more detailed analysis on: the role of climate policies in protecting agricultural land; the future evolution of the CAP and soil policy considerations; the role of indicators and monitoring in delivering effective policy.

Agricultural soils themselves are multifaceted and heterogeneous, the product of natural processes combined with the land management practices to which they are exposed. When seeking to improve already degraded soils, limit future degradation, and promote associated ecosystem services it is important to recognise the diversity of potential intervention points. On the one hand this can prove challenging, as there can be multiple drivers placing pressure on natural systems (economic, environmental and social) that interact to potentially threaten soil quality. Yet it also represents an opportunity, with soil quality linked closely to the delivery of numerous other environmental goals, potentially offering multiple routes for change. For this reason, soil protection cannot be achieved through a single policy intervention.

The analysis of EU level policies and national policies adopted by Member States has identified numerous policy goals and types of policy instrument that either protect soils directly or contribute indirectly to soil protection (i.e. through the pursuit of other goals or objectives). The analysis identified that soil is commonly being protected as a means to deliver an alternative goal; whether climate change mitigation, climate adaptation, biodiversity protection, water quality and availability or resilient and sustainable agricultural production. To deliver soil protection in this context it is important to recognise the positive changes needed to support improved soil condition and fully integrate these priorities within wider policy goals.

The SDGs offer an opportunity to make links between policy areas and highlight the relevance of soil protection to the achievement of sustainable development. The 17 SDGs represent the heart of the 2030 Agenda, signed up to by 193 nations³. While non-binding, there is a weight of expectation that signatories will seek to deliver on and implement the goals⁴. SDGs divide responsibilities across both developing and developed countries. At their core the SDGs are a set of interlinked objectives with soil protection and improved land management necessary for the

³ On September 25th 2015, countries adopted a set of goals to **end poverty**, **protect the planet** and **ensure prosperity for all** as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years - <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

⁴ Generated by the international community and also wider actors, the SDG development process sought to bring other actors beyond governments to support the SDGs including civil society and the private sector.

delivery of multiple Goals. For example, the second SDG links hunger, food and nutrition security with sustainable agriculture⁵; illustrating the connection between environmental sustainability and social inclusion in the SDGs. The SDGs provide targeted commitments and a new language that can be used by all actors to discuss progress towards sustainable development, including the protection of agricultural soils.

The 2030 Agenda sets out ambitious targets for global transformation, yet in order to achieve change requires action in all signatory countries. To succeed, SDGs need to be integrated into national policy, central to policy implementation and monitoring frameworks. In Europe EU Member States have in place a combination of policies and instruments adopted in response to EU level commitments (for example the Nitrates Directive), complimented by nationally initiated policies. The dual origins of policy priorities and instruments (i.e. EU and nationally initiated) are particularly significant in the case of soil protection. Compared to other environmental fields, nationally initiated laws and policies play a greater role given the lack of a common EU law focused on soil protection and the limitations placed on EU intervention in relevant policy spheres such as land use planning. These interact with key EU laws and policies relating to water protection, nature conservation and pollution control and EU funding and support measures under the Common Agricultural Policy.

At the EU level a list of 35 key policies of importance for soil protection was analysed⁶ to determine their relevance to the protection of agricultural soil specifically. Only 9 of these policies were identified as highly relevant to agricultural soils including: three measures related to the CAP (Cross Compliance, Greening and Rural Development Programmes; three measures related to the reduction of pollution (environmental liability, national emission ceiling and sewage sludge Directives); two related to the protection of water bodies (Water Framework Directive and the Nitrates Directive); and one linked to funding environmental and climate related projects (LIFE+). None of the policies identified as ‘highly relevant’ is specifically focused on soil protection. These findings highlight the importance of fully integrating soil needs into other spheres of policy action.

The importance of the CAP is highlighted in the analysis. While actions under the CAP were identified as important in their own right, they are also key to delivering goals across multiple other policies that are highly relevant for soil protection, for example the Water Framework Directive and the Nitrates Directive.

An analysis of soil protection requirements linked to the CAP was undertaken examining provisions for: Good Agricultural and Environment Condition set out as part of cross compliance;

⁵ FAO’ vision of sustainable food and agriculture is “of a world in which food is nutritious and accessible for everyone and natural resources are managed in a way that maintain ecosystem functions to support current as well as future human needs. In this vision, farmers, pastoralists, fisher folks, foresters and other rural dwellers have the opportunity to actively participate in, and benefit from, economic development, have decent employment conditions and work in a fair price environment. Rural men, women, and communities live in security, and have control over their livelihoods and equitable access to resources which they use in an efficient way.” <http://www.fao.org/sustainability/background/en/> (accessed 6 July 2017)

⁶ the list of 35 policies important to soil protection determined based on earlier research conducted by IEEP and partners and informed by discussions with the lead European Commission officials. For details see Frelih-Larsen et al, 2016

the greening of Direct Payments; and the more targeted support provided through Rural Development Programmes. The analysis shows that provisions exist within all three measures, that offer potential to support the protection of agricultural soils⁷. The Regulations governing the funding, support and scope of the CAP are set at the EU level, with detailed decisions about how and which measures and instruments to implement made at the national and regional level; therefore, agricultural soils across EU Member States are subject to subtly different criteria and consequently potentially different levels of protection. When considering Member State implementation of CAP rules, it was concluded that Member States appear to be addressing soil erosion using a range of measures, offering opportunities for a similar range of positive interventions. The picture for the promotion and retention of soil organic matter is different; national and regional choices implementing support for soil organic matter protection and promotion appear to lead to less comprehensive coverage.

In addition to the implementation of EU laws and policy actions, Member States have also adopted a body of nationally initiated policy measures relevant to soil protection. 252 policies were identified as potentially relevant to soil protection on agricultural land and reviewed. The review confirms that there are a number of Member States that have comprehensive or dedicated policies for soil protection or management of agricultural soils and are promoting their protection as a key priority. The vast majority of Member States, however, rely on environmental policies either not dedicated to soils or not specifically focused on agricultural soils to address agricultural soil quality issues. This includes policies focused on land use planning, biodiversity protection, water management, sustainable development, climate change mitigation and adaptation, energy and waste.

To ensure the effective and timely consideration of policy needs throughout the project and a collaborative approach to policy understanding within iSQAPER it was concluded, at the first project review meeting (Madrid, February 2017), that policy analysis activities would continue throughout the project's timeline. This is intended to ensure that relevant policy issues are being reviewed and assessed as key dossiers emerge and evolve, particularly the development of the post-2020 CAP and the implementation of the SDGs.

⁷ The CAP also offers a potential basis for the protection of forest soils, but this is not the focus of this analysis

Contents

SECTION 1 – UNDERSTANDING POLICY FOR SOIL PROTECTION - INTRODUCTION	11
1.1 INTRODUCING POLICY ANALYSIS UNDER ISQAPER	11
1.1.1 THE CONTEXT OF THIS DELIVERABLE	11
1.1.2 REPORT COVERAGE AND ANALYTICAL APPROACH	12
1.2 POLICY MAKING FOR SOIL PROTECTION AND DELIVERING SOIL HEALTH – SCOPING THE CHALLENGE ...	13
1.2.1 REGULATING SOIL HEALTH – THE CHALLENGE	13
1.2.2 STRATEGIES FOR POLICY ACTION – POLICY TO ACCOUNT FOR HETEROGENEOUS NATURAL STATE, LAND USE AND MANAGEMENT AND LEVELS OF SOIL RESILIENCE	16
SECTION 2 – GROUNDING SUSTAINABILITY: LAND, SOILS AND THE SUSTAINABLE DEVELOPMENT GOALS	19
2.1 INTRODUCTION: THE INTERNATIONAL DEBATE ON SUSTAINABLE LAND MANAGEMENT	19
2.2 INTRODUCTION TO THE SUSTAINABLE DEVELOPMENT GOALS	22
2.2.1 ORIGIN, OBJECTIVE AND INTERCONNECTEDNESS OF THE SDGs	22
2.2.2 MONITORING THE IMPLEMENTATION OF THE SDGs	23
2.3 RELEVANT SDGS FOR LAND USE AND SOIL HEALTH	25
2.3.1 LAND USE SDGs	25
2.3.2 SDG 1: END POVERTY IN ALL ITS FORMS EVERYWHERE	27
2.3.3 SDG 2: END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE ...	29
2.3.4 SDG 3: ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES	32
2.3.5 SDG 5: ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS	33
2.3.6 SDG 10: REDUCED INEQUALITIES	36
2.3.7 SDG 12: ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS	37
2.3.8 SDG 15: PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS	39
2.3.9 SDG 16: PEACE, JUSTICE AND STRONG INSTITUTIONS	41
2.3.10 SDG 17: STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT	42
2.4 IMPLICATIONS OF THE SDGS	44
2.4.1 IMPLICATIONS OF LAND USE-RELATED SDGs FOR POLICYMAKERS	44
2.4.2 IMPLICATIONS OF LAND USE-RELATED SDGs FOR LAND USERS AND FARMERS	46
2.4.3 IMPLICATIONS OF LAND USE-RELATED SDGs FOR THE PRIVATE SECTOR	47
2.4.4 IMPLICATIONS OF LAND USE-RELATED SDGs FOR CIVIL SOCIETY	48
2.4.5 IMPLICATIONS OF LAND USE-RELATED SDGs FOR ACADEMICS	49
2.4.6 CRITICAL FACTORS FOR ACHIEVING THE 2030 AGENDA	50
2.5 CONCLUSIONS	53
SECTION 3 – PROTECTING EUROPE’S SOILS – POLICY SOLUTIONS AND OPPORTUNITIES	58
3.1 PROTECTING EUROPE’S SOILS – A REVIEW OF POLICY ACTION AT THE EU AND LEVEL	59
3.1.1 CONCEPTUALISING POLICY AT THE EU LEVEL	59
3.1.2 EU POLICIES FOR SOIL PROTECTION	61
3.1.3 EU POLICIES CONTRIBUTING TO THE PROTECTION OF AGRICULTURAL SOILS	63
3.2 UNDERSTANDING THE EU COMMON AGRICULTURAL POLICY IN THE CONTEXT OF SOIL PROTECTION ...	74

3.2.1.	INTRODUCTION.....	74
3.2.2.	DIVERSITY OF THE EU AGRICULTURAL CONTEXT.....	74
3.2.3.	ORIGINS OF THE CAP AND ITS DEVELOPMENT IN THE FIRST 50 YEARS	74
3.2.4.	THE TWO PILLAR CAP TODAY	76
3.2.5.	CROSS-COMPLIANCE STANDARDS OF GOOD AGRICULTURAL AND ENVIRONMENTAL CONDITION	78
3.2.6.	PILLAR 1 GREENING PAYMENT REQUIREMENTS.....	79
3.2.7.	PILLAR 2 RURAL DEVELOPMENT PROGRAMMES 2014-20	81
3.2.8.	HOW WILL THE NEXT REFORM OF THE CAP SUPPORT SOIL MANAGEMENT?.....	86
3.3	IMPLEMENTING OF THE COMMON AGRICULTURAL POLICY – THE ROLE OF NATIONAL AND REGIONAL DECISION MAKING IN PROTECTING SOIL HEALTH 2015-2020.....	87
3.3.1.	INTRODUCTION.....	87
3.3.2.	ARABLE SOILS.....	87
3.3.3.	SOILS UNDER PERMANENT GRASSLAND	92
3.3.4.	WILL THE POTENTIAL OF THE CAP BE USED TO SUPPORT BETTER SOIL MANAGEMENT 2015-20?	95
3.4	SCOPING SOIL POLICY ACTION IN EUROPEAN MEMBER STATES.....	97
3.4.1.	INTRODUCTION.....	97
3.4.2.	METHODOLOGY.....	97
3.4.3.	POLICY TRENDS AND AREAS OF INTERVENTION IN EUROPE	98
3.4.4.	TYPE OF INSTRUMENTS USED IN EUROPE TO SECURE SOIL HEALTH AND ECOSYSTEM SERVICES.....	101
3.4.5.	SOIL MONITORING APPROACHES ACROSS EUROPE.....	107
3.4.6.	KEY MESSAGES FROM THE ANALYSIS.....	109
3.4.7.	CONCLUSIONS	110
3.4.8.	RATIONALE FOR FURTHER WORK	110
	SECTION 4 – FROM INITIAL RESEARCH FINDINGS TO NEXT STEPS	112
	REFERENCE LIST	115
	ANNEXES	118

Section 1 – Understanding Policy for Soil Protection - Introduction

1.1 Introducing Policy Analysis under iSQAPER

It is widely understood that pressures on agricultural soils can drive detrimental trends in soil quality, both environmentally and in terms of the productive capacity of farmland. Policy action, in all its forms from legislative measures to financial support including for extension services and training, can help to drive alternative outcomes ameliorating pressures, increasing understanding and knowledge through monitoring programmes and improving management to support the delivery of improved soil quality. However, there are a number of barriers to the design and implementation of policies. These barriers include the difficulties of accessing scientific and agronomic data and making use of this at the appropriate level in order to design policy measures which are valid and efficient across a range of different agricultural conditions. The costs and practicalities of monitoring soil characteristics can prove a challenge for national authorities and land managers. It can be difficult to specify in policy those management practices required to meet soil quality objectives in a way which is both precise and relevant to variations in soil, cropping patterns, climate and weather conditions.

The iSQAPER project is intended to both: support understanding of policies that exist for soil protection, their mechanisms for change, their data needs and operational priorities; and generating data and tools (ie the SQAPP) intended to help farmers and policy makers understand soil condition better and tailor policy and management actions. The intention is to improve understanding of policies in place and the opportunities for the future and help support policy development and implementation through the communication of data, tools and conclusions from across the project.

1.1.1 The Context of this Deliverable

To ensure the effective and timely consideration of policy needs throughout the project and a collaborative approach to policy understanding within iSQAPER, it was concluded that policy analysis activities under Work Package 8 would be spread across the entire project timeline. This was agreed in discussions with the core team and European Commission in Madrid at the first project review meeting for iSQAPER. This is intended to ensure that relevant policy issues are being reviewed and assessed as core legislation emerges and evolves. In particular, the EU's Common Agricultural Policy and climate policy specifically relating to agriculture in Europe are under review at present.

This report represents the first collation of policy analysis under iSQAPER, in the original project specification this could be considered as Deliverable 8.1. However, in addition a further collation of work will be completed to complement this report and take forward themed analysis identified in the next steps Section (Section 4). This second report will be prepared ahead of the project's conclusion and will draw together analysis and research concluded after February 2018 (to be termed Deliverable 8.1b).

1.1.2 Report Coverage and Analytical Approach

Task 1 under Work Package 8 of iSQAPER is to ‘Undertake a stocktaking of existing policy measures aimed at improved soil management and the scientific foundation on which they are constructed’. The intention is that this analysis will create a baseline for further work both within WP8 and other work packages. The stocktaking survey is selective rather than comprehensive. It looks at key elements of policy relevant to iSQAPER at the International, EU and national (and on some occasions regional) level to understand the nature of support for soil management now and into the future.

Given the need to scope out the key policies of importance to the iSQAPER team and the future of soil protection, a selective approach to determining the topics of focus was adopted. This was based on discussions with all members of the consortium, including responses to a questionnaire discussed with all partners either before or during 2016 plenary meeting. On this basis the subjects of most use in terms of focus were identified. Based on the issues of political importance and relevance to wider work packages in this initial document the analysis focuses on:

- policy developments at the international level, specifically the evolution of the Sustainable Development Goals and the concept of Land Degradation Neutrality (Section 2);
- policy at the EU level relevant to soil protection (Section 3.1)
- the role of the EU’s Common Agricultural Policy in soil protection and opportunities for improving soil quality (Section 3.2 and 3.3); and
- policies existing at the national level in Europe relevant to securing the protection of agricultural soils outside of formal agricultural management provisions – which are controlled by the national implementation of the CAP (Section 3.4).

The above Sections will be, or have been, published as a series of iSQAPER policy briefings to communicate the key messages to the wider academic and policy community.

Building on the analysis in these four areas it was further agreed to take forward additional analysis based on the key areas and issues of interest identified. The list of next steps and priorities for further work are set out in Section 4 of this report.

Importantly, the research was intended to cover the international, European and Chinese policy context. It was decided, in consultation with Chinese partners, that it was first best to develop the national analysis for Europe and then use this as a template upon which to build the analysis of Chinese policies. This work commenced as of October 2017, based on Section 3.4, in collaboration with all willing partners. This analysis will be concluded in the summer of 2018, following discussions at the project plenary taking place in June.

1.2 Policy Making for Soil Protection and Delivering Soil Health – Scoping the Challenge

1.2.1 Regulating Soil Health – the Challenge

Land makes up one of the trilogy of environmental spheres, the others being air and water. It represents a vital resource enabling the production of food, the preservation of biodiversity, facilitating the natural management of water systems and acting as a carbon store. Land use and soil quality⁸ are important in determining the broader state of the environment. Appropriate management can protect and maximize the services soil and land provides to society. The degradation of soil is, however, common in Europe and across the globe, a consequence of physical, chemical and biological shifts driven by environmental, social and economic pressures.

Pressure on land use and soils is anticipated to increase into the future. This is a consequence of expanding populations, expanding numbers of households, changing patterns of demand including for land intensive commodities such as meat and the increased pressure to meet our energy demand through the use of biomass. Climate change and our need to adapt are also anticipated to change the land resource available and the uses to which it can be put. The consideration of land and soil management as a route to wider environmental protection is, therefore, rising up the political agenda.

Soil is generally defined as the top layer of the Earth's crust, formed by mineral particles, organic matter, water, air and living organisms⁹. It is the interface between land, air and water and hosts most of the biosphere. As soil formation is an extremely slow process, soil can be considered essentially as a non-renewable resource. Soil degradation is defined by the Food and Agricultural Organisation of the United Nations (FAO) as a 'process which lowers the current and/or potential capability of soil to produce goods and services'.

The extent and the type of degradation problem depends upon the scale and nature of external pressures combined with the sensitivity and resilience of the land itself; the latter is in turn determined by a soil's character and the management practices applied. The impacts of degradation processes will depend upon how the land interacts with the surrounding air and water resources, as well as human settlement and land-use needs. Land degradation can be limited, reversed and avoided through the appropriate management of land.

Soil degradation is part of a continuum; the different soil-degradation processes are not distinct from one another. One of the key challenges and opportunities for policy makers is that the possible solutions for addressing soil degradation are as diverse and varied as the situations and circumstances under which they might be applied.

⁸ "the capacity of a soil to function within ecosystem and land-use boundaries to sustain biological productivity, maintain environmental quality, and promote plant and animal health" (Doran and Parkin, 1994)

⁹ This includes within the EU's Thematic Strategy for Soil Protection

Within iSQAPER the goal is the delivery of healthy agricultural soils and in this context limiting future degradation, improving already degraded soils and promoting the ecosystem services that soils can deliver. To achieve this there are multiple actions needed, an array of different potential intervention points and numerous different political and social drivers that interact to impact on soil quality. Figure 1 conceptualises the question of soil health in terms of the environmental threats, outcomes and services associated with its delivery. Each of the different outcomes, threats and services may act as a point where policy intervention may be possible, whether this be to combat a threat or maximise a service to society. However as demonstrated in Figure 1 the ultimate goal or outcome might not be soil health or quality, but motivated by a need or goal in a different policy sphere. Moreover, multiple threats, functions and outcomes can be delivered by the same policy intervention.

The multiplicity of end points, goals and achievements based on a given intervention means that there are potentially significant opportunities and motivators to deliver soil protection on agricultural land. Moreover, there is added value across a number of policy spheres and end points associated with particular interventions. The challenge for delivering soil protection is connecting these elements, the actors, the stakeholder and the value associated with intervention.

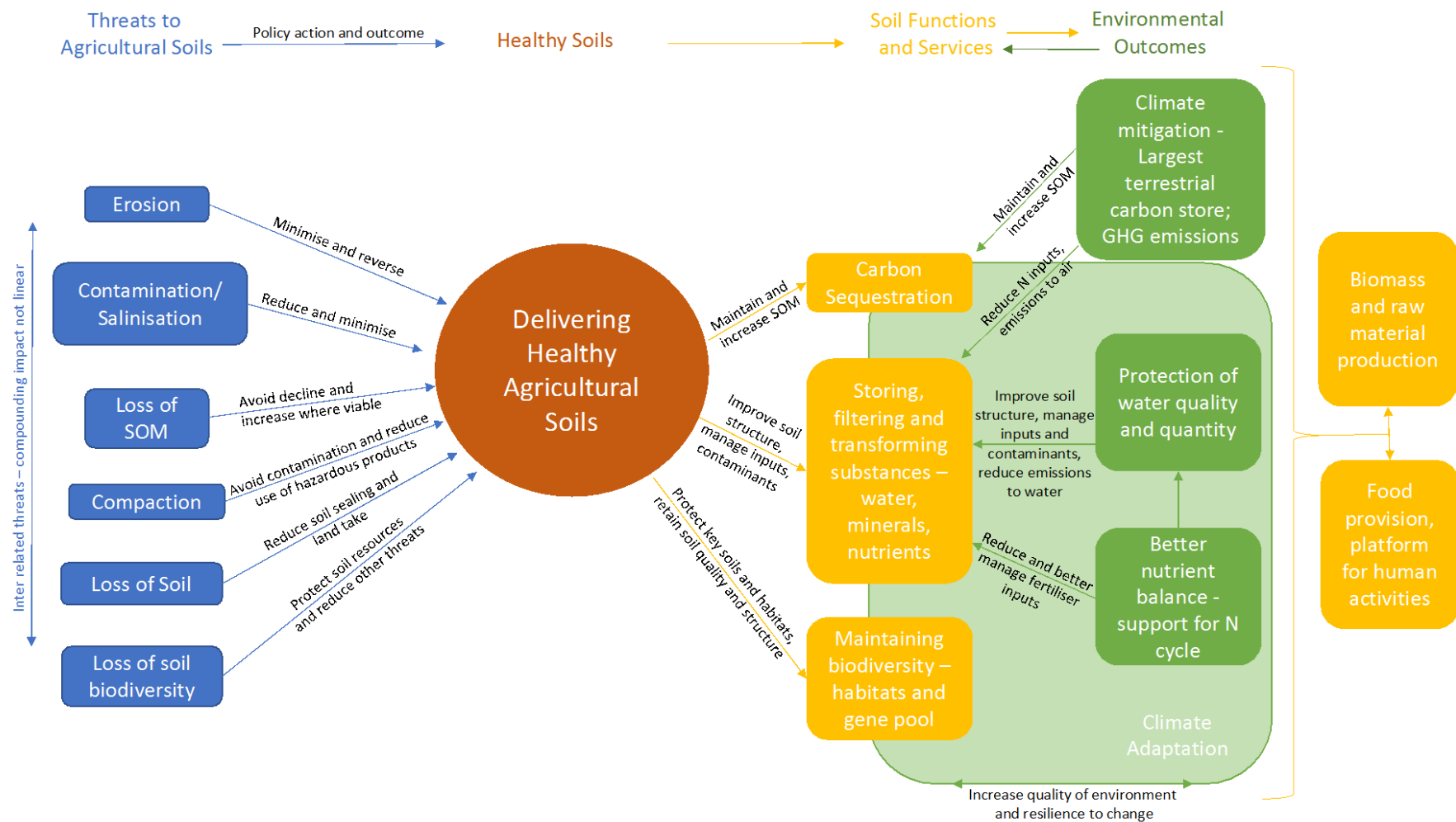


Figure 1 – Interpreting policy demands and needs based on the goal of delivering soil health on agricultural land, addressing key soil threats and delivering soil functions, services and wider environmental goals (Own compilation based on threats, functions and outcomes discussed in the Soil Thematic Strategy, FAO key documents and definitions)

1.2.2 Strategies for Policy Action – Policy to account for Heterogeneous Natural State, Land Use and Management and Levels of Soil Resilience

The multiple drivers for policy action, end points and actor motivations mean that multiple policies across different spheres of action are relevant to deliver soil health, directly and indirectly, implicitly and explicitly. This variation and spread of connections between soil protection and multiple outcomes in terms of environment and sustainable development is explored in the context of international policy and specifically the Sustainable Development Goals in Section 2 of this report.

Soil policy also has another core challenge linked to heterogeneity; the variation in the soil itself. This is driven by both the natural processes that generated the soil and the land use and management regimes to which it has been subject. As noted by Bouma and Droogers (2007) the challenge of classification of soils is at the heart of determining correct management and policy interventions. In terms of soil classifications they argue for both recognition of generic soil types, which they define as genoforms, noting that these do not offer a sensible basis for regulatory action. The genoforms have been transformed with management and use to deliver multiple sub classes of each genoform which they term phenoforms. Applying genoforms to policy questions and land use problems does not work as it is the phenoforms that determine the appropriate intervention. This is a complex way of stating that you can't regulate based solely on the natural characteristics of a soil, nor can you do so based purely on the land management intervention. Regulation has to deal the interaction between the two to promote transition to soil quality in the multiple different settings that exist.

Given the variability and the need for targeted solutions a number of tiered approaches to delivering policy change are set out in relevant literature. The most effective mechanisms for delivering improved land management involve: the careful analysis of land conditions; an understanding of what are the best management techniques for a given area; and the integrated planning of land management decisions at the local level (JRC, 2008). Fullen (2003) identified seven policy needs or requirements for policy to deliver erosion prevention and soil conservation. These include:

- Initiation of national soil conservation services. These organisations should be properly funded and relatively well known;
- Full mapping, monitoring and costing of erosion risk by national soil survey organisations;
- A participatory approach to soil conservation, involving farmers and interested members of the public;
- A cost share partnership between government and farmers;
- The development of rational land use policies such as targeting set aside on steep and erodible land, use of grass strips on erodible arable slopes and the protection and management of riparian zones;
- Increased public understanding and awareness of the value of the soil resource through education encouraging 'land literacy';

- Recognise the broader benefits of effective soil conservation to society.

Bouma and Droogers (2007) propose a modelling based approach to implementing soil protection. This involves a tiered approach to policy implementation based on:

- Water management units in a landscape context;
- Land-use, area hydrology and soil functions;
- Soil threats and relevant soil qualities;
- Drivers of land use change and their future impact;
- Improvement of relevant soil qualities;
- Possibilities for improvements to institutional soil quality arrangements.

The intention of this modelling approach is to systematically define for the landuses, hydrology and soil functions of relevance. Based on this the soil threats and qualities are set out, the drivers of land use change and impact and the improvement goals as a basis for action. This allows the landscape to be broken down to implement action at an appropriate level based on known parameters and goals for the area and at a scale that facilitates stakeholder engagement. This is consistent with findings of Fullen (2003) and others that 'the availability of accurate, high quality soil data is pivotal to a successful policy. A national inventory of land resources is necessary'.

A third element of heterogeneity to consider in relation to the regulation of soils and delivering soil health outcomes is that of soil resilience i.e. a soils resilience to retain their functions and potential to recover following disturbance. Analysis by Schiefer et al (2015) looks at the ability for soils to recover after disturbance and therefore their potential to deliver 'sustainable intensification¹⁰', and future agricultural ambitions. The study identified that almost half of the investigated arable land could not be recommended for sustainable intensification (44%) and 16% could only be recommended with restrictions due to the known soil characteristics.

Soil resilience is considered to be different from simply soil health or a soil's existing state, although it is based on the natural characteristics of a soil. 'Resilient soils have a high rate of recovery, a high elasticity, high buffering capacity, low malleability' (Schiefer, 2015), resilience is based on functional soil characteristics like soil depth, texture, pH, cation exchange capacity and content of organic matter. Indicators used for assessment include SOC, clay and silt content, pH, cation exchange capacity, depth of soil, soil slope. It should be noted that high soil resilience has been noted to always overlap with highly natural fertile soils, however, soils with high fertility were not always highly resilient.

While an individual incidence of soil degradation and specific soils might need tailored solutions, there are some high level actions which have been noted as offering improvements to soil quality more generally. Among the priorities identified relevant to agricultural soils are (European Parliament, 2008):

- The control of inappropriate urban development.

¹⁰ Defined in 2009 by the Royal Society London as 'a form of agricultural production where yields are increased without adverse environmental impact and without the cultivation of more land'

- Reduced emissions of atmospheric pollutants reducing the deposition of chemical limiting processes such as acidification and inappropriate nutrient enrichment.
- Improved management of irrigation drainage.
- The promotion of sustainable agriculture including ceasing the cultivation of unsuitable soils, shifting management practices and reducing impacts of contaminants on farmland.
- Improving waste management.

The above types of policies are considered in the European context both in Section 3.1 at EU level and in Section 3.4 at the national level.

Section 2 – Grounding Sustainability: Land, soils and the Sustainable Development Goals

Note that this chapter of the deliverable was edited and reproduced as a policy brief and 2 page summary under the auspices of iSQAPER for the UNCCD meeting in Ordos, September 2017. It was used as a basis for discussions amongst Civil Society Organisations (CSOs) and for training held for iSQAPER consortium members in Beijing (Plenary meeting Sept 2017). Feedback from discussions that took place in Beijing can be found Annexed to this report.

- for the full brief see http://www.bothends.org/uploaded_files/document/1Grounding_Sustainability_-_briefing_paper_FINAL.pdf
- for the two pager see http://www.bothends.org/uploaded_files/document/1iSQAPER_2-pager.pdf

2.1 Introduction: the international debate on sustainable land management

In the last decades, the issue of soil and land has been raised on the agenda, both locally and internationally. In the discussions of four Global Soil Weeks about land and soils, land tenure played an increasingly important role in bringing soil health¹¹ to the forefront. Land governance is being discussed in the United Nations and has resulted in the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT)¹².

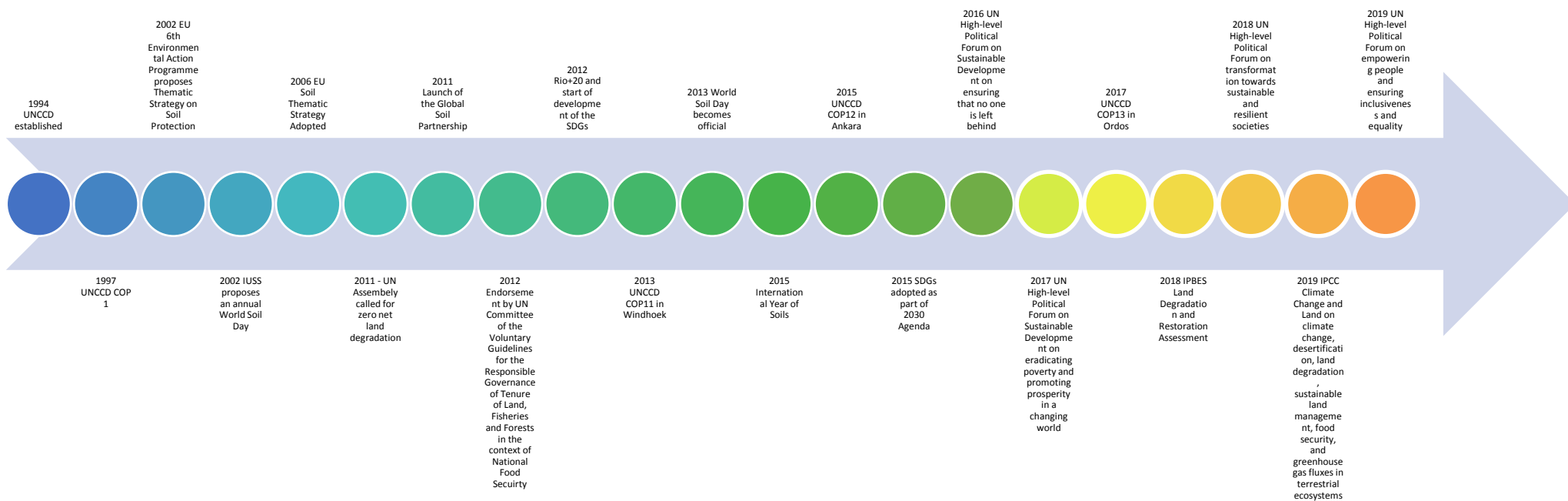
We have seen the growing interest in land tenure and land degradation in international and national UNCCD discussions, which have resulted in the Conceptual Framework on Land Degradation Neutrality and also in the development of a Land Degradation Neutrality Fund. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is developing an international assessment on land degradation and restoration which will be finalised in 2018. The Intergovernmental Panel on Climate Change (IPCC) is commissioning a Special Report on Climate Change and Land, to be ready in 2019, which will address desertification, land degradation, sustainable land management and greenhouse gas emissions. The Sustainable Development Goals (SDGs) embody these considerations and the interconnectedness of soil, land governance, land degradation and restoration, and climate change.

This chapter seeks to offer an analysis of the linkages of the SDGs with land use (decisions) and soil health and to provide insights on and recommendations for the opportunities of the SDGs to enhance soil and land management and restoration. To put these connections into perspective, what follows is a succinct overview of the most recent policy developments (Section 2) and a

¹¹ The terms 'soil health' and 'soil quality' are becoming increasingly familiar worldwide. A modern consensus definition of soil health is "the continued capacity of the soil to function as a vital living ecosystem that sustains plants, animals and humans" (USDA-NRCS, 2012).

¹² FAO (2012) Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security <http://www.fao.org/docrep/016/i2801e/i2801e.pdf> (accessed 6 June 2017)

study of the most relevant SDGs and targets concerning soils and land use (Section 3), followed by an overview of the implications for policymakers, land users, farmers, the private sector, civil society and academics (Section 4).



2.2 Introduction to the Sustainable Development Goals

2.2.1. Origin, objective and interconnectedness of the SDGs

Unanimously adopted by 193 UN Member States and launched in September 2015, the SDGs sit at the heart of the 2030 Agenda for Sustainable Development¹³. These 17 goals aim to advance sustainable development in the world by employing a holistic approach in simultaneously advancing social inclusion, environmental sustainability and economic development¹⁴. The 2030 agenda builds upon the achievements of the Millennium Development Goals (MDGs), which were set for 2000-2015, and fills the gaps that were insufficiently addressed by the MDGs^{15,16}. Whereas the MDGs were directed towards developing countries being ‘assisted’ and ‘helped’ by developed countries, the SDGs are applicable to all countries and divide responsibilities across both developing and developed countries.

The Rio+20 Conference took place in Rio de Janeiro in June 2012; this conference’s outcome document, ‘The Future We Want’ (articles 245-251), officially spurred the development of the SDGs. In the interest of creating a new, people-centred development agenda, global consultations were conducted online and offline. Civil society organisations, scientists, academics, the private sector, citizens, local authorities, national governments and international organisations from around the world were actively engaged in the process. The results of these consultations fed into the negotiations between the UN Member States to develop the final SDGs¹⁷ in 2015.

The 17 SDGs are a reference framework for different actors. Although the SDGs are not legally binding, the 193 member states are strongly expected to integrate the goals in their policies¹⁸. The SDGs are meant to integrate into international, national and regional debates on policymaking and implementation and member states have the primary responsibility to do so. Alignment with international human rights and environmental law can strengthen the enforceability of the SDGs¹⁹. Due to the public commitments and attention for the SDGs, they can serve for all actors, from policymakers and citizens to academics, civil society and the private sector, as a collective language for the discussion of the implementation and progress of sustainable development; furthermore, individuals can align their goals with the 2030 Agenda.

The SDGs are characterised by:

¹³ UN (NA) ‘Historic New Sustainable Development Agenda Unanimously Adopted by 193 UN Members’ <http://www.un.org/sustainabledevelopment/blog/2015/09/historic-new-sustainable-development-agenda-unanimously-adopted-by-193-un-members/> (accessed 6 June 2017)

¹⁴ UN (2015) Transforming our world: the 2030 Agenda for Sustainable Development <https://sustainabledevelopment.un.org/post2015/transformingourworld> (accessed 6 June 2017)

¹⁵ SDG.guide (NA) Chapter 1: Getting to know the Sustainable Development Goals <https://sdg.guide/chapter-1-getting-to-know-the-sustainable-development-goals-e05b9d17801> (accessed 6 June 2017)

¹⁶ The Hunger Project (2014) MDGs to SDGs: Top 10 Differences <https://advocacy.thp.org/2014/08/08/mdgs-to-sdgs/> (accessed 6 June 2017)

¹⁷ Anderson, A (2013) The (Tangled) Road Map to September’s U.N. General Assembly Meeting on the Post-2015 Development Agenda <https://www.brookings.edu/blog/education-plus-development/2013/02/15/the-tangled-road-map-to-septembers-u-n-general-assembly-meeting-on-the-post-2015-development-agenda/> (accessed 6 June 2017)

¹⁸ UN (NA) The Sustainable Development Agenda <http://www.un.org/sustainabledevelopment/development-agenda/> (accessed 5 July 2017)

¹⁹ Miller-Dawkins, M. (2014) Global goals and international agreements: Lessons for the design of the Sustainable Development Goals, Overseas Development Institute (accessed 5 July 2017)

1. **Interconnectedness:** The goals are interconnected via targets and cross-cutting issues, such as land; the goals are also connected via people across regions and borders.
2. **Accountability:** The goals refer to the relationship between rights holders and duty bearers. The goals encourage the duty bearers to take responsibility for the fulfilment of human rights and embolden the rights holders to hold the duty bearers accountable for this responsibility.
3. **Commitment to leave no one behind:** The goals encourage sustainable development for all.



Figure 2 - Overview of the 17 SDGs – UN Official Listings

2.2.2. Monitoring the implementation of the SDGs

The 17 SDGs are divided into 169 targets and 230 indicators, which are used to monitor the progress of the SDGs. The indicator framework was developed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs), based on a process of open consultations and working groups²⁰.

The IAEG-SDGs has categorised the indicators based on existence of an international standard and data availability for the indicator. The group has categorised the indicators according to the following three tiers:

- Tier 1: Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 per cent of countries and of the population in every region where the indicator is relevant.
- Tier 2: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.

²⁰ UNSTATS <https://unstats.un.org/sdgs/iaeg-sdgs/> (accessed 6 June 2017)

- Tier 3: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.²¹

According to the IAEG_SDGs:

*As of 20 April 2017: the updated tier classification contains 82 Tier 1 indicators, 61 Tier 2 indicators and 84 Tier 3 indicators. In addition to these, there are 5 indicators that have multiple tiers (different components of the indicator are classified into different tiers).*²²

The indicators have been (partly) integrated into national monitoring schemes; therefore, member states can report on the indicators' progress. The indicator framework will provide insights into the impacts and results of the SDGs. Yet, at the same time, the challenge remains in the collecting, analysing and processing of the necessary data for reporting²³.

Therefore, the High-level Political Forum²⁴ was established. It is the United Nations' central platform for the follow-up and review of the 2030 Agenda for Sustainable Development and the SDGs. The High-level Political Forum meets regularly to monitor the implementation of the SDGs. In accordance with paragraph 84 of the 2030 Agenda:

*The HLPF, under the auspices of ECOSOC, shall carry out regular reviews, in line with Resolution 67/290. Reviews will be voluntary, while encouraging reporting, and include developed and developing countries as well as relevant UN entities and other stakeholders, including civil society and the private sector. They shall be state-led, involving ministerial and other relevant high-level participants. They shall provide a platform for partnerships, including through the participation of major groups and other relevant stakeholders.*²⁵

Every meeting has a theme and focuses on a specific set of goals; though, the High-level Political Forum will annually consider Goal 17: Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development. Based on the voluntary reviews and dialogues with the major groups²⁶ and other stakeholders²⁷, HLPF will discuss the progress of the SDGs and give guidance on how to deal with challenges regarding the implementation of the agenda 2030.

²¹ IAEG SDGs IAEG-SDGs Tier Classification for Global SDG Indicators <https://unstats.un.org/sdgs/iaeg-sdgs/tier-classification/> (accessed 05 July 2017)

²² *ibid.*

²³ Dunning, C. (2016) 230 Indicators Approved for SDG Agenda <https://www.cgdev.org/blog/230-indicators-approved-sdg-agenda> (accessed 6 June 2017)

²⁴ The United Nations High-level Political Forum on Sustainable Development or HLPF replaced the Commission on Sustainable Development which had lasted for 20 years. The forum meets every 4 years at the level of Heads of State and Government under the auspices of the UN General Assembly and every year under the auspices of the Economic and Social Council

²⁵ UN Transforming our world: the 2030 Agenda for Sustainable Development, paragraph 84 <https://sustainabledevelopment.un.org/post2015/transformingourworld> (accessed 7 July 2017)

²⁶ the official UN major groups are: Women, Children and Youth, Indigenous Peoples, Non-Governmental Organizations, Local Authorities, Workers and Trade Unions, Business and Industry, Scientific and Technological Community, Farmers and Persons with disabilities

²⁷ For example parliamentarians and UN System representatives

2.3 Relevant SDGs for land use and soil health

2.3.1. Land use SDGs

To further illustrate the interconnections between several of the SDGs, soil health and sustainable land use, in the following Sections we will look more closely at nine goals and fifteen related targets. We will also elaborate on the specifics of some of the most salient socio-economic (notably gender and land tenure aspects), ecological and governance dimensions that these SDGs bring to the fore; furthermore, we will examine how these translate into methodological approaches (e.g. in terms of measuring [levels of] environmental stress in relation to agricultural productivity and pollution) and concrete policy recommendations.

These are the land related SDGs and targets²⁸:



SDG 1: End poverty in all its forms everywhere

Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, **ownership and control over land** and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance

Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce **their exposure and vulnerability to climate-related extreme events** and other economic, social and **environmental shocks and disasters**.



SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, **including through secure and equal access to land**, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that **progressively improve land and soil quality**



SDG 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and **soil pollution and contamination**

²⁸ UN Sustainable Development Knowledge Platform <https://sustainabledevelopment.un.org/sdgs> (accessed 26 June 2016)



SDG 5: Achieve gender equality and empower all women and girls

Target 5a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws



SDG 10: Reduce inequalities within and among countries

Target 10.1: By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average



SDG 12: Ensure sustainable consumption and production patterns

Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment



SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

Target 15.a: Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems



SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.

Target 16.3: Promote the rule of law at the national and international levels and ensure equal access to justice for all

Target 16.7: Ensure responsive, participatory and representative decision-making at all levels




SDG 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Target 17.6: Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among

existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

Target 17.16: **Enhance the Global Partnership for Sustainable Development**, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries

2.3.2. SDG 1: End poverty in all its forms everywhere

	<p>Target 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, <u>ownership and control over land</u> and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance</p>	<ul style="list-style-type: none"> Indicator 1.4.2: Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure (Tier 3, Custodians: World Bank, UN-Habitat; partner agencies FAO, UNSD, UN Women, UNEP, IFAD)²⁹
	<p>Target 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce <u>their exposure and vulnerability to climate-related extreme events</u> and other economic, social and <u>environmental shocks and disasters</u>.</p>	<ul style="list-style-type: none"> Indicator 1.5.1: Number of deaths, missing persons and persons affected by disaster per 100,000 people (Tier 2, Custodian UNISDR, partner agencies UN-Habitat, UNEP, DESA Population Division) Indicator 1.5.2 Direct disaster economic loss in relation to global gross domestic product (GDP) (Tier 2, Custodian UNISDR, partner agencies: UNEP, FAO) Indicator 1.5.3 Number of countries with national and local disaster risk reduction strategies (Tier 2, custodian: UNISDR, partner agency: UNEP)³⁰

The establishment of the SDGs in 2015 involved a discussion around the need to recognise land user rights in the targets and indicators^{31,32}. This links to the wider debates on sustainable development in which the relevance of land user rights in social and economic rights has gained ground. The Voluntary

²⁹ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

³⁰ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

³¹ International Land Coalition (2015) Land Rights: An Essential Global Indicator for the Post-2015 SDGs http://www.landcoalition.org/sites/default/files/documents/resources/land_rights_an_essential_global_indicator_-_sep_2_2015_0.pdf; (accessed 6 June 2017)

³² Cordes, K and J. Sachs (2015) Measuring Land Rights for a Sustainable Future <http://ccsi.columbia.edu/files/2015/10/Measuring-Land-Rights-for-a-Sustainable-Future-SDSN-Sept-22-2015.pdf> (accessed 6 June 2017)

Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT), adopted by the UN Committee on World Food Security in 2012, articulate the importance of land tenure rights of female and male farmers, pastoralists, customary land users, young, poor and Indigenous peoples in realising sustainable land use and the right to food, as well as the roles and responsibilities of governments, the private sector and civil society. Article 115 in 'The Future We Want' calls for the implementation of the tenure guidelines³³.

Target 1.4 and the related indicators underpin the crucial role of tenure governance in both sustainable development and ending poverty. Secure land tenure rights enable people to sustainably use their land with a long-term view³⁴. In many countries, particularly in the Global South, the majority of people do not have formally recognised rights to their land. In particular, women, pastoralists, indigenous peoples and young people often lack control over the land on which they live. This is increasingly problematic, as growing pressures caused by both demographic change and heightened demand for food, fodder, fuel and minerals (as a result of increased international trade) lead to increased competition for land and natural resources.

This ecological footprint articulates the linkages between the consumption of products in the EU and the production of these on lands in Southern countries. Consumers in EU have in this way an impact on tenure and use of land in Southern countries³⁵. Secure tenure rights may be a strong enabling factor for people to sustainably use their land, especially in an environment where they can access the right knowledge and means, which benefits soil health³⁶. Indicator 1.4.2 addresses these issues by referring to both legally recognised and perceived land (user) rights of women and men, and different tenure types, such as formal or customary rights³⁷.

Indicator 1.4.2. is categorized in Tier 3, meaning there are not yet suitable methods or instruments to effectively measure the progress on this indicator³⁸. The understanding of the indicator and its concepts is based on the VGGT, as the international leading guidelines on land tenure. As custodians, the World Bank and UN Habitat will stimulate the use of existing administrative data on registered lands and household surveys for monitoring purposes and assisting national governments. Yet, both are researching what additional data are needed and how these can be obtained.

Progress on indicator 1.4.2. will be measured by dealing with the data in two complementary ways: firstly by measuring the incidence of people with secure tenure rights over land among the total population; secondly by focusing on the perceived secure rights to land among the population or communities³⁹. A difficulty to measure the progress on this indicator is that countries are not obligated to monitor progress. For example, the Netherlands has stated that it almost completely complies with indicator 1.4.2 and that the indicator is not applicable to the country⁴⁰. Data and understanding of the

³³ UN (2012) Future We Want - Outcome document <https://sustainabledevelopment.un.org/futurewewant.html> (accessed 6 June 2017)

³⁴ De Schutter, O. (2014) Report of the Special Rapporteur on the right to food - Final report: The transformative potential of the right to food http://www.srfood.org/images/stories/pdf/officialreports/20140310_finalreport_en.pdf

³⁵ European Environment Agency (NA) Ecological Footprint of European Countries <https://www.eea.europa.eu/data-and-maps/indicators/ecological-footprint-of-european-countries> (accessed 5 July 2017)

Soy Coalition (2015) Soja tussenstand 2015 http://soycoalition.org/wp-content/uploads/2016/10/Soja_tussenstand_2015.pdf (accessed 5 July 2017)

³⁶ Giovarelli, R. and Duncan, J. (1999) Women and Land in Eastern Europe and Central Asia <https://pdfs.semanticscholar.org/9862/fb88631160a0529cb1191f99fb71fc131046.pdf> (accessed 5 July 2017)

³⁷ Van Gelder, J. L. (2010). What tenure security? The case for a tripartite view. Land Use Policy, 27, 449–456

³⁸ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 5 July 2017)
UNSTATS Goal 1: End poverty in all its forms everywhere <https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-1.pdf> (accessed 5 July 2017)


³⁹ UNSTATS Goal 1: End poverty in all its forms everywhere <https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-1.pdf> page 10 (accessed 5 July 2017)

⁴⁰ CBS (2017) Meten van SDGs: een eerste beeld voor Nederland, Centraal Bureau voor de Statistiek (accessed 5 July 2017)

challenges and how they vary globally will, however, not exist in the absence of a commitment to report. A challenge remains to urge governments to report on the progress of the indicator.

Target 1.5 also has a strong, albeit indirect, land component. Without secure tenure rights, most farmers are reluctant to make the kinds of long-term investments in and improvements to their land that foster environmental resilience⁴¹. Land tenure security can increase farmers' decision-making power and choices to implement farming techniques that include investing in soil health that are more resilient to climate change.⁴² Investing in strong community forest tenure security has also been shown to be a cost-effective measure for climate-change mitigation when compared with other mitigation measures. For example, China's forest land tenure reforms have increased forestry's contribution to household income and reforestation, and have improved the ability of China's farmers to mitigate and adapt to climate change.⁴³

2.3.3. SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

	<p>Target 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, <u>including through secure and equal access to land</u>, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment</p>	<ul style="list-style-type: none"> Indicator 2.3.1: Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size (Tier 3, custodian: FAO) Indicator 2.3.2: Average income of small-scale food producers, by sex and indigenous status (Tier 3, custodian: FAO, partner agency World Bank)⁴⁴
	<p>Target 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that <u>progressively improve land and soil quality</u></p>	<ul style="list-style-type: none"> Indicator 2.4.1: Proportion of agricultural area under productive and sustainable agriculture (Tier 3, custodian: FAO, partner agency UNEP)⁴⁵

⁴¹ See for example: Lawry, S. et al (2014) The impact of land property rights interventions on investment and agricultural productivity in developing countries <https://www.campbellcollaboration.org/library/property-rights-interventions-investment-agriculture.html> (accessed 17 July 2017) Lovo, S (2016) Tenure Insecurity and Investment in Soil Conservation. Evidence from Malawi <http://www.sciencedirect.com/science/article/pii/S0305750X15002454> (accessed 17 July 2017)

⁴² FAO website 'Climate Change' page <http://www.fao.org/climate-change/news/detail/en/c/473073/> (accessed July 11, 2017)

⁴³ Xu, Jintao, Andy White, and Uma Lele. (2010) China's Forest Land Tenure Reform: Impacts and Implications for Choice, Conservation and Climate Change. Washington: Rights and Resources Initiative, <https://www.researchgate.net/publication/239581532> (accessed Jul 15, 2017)

⁴⁴ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

⁴⁵ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

The second SDG links hunger, food and nutrition security with sustainable agriculture⁴⁶, which illustrates the connection between environmental sustainability and social inclusion in the SDGs. While Target 2.3 focuses on the nexus of agricultural productivity and social inclusion, Target 2.4 zooms in on the relationship between agricultural productivity and the environment.

This attention is also translated into Indicators 2.3.1 and 2.3.2, which focus on income and increased production per land user (not per hectare), and Indicator 2.4.1, which aims to grasp the area under productive and sustainable agriculture. There is tension between the volume produced per unit of labour by classes of enterprise size (2.3.1) and the area under productive and sustainable agriculture (2.4.1). Because the former may imply intensified agricultural production, the question that is next raised is, *how* can production be intensified sustainably? In addition, the three targets may suggest that land users or workers per area will decrease so that the produced volumes per unit of labour will increase (bulk-wise, not the nutritional value), while at the same time, the income of land users will be monitored. These targets might influence the creation of policies that promote large-scale agricultural systems (monocultures and bulk production), where only a small number of people will find employment.

Olivier De Schutter, the former Special Rapporteur on the right to food, argues that agricultural techniques that both have a low level of external inputs and preserve agricultural biodiversity, such as agroecology, have shown increased food production ratios at different farms and in various areas⁴⁷. The International Panel of Experts on Sustainable Food Systems (IPES-Food) confirms that food production can especially increase when diversified agro-ecological methods are applied in situations of environmental stress due to climate change (such as drylands or soil degradation)⁴⁸.

The challenge posed in realising SDG 2 is balancing productivity increases, environmental sustainability and social inclusion in agricultural and food systems, especially in the long run. From this perspective, the interconnectedness of SDG 2 with other goals, like SDGs 3, 12, 15 and 16, becomes very relevant.

FAO is custodian of the indicators 2.3.1, 2.3.2 and 2.4.1. The FAO Statistics division, together with the International Fund for Agricultural Development (IFAD) and the World Bank, are developing a harmonised programme of Agricultural and Rural Integrated Surveys (AGRIS). These surveys can form the basis for the collection of data on several land-related SDG

⁴⁶ FAO' vision of sustainable food and agriculture is "of a world in which food is nutritious and accessible for everyone and natural resources are managed in a way that maintain ecosystem functions to support current as well as future human needs. In this vision, farmers, pastoralists, fisher folks, foresters and other rural dwellers have the opportunity to actively participate in, and benefit from, economic development, have decent employment conditions and work in a fair price environment. Rural men, women, and communities live in security, and have control over their livelihoods and equitable access to resources which they use in an efficient way." <http://www.fao.org/sustainability/background/en/> (accessed 6 July 2017)

⁴⁷ De Schutter, O. (2010) *Report submitted by the Special Rapporteur on the right to food*, United Nations General Assembly. Retrieved from: http://www.srfood.org/images/stories/pdf/officialreports/20110308_a-hrc-16-49_agroecology_en.pdf

⁴⁸ IPES-Food. (2016) *From uniformity to diversity: a paradigm shift from industrial agriculture to diversified agroecological systems*, International Panel of Experts on Sustainable Food systems. Retrieved from: http://www.ipes-food.org/images/Reports/UniformityToDiversity_FullReport.pdf

indicators. The AGRIS programme will provide methodological guidelines on how to conduct surveys in agriculture⁴⁹.

Indicator 2.3.1 has a Tier 3 classification. FAO comments that *sources of information can either be agricultural surveys or agricultural modules in integrated household surveys (e.g. LSMS-ISA) organised by national statistical agencies, with necessary support of the World Bank, the FAO and other international agencies, to ensure methodological rigour*⁵⁰.

For Indicator 2.3.2: Average income of small-scale food producers, by sex and Indigenous status, FAO has not yet developed a methodology.

FAO explains the following regarding the measurement methodology of Indicator 2.4.1:

Indicator 2.4.1 is defined by the following formula:

$$\text{\% of land under productive and sustainable agriculture} = \frac{\text{Area under productive and sustainable agriculture}}{\text{Agricultural area}}$$

Where: agricultural area = arable land + permanent crops + permanent meadows and pastures

The *denominator* agricultural area is a well-known and established indicator that is collected by national statistical offices and compiled internationally by FAO. These data are available from the FAO's database, FAOSTAT.

The *numerator* which is the area under productive and sustainable agriculture captures the environmental, economic and social dimensions of production. The farm surveys, which is the proposed measurement instrument, will give countries the flexibility to identify issues that are most relevant to their priorities and challenges within these three sustainability dimensions.

Land under productive and sustainable agriculture is thus those farms that satisfy the indicators selected across all three dimensions. The main points on which the numerator is based are as follows:


- Maintain the natural resource base in order to ensure sufficient productivity for the foreseeable future.
- Ensure a sufficient level of income in order to keep the livelihood of the entire family steadily above the poverty line and in accordance with the development objectives of the country.

⁴⁹ UNSTATS Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture <https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-2.pdf> (accessed 01 June 2017)

⁵⁰ UNSTATS Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture, page 8 <https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-2.pdf> (accessed 01 June 2017)

- Provide access to safety nets, ensure flexibility in the face of both market and natural shocks and ensure clear ownership and tenure rights, with no discrimination on the basis of gender⁵¹.

2.3.4. SDG 3: Ensure healthy lives and promote well-being for all at all ages

	<p>Target 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and <u>soil pollution and contamination</u></p>	<ul style="list-style-type: none"> • Indicator 3.9.3: Mortality rate attributed to unintentional poisoning (Tier 2, custodian: WHO, partner agency World Bank)⁵²
---	---	--

Healthy lives and well-being for all involve many aspects and topics. Target 3.9 specifically links human health to environmental health, such as air, water and soil. Since the Green Revolution began in the 1960s, agrochemicals have increasingly been used as pesticides (herbicides, fungicides, insecticides, insect growth regulators, nematicides, miticides, molluscicides, rodenticides, etc.) and fertilisers to improve agricultural yields⁵³.

However, the Green Revolution came at a high social and environmental cost, including the depletion of soils, the pollution of groundwater, and increased inequalities among farmers. Furthermore, the productivity gains were not always long-term sustainable and relied heavily on agrochemicals⁵⁴. The runoff and infiltration of these agrochemicals, which contain toxic substances and nutrients such as nitrogen and phosphorus, affect the air, water and soil health, and therefore human lives⁵⁵. In addition to the impacts that pollution has on communities and the ecosystem, the health of farmers and workers using these agrochemicals, due to direct contact or long-term exposure, is also impacted; in fact, the agrochemicals may lead to unintentional poisoning (see Indicator 3.9.3).

Although awareness on the impacts of agrochemicals has risen throughout the years, the challenge remains to reduce their usage in order to ensure healthy lives and well-being for all. In this regard, it is also important to look at SDG 14 on oceans, where Target 14.1 states: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution. The corresponding indicator (14.1.1) is: Index of coastal eutrophication and floating plastic debris density. This indicator also makes the wider connection to nutrient pollution associated with inputs to agricultural land and systems.

⁵¹ UNSTATS Goal 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture, page 10 <https://unstats.un.org/sdgs/files/metadata-compilation/Metadata-Goal-2.pdf> (accessed 01 June 2017)

⁵² Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

⁵³ Hill, E. (2014). The Benefits and Costs of the Green Revolution. Retrieved from <http://www.trinity.net/sam2/view/article/51cbf44f7896bb431f6af545>

⁵⁴ De Schutter, O and G. Vanloqueren (2011) The New Green Revolution: How Twenty-First-Century Science Can Feed the World. Solutions Journal, 2 (4) (2011): 33-44

⁵⁵ UNEP, *Where Nutrients Come From and How They Cause Eutrophication*, Lakes and Reservoirs Volume 3. Retrieved from http://www.unep.or.jp/ietc/publications/short_series/lakereservoirs-3/3.asp (accessed 6 June 2017)

The Special Rapporteur on the right to food, together with the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, argues:

*Today, hazardous pesticides are in excessive use, inflicting damage on human health and ecosystems around the world, and their use is poised to increase in the coming years. Safer practices exist and can be developed further to minimise the impacts of such excessive, in some cases unnecessary, use of pesticides that violate a number of human rights. A rise in organic agricultural practices in many places illustrates that farming with less or without any pesticides is feasible.*⁵⁶


Ferew Lemma of the Ethiopian Ministry of Health turned this issue around during her intervention at Global Soil Week 2017 by stating:

*Nutrition starts in the soil. Whatever grows is what we eat: microminerals in our foods come from our soils. Soil is the foundation of nutrition and health and ultimately our food security. Take care of the soil and the soil will take care of you.*⁵⁷

The World Health Organisation (WHO) as custodian of Indicator 3.9.3 has proposed a guideline for measurement. It suggests:

*The methods used for the analysis concerning causes of death depend on the type of data available from countries. For countries with a high-quality vital registration system, including information on causes of death, the vital registration that member states submit to the WHO Mortality Database can be used, with adjustments where necessary, e.g. for the under-reporting of deaths. For countries without high-quality death registration data, the causes of death estimates can be calculated using other data, including household surveys with verbal autopsies, samples, sentinel registration systems, special studies and surveillance systems. In most cases, these data sources are combined in a modelling framework.*⁵⁸

2.3.5. SDG 5: Achieve gender equality and empower all women and girls

	<p>Target 5a Undertake reforms to give women equal rights to economic resources, as well as <u>access to ownership and control over land</u> and other forms of property, financial services, inheritance and natural resources, in accordance with national laws</p>	<ul style="list-style-type: none"> Indicator 5.A.1: (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure (Tier 2, custodians FAO, UN Women, UNSD, partner agencies UNEP, World Bank, UN-Habitat) Indicator 5.A.2: Proportion of countries where the legal framework (including
---	---	---

⁵⁶ Hilal, E. (2017) *Report of the Special Rapporteur on the right to food (A/HRC/34/48)*, UN Human Rights Council. <http://daccess-ods.un.org/access.nsf/Get?Open&DS=A/HRC/34/48&Lang=E> (accessed 01 June 2017)

⁵⁷ Speech delivered during the opening plenary at the Global Soil Week 22 May 2017

⁵⁸ UNSTATS metadata Goal 3: Ensure healthy lives and promote well-being for all at all ages; Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination; Indicator 3.9.3: Mortality rate attributed to unintentional poisoning, page 2 <https://unstats.un.org/sdgs/metadata/files/Metadata-03-09-03.pdf> (accessed 01 June 2017)

		customary law) guarantees women's equal rights to land ownership and/or control (Tier 3, FAO, World Bank, UN Women) ⁵⁹
--	--	---

Target 5 of SDG 5 integrates gender, land use and tenure rights. While mainstreaming gender in various parts of policies and practices is often a challenge, gender commitments within the SDGs are not limited to one goal. Gender and women's rights are also integrated into other SDGs, for instance, through sex-segregated indicators or targets.

Women and men play different roles when it comes to land use. On a global scale, women produce more than half of all the world's food. In sub-Saharan Africa and the Caribbean, they grow up to 80 per cent of basic food. In Asia, they provide from 50 to 90 per cent of the labour for rice cultivation. In China, women provide over 50% of all agricultural labour.⁶⁰ In addition, women are primarily responsible for preparing, storing and processing food. They also handle livestock, gather food, fodder and fuelwood and manage the domestic water supply, as well as providing most of the labour for post-harvest activities.⁶¹

Despite this, it is men that regularly have more direct access to land tenure and land-related assets⁶² (see Figure 1). For example, across Europe, women typically own less than 30 per cent of landholdings, with only Italy, Austria, Romania and the Baltic States faring better. In China, women are legally guaranteed land tenure rights equal to men. However, a 2011 survey of over 1,700 households across 17 provinces indicated that only 17.1% of the existing contracts and 38.2% of the existing certificates include women's names.⁶³ Compared to men, women often participate less in decision-making processes at both the community level and in broader political processes. In the spirit of the SDGs to leave no one behind, it is, therefore, important to monitor access to ownership and control over land, as incorporated in Target 5a and the related indicators⁶⁴.

Indicator 5.a.1 (a) and (b) on women's ownership of or secure rights to agricultural land is already disseminating by the FAO through the FAO Gender and Land Rights Database. The indicator is classified as Tier 2 and FAO is together with UN Women, UNSD custodian of the indicator. As of May 2015, the database included 83 country profiles, which contain key information on women's land rights and information about customary land tenure and gender and land-related policies. The database has a tool for assessing the extent to which national legal frameworks enable gender-equitable land tenure, assessing 30 legal indicators in different countries⁶⁵.

For indicator 5.a.2, a guideline for measurement has been developed by the FAO. Indicator 5.a.2 is classified as Tier 3. The data is currently being collected through FAO's Legal

⁵⁹ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 14 July 2017)

⁶⁰ FAO (2011) The role of women in agriculture <http://www.fao.org/docrep/013/am307e/am307e00.pdf> (accessed 17 July 2017)

⁶¹ UN Food and Agriculture Organization website (accessed 11 July 2017) <http://www.fao.org/docrep/x0262e/x0262e16.htm>

⁶² UNCCD (2016) *Turning the Tide – the gender factor in achieving Land Degradation Neutrality*. Retrieved from: http://www2.unccd.int/sites/default/files/documents/2017_Gender_ENG.pdf

⁶³ Study conducted by Landesa <https://www.landesa.org/china-survey-6/>

⁶⁴ De Schutter, O. (2013) *Gender and the Right to Food*, Office of the United Nations High Commissioner for Human Rights. Retrieved from: http://www.ohchr.org/Documents/Issues/Food/20130304_gender_execsummary_en.pdf

⁶⁵ FAO Gender and Land Statistics - Recent developments in FAO's Gender and Land Rights Database (2015) and FAO Gender and Land Rights Database <http://www.fao.org/gender-landrights-database/data-map/statistics/en/> (accessed 6 June 2017)

Assessment Tool for gender-equitable land tenure. Indicator 5.a.2 collects policy objectives, draft provisions, existing legal provisions and implementing legislation which reflects good practices and that guarantee women's land (user) rights. Information is then classified by stage of incorporation into the policy and legal framework, using a scale from 0 to 4:

- *Stage 0: Absence of all proxies in the legal framework*
- *Stage 1: A draft policy document provides for the adoption of one or more proxy*
- *Stage 1.5: A formally adopted policy document provides for the adoption of one or more proxy*
- *Stage 2: A bill contains one or more proxy*
- *Stage 3: Primary law contains one or more proxy*
- *Stage 4: Secondary legislation contains one or more proxy*⁶⁶.

Twenty-three countries are currently assessed through the Legal Assessment Tool, namely Cambodia, Chile, China, Colombia, Ecuador, Ethiopia, Ghana, Guatemala, Kenya, Madagascar, Mali, Mexico, Mongolia, Morocco, Nepal, Nicaragua, Panama, Peru, Rwanda, Sierra Leone, South Africa, Tunisia and Uruguay⁶⁷.

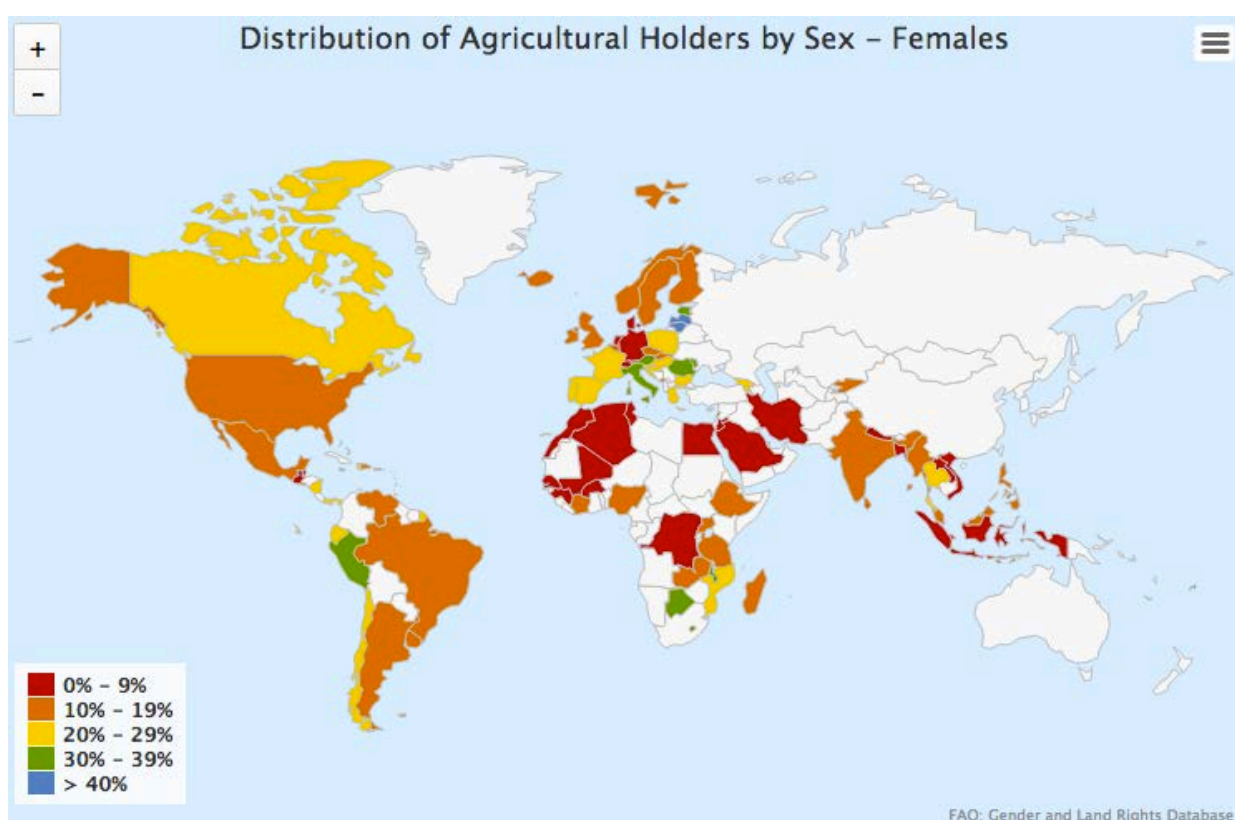



Figure 3: Women's Share of Land Ownership Worldwide Source: FAO Gender and Land Rights Database: <http://www.fao.org/gender-landrights-database/data-map/statistics/en/>

⁶⁶ UNSTATS Goal 5: Achieve gender equality and empower all women and girls; Target 5.a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws; Indicator 5.a.2: Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership or control, page 4 <https://unstats.un.org/sdgs/metadata/files/Metadata-05-0A-02.pdf> (accessed 01 June 2017)

⁶⁷ Gender and Land Rights Database <http://www.fao.org/gender-landrights-database/legislation-assessment-tool/en/> (accessed 7 July 2017)

2.3.6. SDG 10: Reduced Inequalities

	Target 10.1 By 2030, progressively <u>achieve and sustain income growth of the bottom 40 per cent of the population</u> at a rate higher than the national average	<ul style="list-style-type: none"> Indicator 10.1.1: Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population (Tier 1, Custodian: World Bank⁶⁸)
---	---	---

Land ownership and land tenure are critical factors in determining levels of inequality within countries, and thus has a direct bearing on achieving target 10.1. Even in an era of hyper-globalisation, land retains primary importance as a factor of production, store of wealth, and source of status.⁶⁹

This is especially true in predominantly agrarian societies. Land plays a central role in sustaining rural livelihoods and income generation, and the allocation of land holdings influences the ability of households to exploit farm assets and invest in farm technologies.⁷⁰ A relatively even distribution of land holdings therefore tends to correlate with a narrower gap in extremes between rich and poor households.

⁶⁸ Tier Classification for Global SDG Indicators 20 April 2017
https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

⁶⁹ Faguet, J.P. et. al. (2016) "The Paradox of Land Reform, Inequality and Local Development in Colombia"
http://eprints.lse.ac.uk/67193/1/Faguet_Paradox%20of%20land%20reform_2016.pdf

⁷⁰ Naseer, A; Ashfaq, M; Abid, M; Razzaq, A. and Hassan, S. (September 2016) *Current Status and Key Trends in Agricultural Land Holding and Distribution in Punjab, Pakistan: Implications for Food Security*
https://www.researchgate.net/publication/307628146_Current_Status_and_Key_Trends_in_Agricultural_Land_Holding_and_Distribution_in_Punjab_Pakistan_Implications_for_Food_Security (accessed Jul 10, 2017).




Figure 4 - Links Between Secure Land Rights for Women and SDGs - Source: Rights and Resources International http://rightsandresources.org/wp-content/uploads/2017/05/Secure_Community_Land_Rights_Women_SDGs-1024x687.jpg

At the same time, insecure secure land rights limits investment and the up-take of new approaches, practices and technologies in agriculture and undermines sustainable land management. Insecure land rights are thus a major source of social and economic inequality around the world. Increasing tenure security can allow rural households – even those producing on relatively small parcels of land – to invest in their farms through adopting longer-term measures such as soil erosion controls, agroforestry systems, fishponds and the introduction of new experimental technologies. These types of investments typically increase the overall incomes and long-term resilience of small farms, helping to close the gap between household earnings.⁷¹

Within households, increasing land tenure security for women – who in many countries are the primary food producers – is a vital strategy for enabling rural women to achieve income parity with men, and to raise their social status (also relating to target 5.a).

2.3.7. SDG 12: Ensure sustainable consumption and production patterns

<p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p> 	<p>Target 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in</p>	<ul style="list-style-type: none"> Indicator 12.4.1: Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement (Tier 1, Custodian: UNEP)
---	--	---

⁷¹ See for example: Lawry, S. et al (2014) The impact of land property rights interventions on investment and agricultural productivity in developing countries <https://www.campbellcollaboration.org/library/property-rights-interventions-investment-agriculture.html> (accessed 17 July 2017) Lovo, S (2016) Tenure Insecurity and Investment in Soil Conservation. Evidence from Malawi <http://www.sciencedirect.com/science/article/pii/S0305750X15002454> (accessed 17 July 2017)

	<p><u>order to minimize their adverse impacts on human health and the environment</u></p>	<ul style="list-style-type: none"> Indicator 12.4.2: Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment (Tier 3, Custodian: UNSD, UNEP, partner organisations: OECD, Eurostat)⁷²
--	--	--

As food production and consumption lead to substantial environmental and human health impacts, Target 12.4 aims to reduce the release of chemicals and waste to the air, water and soil. This target relates to Target 3.9 to substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination. There are currently more than 40 international multilateral environmental agreements worldwide⁷³.

However, not all of these agreements have been ratified by every country. Furthermore, the efficiency of the agreements depends on the extent to which they are implemented in each country's legal framework and in practice⁷⁴. There are four international multilateral environmental agreements on chemicals or waste, namely:

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (into force in 1992).
- The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (into force in 2004).
- The Stockholm Convention on Persistent Organic Pollutants (into force in 2004).
- The Minamata Convention on Mercury (not yet in force).

Measuring Indicator 12.4.1 thus covers a commitment of states, not the actual implementation of it. Indicator 12.4.4 is classified as Tier 1.

Statistics for the overall hazardous waste generated per capita, as Indicator 12.4.2 refers to, have already been collected at the international level by United Nations Statistics Division, Secretariat of the Basel, Rotterdam and Stockholm Conventions, Organisation for Economic Co-operation and Development (OECD) and Eurostat.

However, the concepts and definitions behind these statistics are not all described by internationally agreed methodologies and are not entirely harmonised among these entities, therefore Indicator 12.4.3 is classified as Tier 3. The United Nations Environmental Programme and the United Nations Statistics Division expect to have a methodology developed by the end of 2017⁷⁵.


⁷² Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

⁷³ The MEA Information and Knowledge Management (IKM) Initiative brings together the Multilateral Environmental Agreements (MEA) to develop harmonized and interoperable information systems for the benefit of the Parties and the environment community at large. www.informea.org

⁷⁴ Raustiala, K. (2001) *Reporting and Review Institutions in 10 Selected Multilateral Environmental Agreements* UNEP.

⁷⁵ UNEP Goal 12: Ensure sustainable consumption and production patterns; Target: 12.4; Indicator and Name: 12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment http://uneplive.unep.org/media/docs/projects/12_4_2_work_plan.pdf (accessed 10 June 2017)

2.3.8. SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

	Target 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt <u>deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.</u>	<ul style="list-style-type: none"> Indicator 15.2.1: Progress towards sustainable forest management (Tier 2, custodian: FAO)
	Target 15.3 By 2030, <u>combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation neutral world.</u>	<ul style="list-style-type: none"> Indicator 15.3.1: Proportion of land that is degraded over total land area (Tier 3, custodian: UNCCD, partner agencies: FAO, UNEP)
	Target 15.a Mobilize and significantly <u>increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems</u>	<ul style="list-style-type: none"> Indicator 15.a.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems (Tier 1/3, Custodians OECD, UNEP, World Bank)⁷⁶

Goal 15, relating to the protection and restoration of terrestrial ecosystems, has several crucial land-related components. Target 15.2, which concerns the protection of forests and efforts towards reforestation, is arguably impossible to achieve without parallel efforts to secure the land rights of forest-based communities.

A growing body of evidence underscores that secure land rights for forest communities are the best defence against forest destruction.⁷⁷ This reflects the growing recognition of the limits of centralised state natural resource management and the role strengthened and devolved land rights for communities plays in the conservation and stewardship of natural resources. Conversely, the maintenance of forests is vital to the food and livelihood security of rural farming households in the Global South. For example, one comprehensive global study in 2014 revealed that forests contribute almost as much to rural incomes as agricultural crops, with about 28 per cent of total household income derived from forests and other natural areas.⁷⁸ The FAO is the custodian agency providing guidance on Indicator 15.2.1, which was upgraded in 2016 from a Tier 3 to a Tier 2 indicator.

Target 15.3 is designed to galvanise action to combat land degradation and desertification. Out of the world's 192 UN Member States, 169 have declared that they are affected by land

⁷⁶ Tier Classification for Global SDG Indicators 20 April 2017 web.pdf (accessed 07 July 2017) https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf

⁷⁷ see for example studies by the World Resources Institute: <http://www.wri.org/our-work/project/securing-rights>

⁷⁸ Published by the Poverty and Environment Network, an initiative of the Centre for International Forestry Research (CIFOR). <http://blog.cifor.org/21825/global-study-forests-livelihoods-poverty-pen>

degradation.⁷⁹ Indicator 15.3.1 is classified as Tier 3. The UNCCD is the custodian to give guidance on Indicator 15.3.1

One concept that has gained traction as a way of assessing, controlling and countering land degradation (including soil loss) is Land Degradation Neutrality (LDN). The purpose of LDN is to maintain or even improve the amount of healthy and productive land resources over time and in accordance with national priorities for sustainable development. LDN is a goal that can be achieved at local, national and even regional scale. At the heart of LDN are sustainable land management (SLM) practices that result in sufficient yield and enhance the resilience of the land and land-dependent communities, while simultaneously avoiding land degradation. Because the SDGs primarily encourage national level action, striving to achieve a land degradation neutral world has been interpreted as, “a world where nations individually strive to achieve land degradation neutrality”.⁸⁰

The focus and aim of LDN is to maintain and improve the productivity of the land through sustainable management and the restoration of the soil, water and biodiversity, while contributing to SDG 1 (no poverty), SDG 2 (zero hunger), SDG 6 (clean water and sanitation), SDG 13 (climate action) and the implementation of the VGGT. According to UNCCD:

*LDN does not advocate for market-based offset or compensation schemes, which have been proven to be complex, problematic and generally ineffective.*⁸¹

LDN encourages inclusive and participatory land use planning at local, national and regional levels through disaggregated targets for SLM and ecosystem restoration. It provides the flexibility to establish baselines for monitoring, to evaluate trade-offs and to prioritise action on the ground at the appropriate scale⁸².

The metrics for LDN are:

- Land cover (land cover change through nationally-refined FAO Land Cover Classification System (LCCS) classes).
- Land productivity (net primary productivity, tDM/ha/yr).
- Carbon stocks (soil organic carbon, tC/ha, to 30 cm).

If any of the three metrics shows significant negative change, it is considered a loss, or degraded land. Conversely, if at least one metric shows a significant positive change and none show a significant negative change, the result is considered a gain, or restored land⁸³.

⁷⁹ IISD SDG Knowledge Hub website (accessed July 11, 2017) <http://sdg.iisd.org/commentary/guest-articles/17-sdgs-but-is-there-a-priority-sdg-target/>

⁸⁰ UNCCD/Science-Policy Interface (2016). Land in balance. The scientific conceptual framework for land degradation neutrality (LDN). Science-Policy Brief 02. September 2016. http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/10_2016_spi_pb_multipage_eng.pdf (accessed 2 June 2017); Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton. 2017. Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. <http://www2.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality> (accessed 2 June 2017)

⁸¹ UNCCD Land Degradation Neutrality - Frequently Asked Questions (FAQs) <http://www.unccd.int/en/programmes/RioConventions/RioPlus20/Pages/LDNFAQ.aspx> (accessed 15 June 2017)


⁸² Land Degradation Neutrality - Frequently Asked Questions (FAQs) <http://www.unccd.int/en/programmes/RioConventions/RioPlus20/Pages/LDNFAQ.aspx> (accessed 2 June 2017)

⁸³ UNCCD/Science-Policy Interface (2016). Land in balance. The scientific conceptual framework for land degradation neutrality (LDN). Science-Policy Brief 02. September 2016.

Indicator 15.a.1 is classified as Tier 1 and 3 as it is compiled out of different components (Official Development Assistance and Public Expenditures). It is defined as the gross disbursements of the total official development assistance (ODA) for biodiversity from all donors (e.g. donors in the Development Assistance Committee of OECD, other donors and multilateral organisations). The sum of the ODA flows from the donors to the developing countries quantifies the public effort for biodiversity in these countries. The ODA marked for biodiversity is captured via the biodiversity marker in the Creditor Reporting System of the OECD; this marker was introduced to this system in 2002. The 'ODA' part is therefore classified as Tier 1. The 'public expenditures' part is classified as Tier 3 and has no work plan yet⁸⁴.

Indicator 15.a.1 does not include private sector resources; as these will be increasingly mobilised (for instance, through the LDN Fund), monitoring these resources and determining the ways in which they contribute to LDN would also be very interesting.

2.3.9. SDG 16: Peace, Justice and Strong Institutions

	Target 16.3 <u>Promote the rule of law at the national and international levels and ensure equal access to justice for all</u>	<ul style="list-style-type: none"> Indicator 16.3.1: Proportion of victims of violence in the previous 12 months who reported their victimisation to competent authorities or officially recognised conflict resolution mechanisms (Tier 2, Custodian UNODC, partner agencies UN Women, UNFPA, WHO)
	Target 16.7 <u>Ensure responsive, participatory and representative decision-making at all levels</u>	<ul style="list-style-type: none"> Indicator 16.7.2: Proportion of population who believe decision-making is inclusive and responsive by sex, age, disability and population group (Tier 3, Custodian UNDP)⁸⁵

Insecure land rights are a major source of conflict around the world. Land is inextricably tied to the use and management of natural resources; including oil and gas, precious metals, minerals, timber and water. In many countries, uncertainty of land ownership has resulted in competition for control over these valuable resources, driving localised land grabbing and creating conflict between individuals, companies, communities and the state.⁸⁶ In many cases, governments play an active role in this process, both by failing to adequately define and protect customary land rights and informal user rights, and by conducting land deals that violate the rights of communities. An estimated 93% of concessions granted to investors in

http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/10_2016_spi_pb_multipage_eng.pdf (accessed 2 June 2017); Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton. 2017. Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany. <http://www2.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality> (accessed 2 June 2017)

⁸⁴ 4th Meeting of the Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs) Agenda Item 6, 7. Review of plans for Tier III indicators and review proposals of developments of indicators that currently do not have an agency involved in their development <https://unstats.un.org/sdgs/files/meetings/iaeg-sdgs-meeting-04/6-7.Tier%20III%20work%20plans-orphan%20indicators%20Plenary%20session.pdf>


⁸⁵ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

⁸⁶ Land Matters website (accessed July 11, 2017) <https://pages.devex.com/land-matters-conflict-resolution.html>

emerging economies for extractive activities are already occupied, setting the stage for widespread expropriation and violence. A study of civil conflicts since 1990 has shown that land was at the root of the majority of them.⁸⁷

Two targets within Goal 16 relate directly to these concerns. Target 16.3 directs states to “Promote the rule of law at the national and international levels and ensure equal access to justice for all”. Upholding and implementing existing international and domestic laws would have a significant positive impact on community land tenure; while ensuring equal access to justice would enable millions of displaced people to get redress for past injustices. Target 16.7, meanwhile, encourages “participatory and representative decision-making”. This relates to the concept of “free, prior and informed consent”, enshrined in the UN Declaration on the Rights of Indigenous Peoples and the VGGT with regards to the right of indigenous communities to maintain control over decisions regarding if, when and how their traditional lands are used by others.⁸⁸ It also relates directly to Principle 6 of the VGGT, which states the responsible governance of land should include consultation and participation of stakeholders affected by potential land use changes.⁸⁹ In addition, land deals in regions of weak governance are often associated with corruption⁹⁰. As such, efforts to “substantially reduce corruption in all its forms”, as set out in Target 16.5, would have a hugely positive impact on land governance.

2.3.10. SDG 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

	Target 17.6 <u>Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation</u> and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism	<ul style="list-style-type: none"> Indicator 17.6.1: Number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation (Tier 3, Custodian: UNESCO-UIS)
	Target 17.16 <u>Enhance the Global Partnership for Sustainable Development,</u> complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable	<ul style="list-style-type: none"> Indicator 17.16.1: Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals (Tier 2, Custodians OECD, UNDP, Partner agency UNEP)⁹¹

⁸⁷ The World Bank website (accessed July 11, 2017) <http://blogs.worldbank.org/developmenttalk/ten-signs-impending-global-land-rights-revolution>

⁸⁸ <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>

⁸⁹ *ibid.*

⁹⁰ For a comprehensive review of this topic see: <https://www.icar.ngo/news/2016/11/15/tainted-lands-corruption-in-large-scale-land-deals>

⁹¹ Tier Classification for Global SDG Indicators 20 April 2017 https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_20%20April%202017_web.pdf (accessed 07 July 2017)

	Development Goals in all countries, in particular developing countries	
--	--	--

The above-mentioned goals are ambitious in striving for a sustainable world. Realising responsible governance of land, sustainable management and use of land, as well as ensuring healthy soils by 2030, require the commitment of various stakeholders. As SDG 17 points out, the SDGs are not solely a matter of the UN Member States; instead, there is a need for close collaboration with and between civil society organisations, scientists, academics, the private sector, citizens, local authorities, national governments and international organisations. These partnerships aim to develop and exchange expertise, knowledge and technology, as well as the mobilisation of financial resources.

The emphasis on multi-stakeholder partnerships is not new and has been incorporated in previous initiatives related to sustainable development and land. The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, for instance, stress that ‘responsible investments [...] should be made working in partnership with relevant levels of government and local holders of tenure rights to land, fisheries and forests, respecting their legitimate tenure rights’⁹². The guidelines also strongly encourage states to organise multi-stakeholder platforms in local, national and international settings in order to implement the guidelines.

In addition, the 2015 Addis Ababa Action Agenda on Financing for Development points to the importance of cooperation to mobilise sufficient financial means for the realisation of the SDGs; furthermore, this agenda stimulates stakeholders to set up platforms through which capacities can be strengthened and scientific developments, technologies and innovations can be exchanged⁹³.

Indicator 17.6.1 is classified as Tier 3 and its custodian is UNESCO-UIS. It is at the moment of writing not clear when a measurement methodology will be developed.

Indicator 17.16.1 is classified as Tier 2 and its custodians are OECD and UNDP. It assesses the number of countries that report progress on multi-stakeholder monitoring frameworks, which track effective development cooperation for the achievement of the SDGs. This indicator is presented as the global aggregate number of countries. According to OECD and UNDP:

For any country reporting on one (or more) multi-stakeholder development effectiveness framework(s), it is considered to be reporting progress when, for the year of reference, the number of indicators within the framework(s) that experienced a positive trend is greater than the number of indicators that experienced a negative trend (relative to the previous reporting round)...

The design of the indicator has practical benefits: (a) the indicator allows for relevant monitoring frameworks to be updated in line with evolving commitments and country

⁹² FAO (2012) Voluntary Guidelines on the Responsible Governance of Tenure of Land, Forests and Fisheries. Retrieved at: <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>.

⁹³ UN (2015) Addis Ababa Action Agenda of the Third International Conference on Financing for Development http://www.un.org/esa/ffd/wp-content/uploads/2015/08/AAAA_Outcome.pdf (accessed 6 June 2017)

*specific context without affecting the spirit of the indicator; (b) the indicator does not presume a globally-set multi-stakeholder framework, acknowledging the diversity of complementary efforts supporting effective development cooperation; (c) the indicator allows participating countries to choose whether they would like to report as a provider of development co-operation, as a recipient, or both.*⁹⁴

2.4 Implications of the SDGs

2.4.1. Implications of land use-related SDGs for policymakers

Although the 2030 Agenda sets out ambitious targets for global transformation, the SDGs are primarily directed towards countries, and hence need to be integrated into national policy frameworks in order to have real impact. In an era when many governments are faced with tight spending restrictions, politicians and policy makers will need to design measures that deliver synergistic outcomes to maximise the benefits of public investments. This is why good governance of and coherent policy regarding land and soils present a major opportunity for policymakers. Measures that promote more sustainable land use, LDN and land tenure security could potentially help countries (and particularly emerging economies) to meet multiple SDG Targets and Indicators (see Figure 5: Linkages and Positive Feedbacks Between Good Land, Soils and SDG below).

⁹⁴ UNSTATS Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development Target 17.16: Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the SDGs in all countries, in particular developing countries Indicator 17.16.1: Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the SDGs, pages 2-3 <https://unstats.un.org/sdgs/metadata/files/Metadata-17-16-01.pdf> (accessed 2 June 2017)

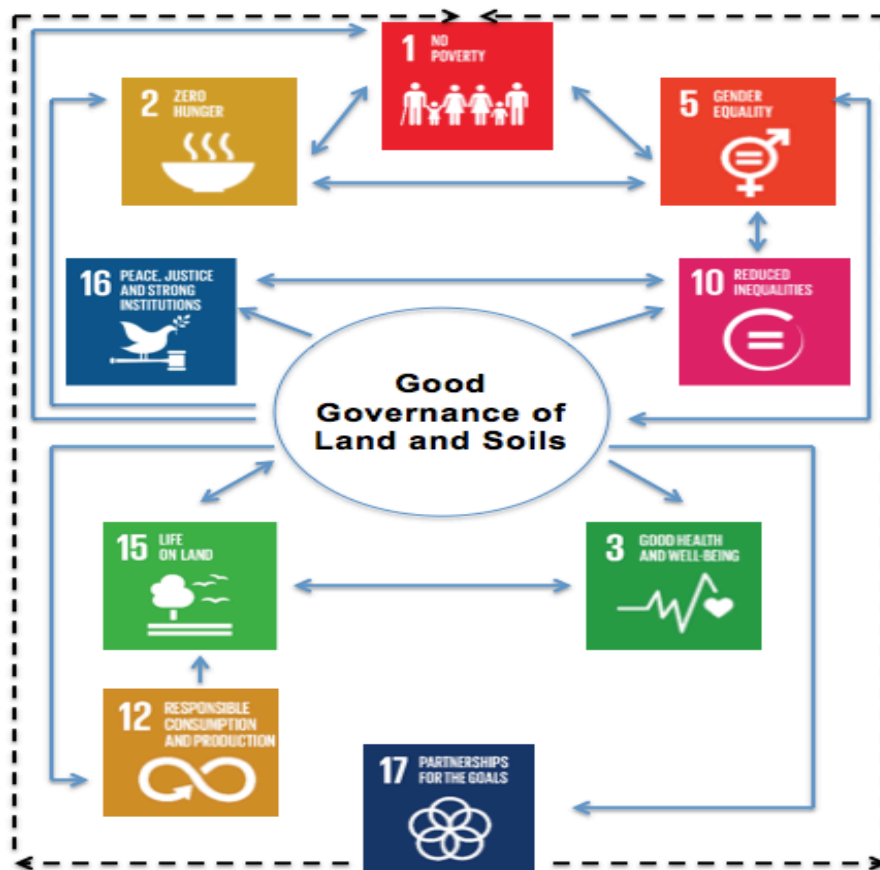


Figure 5: Linkages and Positive Feedbacks Between Good Land, Soils and SDG

As detailed in Section 3, land-related policy reforms could enable States to:

- Achieve secure land tenure for food producers (Targets 1.4 and 2.3), especially for women (Target 5a);
- Support the adoption of sustainable agricultural practices (Target 2.4);
- Increase resilience to climate shocks (Target 1.5)
- Help farmers transition towards the use of fewer agrochemicals (Targets 3.9 and 12.4);
- Reduce inequalities (Target 10.1 and 5a)
- Realise inclusive land use planning and work towards healthy soils (Target 15.3);
- Build peace, rule of law and increased access to justice (Targets 16.3 and 16.7)
- Develop better knowledge systems (Targets 17.6.1 and 17.16.1).

For example, in order to realise SDG 2 on eliminating hunger, policies are needed to support agricultural systems that can deal with environmental stress, increase food production and prevent further land degradation (which relates to SDG 15). Because such systems will need to be less (agro)chemically intensive, they will also help to reduce deaths from chemical poisonings (relating to SDG 3).

To realise SDG 5, gender has to be mainstreamed in natural resources policies, and women's access to land and tenure security needs to be greatly enhanced. Doing so would also create a positive feedback loop, in that it would help to reduce overall social and economic

inequalities (SDG 10) and also contribute to improving food security and reducing poverty (SDG 1). In addition, although SDG 16 is not specifically related to soils and land, governments at all levels need to take measures towards inclusive decision-making for the management and use of land, as well as to ensure access to justice in case of land grabbing and reduce corruption in land deals.

Adopting measures that strengthen land governance, improve soils and achieve land degradation neutrality therefore has the potential to deliver multiple ‘wins’ for national policymakers. However, it could also be argued that the opposite holds true: that political resistance or foot-dragging over tenure reforms or sustainable land use could retard progress towards multiple SDG Targets. It must be remembered that, in many countries, land is a highly political and politicised topic. While securing land rights is critical to achieving sustainable development, efforts to do so are limited by the entrenched interests of local powerful elites. This is compounded by the fact that improving land tenure governance and soil management systems is often a complex, long-term process that can take many years. As a result, many developing country governments (and indeed donors) have shied away from land tenure reforms within their development strategies.

Furthermore, elements of the SDGs relating to land may themselves face political obstacles. For example, policies that address wealth inequalities are likely to face resistance, particularly if the recipients of these forms of redistribution are viewed with suspicion or are politically marginalised. In terms of food security and sustainable agriculture, there is a strong push amongst leading multinational agribusiness firms to position their products and technologies to the forefront of policymakers attention as the solution to solving hunger, conserving soil and protecting ecosystems. The resources available to these companies (and their political supporters) far outweigh those promoting agroecology and similar low/ zero external input farming systems, meaning that such strategies face an uphill battle to win support from policymakers.

2.4.2. Implications of land use-related SDGs for land users and farmers

The implementation of government policies designed to meet the SDGs could affect people with land-based livelihoods in a number of ways, and are likely to be experienced unevenly between and within regions and countries. These outcomes will depend on how various decisions create outcomes that have a bearing on other land use (and SDG) dynamics.

For example, if governments introduce and uphold strong inclusive land tenure laws, land users (and especially women) will be able to invest in longer-term soil health and sustainable land use measures. This should help not only in terms of achieving LDN, but also to increase food security amongst small-scale farmers in emerging economies (again, particularly that of women). Conversely, if governments decide to convert farmland to biofuels or flood large areas for hydroelectric dams in order to achieve energy security and climate mitigation targets, traditional land users in those locations could face declining food security.

Another example concerns the use of agrochemicals. Governments could be persuaded by the view that various packages of high-yielding seed varieties and agrochemicals are needed to meet targets on food security and the protection of ecosystems (e.g. by growing more food intensively on less land). However, other countries could go in a different direction, where

industrialised farming becomes more difficult to practice as policy measures are taken to cut the dependency on agrochemicals, and alternatives such as agroecology are actively supported.

Land users that have not taken care of the soil health will find it difficult to not take action and will invest in soil health (Target 15.3). Land users will be asked by governments to engage in new multi-stakeholder cooperation modes (Targets 17.6.1 and 17.16.1) in order to realise the land- and soil-related SDGs and at the same time, SDG 16 will make land use planning inclusive. Furthermore, realising the SDGs in a sustainable way in the long run, to a large extent, also depends on land users' knowledge and intrinsic motivation towards sustainable land use and soil health, and hence should benefit from partnerships involving the academic and research communities.

2.4.3. Implications of land use-related SDGs for the private sector

In order to achieve the SDGs, it is widely understood that “business as usual” will have to change.⁹⁵ In a literal sense, this means that companies of all sizes will have to adjust their business models to become more sustainable. Because of the multiple ways in which the SDGs touch upon land issues, this is especially true of companies that operate in land-dependent sectors, such as agribusiness, forestry, energy, extractives, infrastructure and tourism firms.

To this end, it is anticipated that policy disincentives for unsustainable land use (Targets 3.9 and 12.4) – in addition to chances or incentives to invest in sustainable land management and achieving LDN (Targets 2.4 and 15.3) – will aim to push the private sector towards sustainable land use and soil health. At the same time, the private sector is expected to become more inclusive and transparent in its decision-making processes regarding natural resources management (Target 16.6). But the SDGs don't just represent a burden of additional regulatory obligations for companies. The World Business Council for Sustainable Development (WBCSD⁹⁶) has identified several opportunities for the private sector in relation to the SDGs:

- ‘Companies that align themselves with the SDGs, and that are able to communicate clearly about how their business helps governments to achieve their goals, will garner a strong ‘social license to operate’ and to differentiate themselves from competitors. Likewise, those that do not will be exposed to growing legal and reputational risks.
- Achieving the SDGs requires unprecedented public and private finance, which translates into new opportunities for business engagement and market penetration. Forward-thinking companies are in a unique position to seize these opportunities.
- The success of the SDGs will create thriving, inclusive economies around the world and provide better social, political and environmental stability across the globe, enabling businesses everywhere to flourish. In other words, we [the private sector] have an interest in achieving the SDGs because business cannot succeed in societies that fail’⁹⁷.

⁹⁵ World Business Council Sustainable Development: The SDGs, one year in: Where do we stand? <http://www.wbcsd.org/Overview/News-Insights/Insights-from-the-President/The-SDGs-one-year-in-Where-do-we-stand> (accessed 06 June 2017)

⁹⁶ The World Business Council for Sustainable Development describes itself as a global, CEO-led, organisation comprises over 200 leading businesses working together to accelerate the transition to a sustainable world.

⁹⁷ World Business Council Sustainable Development: (*op. cit.*)

However, as mentioned above, it should be acknowledged that not all companies are likely to welcome policy initiatives designed to drive greater sustainability of land and natural resources, and therefore that resistance from certain private sector actors is highly probable. It will therefore be important for civil society groups, academics and others (including progressive companies) to continue to push governments to implement land-related policies that support the SDGs.

2.4.4. Implications of land use-related SDGs for civil society

The SDGs are a tremendous opportunity for civil society to advance agendas on secure land tenure and sustainable land use across the donor community, as well as within countries. While the various goals and sub-goals pertaining to land user rights do not form a comprehensive approach to the sector, they do offer a strong advocacy platform to address critical aspects of land governance and soil management. Civil society organisations (CSOs) should coordinate their efforts to provide the impetus for governments to craft context-appropriate land use and tenure rights strategies that harness their potential to deliver on the 2030 Agenda. In particular, CSOs can play the following roles in the implementation of the SDGs:

- Support land user communities, particularly marginalised groups and women, by:
 - Raising awareness about the SDGs, and the linkages between these and human rights/ land user rights
 - Amplifying their voices, and bringing their concerns to the attention of the policymakers.
 - Delivering technical assistance to land users communities regarding implementation of sustainable soil management and land rights initiatives
- Ensure that governments are held accountable by:
 - Engaging public authorities that have responsibility over land issues to highlight related SDGS Targets/ Indicators, and set out positions on how progress towards these could be tracked by those agencies transparently and objectively.
 - Identify specific national land governance and sustainable land management strategies, actions and policies that can help contribute to the 2030 Agenda, and advocate these to donors and governments.
 - Engage voters through public communications campaigns, to raise awareness of land issues in the context of the SDGs, and highlight the responsibilities of elected public officials to deliver on their commitments
 - Call for public mechanisms (or set up parallel civil society mechanisms) that monitor the degree to which government officials and institutions comply with established standards, impose sanctions on officials who do not comply, and ensure that appropriate corrective action is taken when required.⁹⁸

⁹⁸ Office of the United Nations High Commissioner for Human Rights and Centre for Economic and Social Rights (OHCHR, CESR, 2013). 'Who will be accountable? - Human Rights and the Post-2015 Development Agenda' <http://www.ohchr.org/Documents/Publications/WhoWillBeAccountable.pdf> (accessed 6 June 2017)

- Locally monitor implementation of the SDGs, in conjunction with academic institutions, particularly concerning:
 - The responsible governance of land tenure (Targets 2.3), and in particular trends in women's access to, and secure tenure over, land (Targets 5a. and 10.2)
 - The promotion and expansion of sustainable agricultural practices (Target 15.3);
 - The decreasing use of agrochemicals (Targets 3.9 and 12.4);
 - The expansion of sustainable land use, land restoration and the reduction of land degradation (Target 15.3);
 - The inclusion of local land users in decision-making processes regarding land use and land use planning (Targets 15.3, 16.6 and 16.7);
 - The presence and functionality of local judicial and non-judicial redress mechanisms for those affected by land grabs (Targets 16.3 and 17.7)
- Engage private sector actors and seek to identify key 'champions' and 'blockers' of progress towards implementation of land-related aspects of the SDGs; with the aim of collaborating with the former group and seeking to neutralise the latter group

2.4.5. Implications of land use-related SDGs for academics

Academic institutions have a central role to play in ensuring land-related measures are successfully implemented. These roles fall into three categories: knowledge development, tracking and monitoring and advocacy.

Knowledge Development

In order to meet the daunting challenges embedded within the 2030 Agenda, the role of academics in refining and developing new knowledge on sustainable land and soil management will be vital. In particular, SDG 17, which concerns partnerships, is important for academics. Targets 17.6 and 17.16 should ensure financial funds for knowledge development on the implementation of the land use-related SDGs. The focus will be on multi-stakeholder cooperation for knowledge development. It is important that new knowledge for sustainable land management generated through academic research has effective channels for reaching other key stakeholders, including public officials but also including civil society and private sector actors.

Tracking Implementation

Academics also have an important role to play in monitoring the implementation of the SDGs, especially at the local level. Through academic research, reliable and independent data about sustainable land use management and soil health can be gathered; as well as analyses concerning sustainable agricultural practices, the use of agrochemicals, food insecurity, inequality *etc.* Rigorous data is essential in order to track progress towards achieving the SDGs. Again, actively sharing findings with policymakers, land users, civil society and private sector actors can allow these stakeholders to adjust their policies and practices when needed in order to realise the SDGs.

Advocacy

Although academics often see their role as apolitical, it will at times be important for the research community to reach out directly to policymakers (or other constituencies) to highlight the urgency of a particular course of action in relation to land and soils. This is not unprecedented: one only has to think of recent interventions by leading scientists with regards to climate change; or of the medical community with regards to critical public health issues. While public trust in politicians, the media and other traditional voices of ‘respected opinion’ has slumped in many countries, there is still widespread public trust in the academic and scientific community, meaning that statements emanating from research bodies carry particular weight. At times, academics could and should even undertake joint advocacy with other civil society actors, particularly where these actors themselves carry particular expertise in a topic related to land and soils; and/ or have a strong public supporter base and advocacy infrastructure.

2.4.6. Critical Factors for Achieving the 2030 Agenda

As mentioned above, the realisation of the SDGs will rely largely on the extent to which the relevant targets are integrated into country-level policy initiatives, plans and budgets. This brings a number of challenges.

Global Instability

The greatest challenges to harnessing the SDGs for improved land governance and soil management arguably stem from current global political economy meta-trends; security risks/ conflicts, mass migration, economic instability, increasingly polarised and unequal societies, anti-globalisation sentiment, and the rise of populist movements.

The 2030 Agenda sets out highly ambitious targets to address complex environmental, economic and social problems, and hence relies on concerted efforts by nations around the world to succeed. This requires sustained political leadership (at both global and national levels), as well as committed partnerships between various stakeholders. This is especially true in the case of land and soils, which often require long term solutions that can take years to implement. Yet in a world where many governments and populist movements are adopting an increasingly isolationist stance – and where domestic political resolve is being tested by economic uncertainties, security concerns, civil conflicts, migration, etc. – there is high risk that efforts to address sustainable land management and land tenure governance will remain fragmented, piecemeal and under-resourced.

Weak National Governance

The SDGs are likely to go unmet unless more attention is given to addressing governance challenges crucial to their implementation at the national level. Governance fundamentally underpins the ability to “get things done”, yet many countries are faced with weak governance in public sector entities, including endemic corruption, inadequate financial system controls, impunity for powerful elites, ineffective judicial systems, weak enforcement of environmental laws, etc. As noted previously, this is a particularly acute problem in the realm of land and soils, as land governance is, in many countries, beset with corruption and captured by entrenched interests.⁹⁹

⁹⁹ <https://www.weforum.org/agenda/2015/08/3-challenges-facing-the-uns-sustainable-development-goals/> World Economic Forum website (accessed July 12, 2017)

Shrinking Civic Space

Compounding the above, the past decade has witnessed an unprecedented and contagious wave of measures by governments all around the world designed curtailing the ability for civil society (including journalists and even academics) to operate freely. These measures pose a threat to fundamental freedoms and human rights, and in some cases also lead to direct attacks on activists. The land sector has felt this particularly acutely, with rapidly rising threats to land rights defenders. According to Global Witness, more than four people were killed each week in 2016 by police, military private security or hired assassins.¹⁰⁰ In these situations, 'partnerships' between state and non-state actors to achieve reforms to land governance and sustainable soil management become almost impossible.

Finance

Financing remains a key obstacle to implementation. The 2030 Agenda requires a significant mobilisation of resources to succeed; the United Nations Conference on Trade and Development (UNCTAD) World Investment Report 2014 estimated that US\$5–7 trillion a year is needed to finance the SDGs. The Intergovernmental Committee of Experts on Sustainable Development Financing (ICESDF) calculated US\$80–90 trillion in untapped assets for investment and offered blended financing as a major vehicle for 'crowding in' corporate funds. Proponents argue that traditional aid is not growing fast enough but it can be used to encourage private investors to put their own money into projects that otherwise seem risky.

However, this approach remains controversial. Critics argue that public-private finance initiatives are often opaque and generally only attract corporate partners that can make a return on their investments, skewing the policy agenda towards business interests. Furthermore, the evidence that blended finance actually works to pull private sector money into sustainable development initiatives is weak. One review published in November 2016 found that the limited data available on blended finance indicates that, even at high rates of growth, it would be almost impossible for it to plug the SDG funding gap – which is estimated to be as high as \$3.1tn (£2.49tn) annually by 2030. Furthermore, most of the money so far has supported investments in wealthier developing countries and places with lower poverty rates. Energy, construction and mining projects received much of this finance.¹⁰¹ This suggests that, on a global level, there is still a considerable funding gap with regards to wider SDG implementation, including for land based sustainability measures.

Managing Competing Interests

Forming effective partnerships between key groups of stakeholders, such as rural communities, civil society organisations, companies, public officials and academics, is widely recognised as a critical component to achieving the SDGs (as indicated by Goal 17 itself). However, forging lasting partnerships between diverse groups is easier said than done. For a start, who is considered a stakeholder? How are they identified, and by whom? What are the complimentary or potentially competing interests between these groups?

¹⁰⁰ Global Witness (2017) Defenders of the Earth <https://www.globalwitness.org/en/campaigns/environmental-activists/defenders-earth/> (accessed 14 July 2017)

¹⁰¹ *The Guardian* (accessed July 12, 2017) <https://www.theguardian.com/global-development/2016/nov/17/little-evidence-public-private-finance-can-plug-development-funding-gap>

Such questions are often vital with regards to land interventions, as land may be occupied or used by farmers, pastoralists, fisherfolk, indigenous communities, recent settlers, transient workers, etc. Furthermore, the interests of ‘communities’ maybe stratified by age, gender, ethnicity, religion and social class. Similarly, when discussing the ‘private sector’, it is important to consider what type of business is being brought into the process and understand their different interests; e.g. between multinational corporations, national companies, local entrepreneurs, social enterprises or cooperatives. Then there is the question of how to convene these various interest groups, as not all will feel comfortable with, or be able to meet in, the same sorts of venues.

It should also be recognised that the SDGs will sometimes involve trade-offs between interest groups. This may involve difficult political choices that create “winners” and “losers”, at least in the short term. Again, this is particularly relevant to land, as land use decisions tend to favour one set of interests over another. For example, biodiversity could be threatened if forests are cut down to expand agricultural production for food security. Conversely, food security could be threatened if land is switched from food production to growing biofuels for energy security, or to build hydropower facilities for greenhouse gas mitigation.¹⁰²

Tracking Progress

Another important issues will be the monitoring standards used to track progress towards meeting the SDGs. A robust, transparent and participatory accountability mechanism is necessary for people to monitor progress and hold their governments accountable for implementing the SDGs. As highlighted by the UN Secretary-General in his 2014 Synthesis Report, there is a need for a “new paradigm of accountability” to spur people-centred, planet-sensitive development, and to fulfil the 2030 Agenda pledge to “leave no one behind.”

The UN Statistical Commission agreed a first set of 230 indicators to track progress in March 2016. But a third of these were classified as ‘Tier 3’ – meaning they still needed to be developed. Data are lacking for many other indicators (including around land rights). In some cases these gaps are spatial (i.e. no data at national level), in others temporal (i.e. missing data for certain years), and in others lack disaggregation by sub-populations of interest, such as women, or racial, ethnic and religious minorities groups.

Fortunately, opportunities to develop new ways of tracking both environmental and socio-economic trends are emerging due to the pooling of multiple data sources and improving technologies. For example, instead of collecting data on land clearance or desertification at a local level, officials can now obtain sophisticated geospatial data from an analysis of satellite imagery at national, regional or even global levels. Information technology is also making economic and social data available more quickly.¹⁰³ Regular dialogue and engagement with stakeholders can also be an integral part of data gathering processes.

Nonetheless, the lack of agreed standards for measuring progress towards a large number of indicators is an ongoing concern. In the absence of a robust accountability instrument, the

¹⁰² <https://www.weforum.org/agenda/2015/08/3-challenges-facing-the-uns-sustainable-development-goals/> World Economic Forum website (accessed July 12, 2017)

¹⁰³ <http://www.sustainablegoals.org.uk/new-ways-to-measure-the-goals/> (accessed July 12, 2017)

risk of dilution and selectivity in the process of measuring and reporting on progress remains high.¹⁰⁴

2.5 Conclusions

This chapter captures the SDG goals, targets and indicators that are relevant for the responsible governance of land, the sustainable management and use of land, as well as the health of soils. It also highlights that actions taken to improve land governance, increase soil health and achieve land degradation neutrality can make a significant contribution to multiple SDGs, and ultimately to achieving the 2030 Agenda. In particular it highlights linkages between sustainable land use and:

- Target 1.4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property
- Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.
- Target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land
- Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
- Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- Target 5a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws
- Target 10. 1: By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average
- Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle
- Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- Target 15.a: Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

¹⁰⁴ <http://www.tandfonline.com/doi/abs/10.1080/13552074.2016.1142229?journalCode=cgde20> (accessed July 12, 2017)

- Target 16.3: Promote the rule of law at the national and international levels and ensure equal access to justice for all
- Target 16.7: Ensure responsive, participatory and representative decision-making at all levels
- Target 17.6: Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms
- Target 17.16: Enhance the Global Partnership for Sustainable Development

The SDGs provide targeted commitments and a new language that can be used by all actors, from policymakers and citizens to academics, civil society and the private sector, to discuss progress towards sustainable development, and to align their agendas with the 2030 Agenda.

While the 2030 Agenda itself provide a globally ambitious framework, responsibility for driving the SDGs forward rests first and foremost in the hands of national governments, as progress towards realising the goals is largely dependent on individual member states' actions. Changes in national policies and local development plans will thus be crucial for creating appropriate incentives and disincentives for strong land governance, judicious use of land and soil restoration.

This presents both challenges and opportunities. Most governments within democratic societies are relatively short-lived, and the time horizons of policymakers are often limited to the next elections. This runs counter to the medium-to-long term thinking and action that is often needed to improve land rights laws and achieve more sustainable land use. In countries with autocratic regimes, governments may be characterised by greater stability, but are frequently unresponsive to public needs or international pressure to address land-related issues.

In many nations, the land sector is characterised by weak governance, political patronage, corruption and low enforcement of existing laws and policies. In many cases, State security apparatus is an active part of the problem, engaging in forcible evictions of communities and playing a role in violence perpetrated against land rights defenders. Meanwhile, donor agencies, fearful of treading on domestic sensitivities, have often shied away from engaging in land rights issues. Yet facing and addressing these governance issues will be crucial not only for addressing land rights violations and land degradation, but also for achieving the many SDGs Targets with strong land components.

Internal governance failings are not the only obstacle to navigating a path towards land governance in the context of the SDGs. The world is currently facing major upheavals stemming from conflict, mass migration, the threat of terrorism, climate change and economic stagnation. In some cases these have given rise to new populist movements and regimes seeking to withdraw from international policy spaces and cooperative actions. This presents a major threat to a 'globalist' UN initiative such as the 2030 Agenda.

There is also currently a major question mark as to where the money to deliver the necessary changes – known as the 'means of implementation' – will come from. While many donors and the World Bank are keen on so call 'blended' solutions involving public funds to mobilise

private finance, there is limited evidence that this approach will generate sufficient funds to meet the scale of the challenge, or that it can be successful in cases where the interventions do not present clear opportunities for private companies to generate returns on their investments.

Then there is the question of how to manage trade-offs and balance the needs of competing interest groups. This is particularly significant in the context of land, as competing pressures on land for crop production, grazing land biofuels, fodder, fibre, forests, property development, infrastructure, hydropower energy, minerals and oil and gas mean that decisions on how to prioritise certain SDG targets will lead to the creation of ‘winners’ and ‘losers’, at least in the short term. Difficulties in managing these trade-offs could encourage government inertia.

Even where action by policymakers is taken, there are difficulties in assessing where progress is being made on many issues, as the indicators that have been developed to track them lack defined methodologies or readily available data sources. For example, little data currently exists on the proportion of the adult population with secure rights to land. Despite some scattered initiatives, tenure security has never been systematically monitored or measured across nations.¹⁰⁵ Yet this is critical for policymakers to understand, especially given the strong link between securing property rights and various SDG Targets.

Nonetheless, there is hope that progressive reforms to land governance and land and soil management can be achieved. The fact that the SDGs embrace complexity means that policymakers can see the linkages between action in one area and impacts on other targets. This provides a strong logical framework for governments to enact land-related measures that can achieve multiple objectives in helping countries to meet their 2030 Agenda commitments. These linkages will become increasingly difficult for policymakers to ignore, as they also tie into other international frameworks concerning the responsible governance of tenure, indigenous people’s rights, women’s rights, climate change and land degradation and desertification.

Furthermore, it is important to recall that the SDGs were constructed by States as a collective effort, and thus reflect their own priorities. Although the Goals are broad and complex, they have also helped to provide a clearer sense of what ‘development’ is across nations, and to approach the Goals as a joint challenge. Governments are also committed to framing future development financing through the SDGs.

¹⁰⁵ <https://unhabitat.org/experts-reach-important-consensus-on-critical-land-indicator/> UN-Habitat website (accessed July 13, 2017)

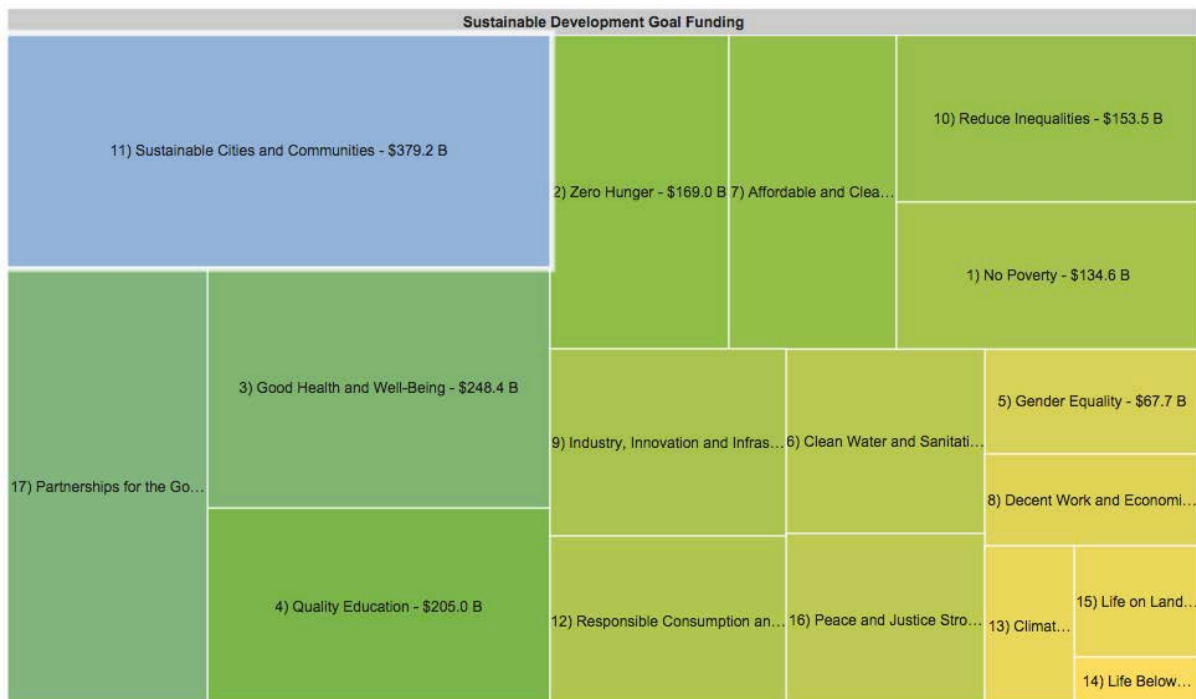


Figure 6: Funding for the SDGs by global goal (\$USD) – Demonstrating the levels of funding and relative levels per SDG - Source: AidData <http://aiddata.org/sdg> (accessed July 13, 2017)

In terms of data, new geospatial technologies and forms of participatory data collection and sharing will be an important part of efforts to fill these data gaps. Furthermore, a high level working group recently agreed on a set of household survey questions to be included within national-level surveys and censuses to measure how secure peoples' land rights are. This agreement will help custodian agencies of this indicator make the argument this October at the Inter-Agency Expert Group meeting on the SDGs that Indicator 1.4.2 deserves to be reclassified from Tier 3 status, where it is in danger of being dropped from the SDG agenda, to a safer Tier 2 status that would allow countries to start the global investments in the data collection of monitoring security of tenure.

But perhaps the greatest cause for hope lies in the multiple stakeholders with an interest in advocating, implementing and tracking land issues related to the SDGs. While accountability for the SDGs primarily lies between governments and their citizens, the 2030 Agenda involves a shared commitment between various actors in the implementation and monitoring progress of the SDGs. These include land users themselves, civil society organisations, the private sector, academics, as well as the UN system. The 2030 Agenda gives the High-level Political Forum on Sustainable Development (HLPF) a central role in overseeing a network of follow-up and review processes at the global level and provides it with a "platform for partnerships".

Multiple actors from within these various communities are increasingly framing their work within the context of the SDGs. It is essential that these actors forge effective partnerships to push for better land governance and sustainable land and soil management to be at the core of the 2030 Agenda. They should also work together to break down the considerable obstacles to sustainable land governance and use and communicate the importance of land-

related policies and actions in yielding progress towards multiple Sustainable Development Goals.

Section 3 – Protecting Europe’s Soils – Policy Solutions and Opportunities

This Section seeks to examine the different types of policy mechanism in place in Europe to protect soils. It provides an overview of the types of intervention and their linkage to soil threat and function. It analyses:

- the policies in place relevant to the protection of soil adopted at EU level (Section 3.1);
- in detail the Common Agricultural Policy (CAP) both in terms of the rules set at the EU level (see Section 3.2) and the role of Member States in delivering and interpreting rules at the national and regional level (see Section 3.3) – The CAP is a key policy, central to changing and supporting on farm management practices in Europe and delivering soil protection. It also represents an example of the important role Member States have in ensuring that the goals and objectives of EU laws are implemented; while CAP rules are set at EU level often the level of ambition and change in practice is determined by how Member States choose to translate and interpret these nationally.
- the nationally initiated policies adopted by Member States relevant to the protection of agricultural soils in Europe (see Section 3.4).

The scoping of European policies undertaken in this chapter has been structured in this way to reflect the, in many ways, unique governance situation in the EU. To understand the level of policy protection and the tools used to protect soils, it is necessary to consider the breadth of EU level policy measures (ie those initiated by the institutions of the European Union), and also understand the national (and at times regional) approaches adopted within EU Member States. Member States have a role both in interpreting and implementing EU level policies and a right of initiative in areas not covered by EU laws. When considering policies relevant to soil protection in Europe there are, therefore, three questions to consider, which this Section seeks to address:

- *Does a policy exist at the EU level determining the rules for soil protection?* (the basis of Section 3.1) – The EU institutions legally hold competence over environmental and agricultural policy development ie. they have the right to generate policies in these fields to ensure the single market and common rights across all Member States.
- *What is the role of the Member States in interpreting and delivering the EU policies in question?* (examined explicitly for the example of the CAP in Sections 3.2 and 3.3) – EU laws and policy, once adopted, is passed to national governments, and in some cases devolved to regional governments, to implement and deliver specified goals and objectives. The exact role of the Member State and flexibilities to adapt and define the approach to implementation will depend on the type of measure adopted at EU level and the specificity of clauses.
- *What is the role of nationally and regionally initiated policy adopted by Member States on their own account in delivering soil protection?* (considered in Section 3.4) – While the EU has competence over environmental and agricultural issues, in the absence of EU policies in an area Member States are free to develop their own approaches. Given the lack of a legally binding, coordinated approach to soil protection and monitoring many have adopted nationally or regionally initiated policies in this field. Moreover,

the EU also has limited competency over issues such as spatial planning which are relevant to soil protection or the protection of agricultural land.

Often studies focus on one of these three questions – for example only reviewing EU level laws. In this Section we have tried to scope out examples related to all the three questions, in order to bring together the different elements and better reflect soil governance in Europe.

3.1 Protecting Europe's Soils – A Review of Policy Action at the EU and Level

3.1.1. Conceptualising Policy at the EU Level

Before examining in detail the European Union policies, laws and measures relevant to soil protection, it is first helpful to set out how policy in the context of delivering soil protection can be conceived. Figure 6 presents a conceptualisation of 'policy' and the consequences and implications of policy for actors. When considering policy questions, it is important to understand that it is not simply 'laws' and their text that are of importance but the whole sphere of action that is elicited as a consequence of requirements.

It is important to note the variety of policy intervention pathways. This of particular relevance when considering soil protection, as soil status change (for the better or worse) is often the consequence of multiple 'policy requirements' that are indirectly or only implicitly linked to soil needs. At the European level this is a consequence of the lack of a strategic, binding law at EU level determining soil issues (Frelich-Larsen, 2017); but (also as presented in Section 1) also fundamentally a consequence of the complex interactions that result in the delivery of improved soil health i.e. that it is linked to so many intervention points and environmental outcomes. Therefore, when considering soil protection, it is important to consider the whole sphere of potential policy influence and change.

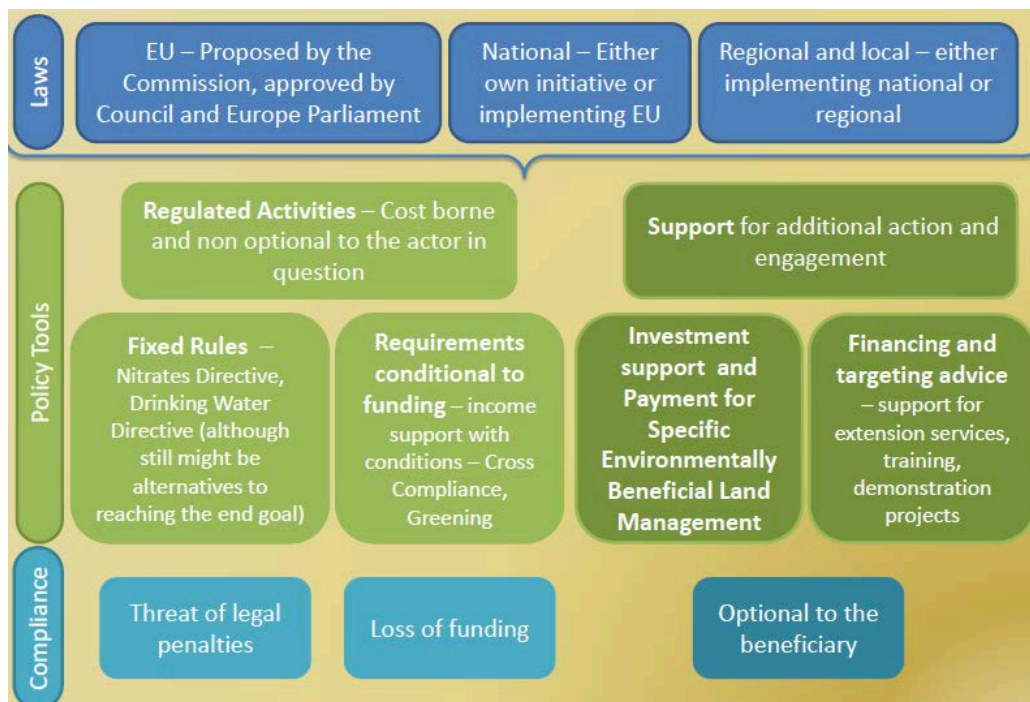


Figure 7 – Conceptualising policy action and the spheres of policy influence. Policy ‘reach’ is greater than the requirements of a specific law in terms of the changes in practice that may result. Own Compilation –Developed by IEEP to represent the breadth of change pathways possible associated with EU laws - iSQAPER Training 2016

3.1.2. EU Policies for Soil Protection

The desire to develop a coordinated policy for Europe's soils stems from commitments made within the Sixth Environmental Action Plan (6EAP). The 6EAP highlighted that 'soil is a finite resource that is under environmental pressure'. It stated that one of its objectives is the 'promotion of a sustainable use of the soil, with particular attention to preventing erosion, deterioration, contamination and desertification'. It also required 'a thematic strategy on soil protection [to be developed], addressing the prevention of, inter alia, pollution, erosion, desertification, land degradation, land-take and hydrogeological risks taking into account regional diversity, including specificities of mountain and arid areas'.

In response to the 6EAP an EU Thematic Strategy on Soil Protection, setting out policy action needed, was adopted in 2006 (COM(2006)231); however, progress towards a dedicated EU law for soil protection action has stalled. The proposed Directive for Soil Protection (COM2006)232) was withdrawn in 2014 following Member States' failure to reach an agreement on the text.

To date, soil protection remains somewhat adrift in that it is not the focus of binding legal action within EU legislation. However, soil protection or soil needs do feature in some EU laws as a secondary objective, i.e. to contribute to the delivery of the primary goal (for example in the water framework Directive) or links are implicitly in place (for example delivering the nitrates Directive implies changes in the management of soils and land to deliver significant reductions in nitrate transfer to water bodies). Soil protection and associated ecosystem services also appear in non-binding, strategic goals set out in EU strategies or roadmaps for environmental protection. For example, Paleari (2017) identified 8 strategic EU objectives considered to address soil protection and its ecosystem services. These include goals for resource efficiency (that by 2050 the EU economy grows in a way that respects resource constraints and no net land take by 2050 set out in the European Commission's Resource Efficiency Roadmap), and species and habitat conservation (by 2020 halting biodiversity loss and accounting and reporting natural capital and ecosystem services set out in the EU Biodiversity Strategy).

In the absence of a coordinating soil policy or binding legislation at the European level focused on soil protection it is, therefore, necessary to look at the whole suite of EU environmental protection policies to identify the measures in place to address soil threats and protect soil functions. Louwagie et al (2010) identified that the most important EU environmental directives for soil quality are the Nitrates Directive and the Water Framework Directive. This is consistent with findings in questionnaires completed as background scoping for analysis under iSQAPER, with the Nitrates Directive noted as most important by multiple case study partners.

At EU level Louwagie et al (2010) noted that six of the soil degradation processes recognised at European Union (EU) level are closely linked to agriculture. Overall, the study concluded that the existing EU policies have the potential to address all recognised soil degradation processes; however, that these policies need to be well targeted and require appropriate farm management in order to reach desired levels of soil quality. These findings imply that the legal text provides opportunities, but how these are coordinated, translated, implemented and transformed on the ground will impact on whether soil protection is prioritised. In this context

it is important to note analysis by Vrebos et al (2017), which identified that the impact of policies (positive or negative) on a soil function is usually not established. The impact will depend on how the policy is implemented by local authorities and the farmers, making it difficult to estimate the overall state and trends of the different soil functions in agricultural ecosystems.

Paleari (2017) also looked at coverage of soil protection in EU level policies, analysing whether an explicit or implicit mention is made and what threats and functions are covered. The analysis concluded that 'The EU is increasingly emphasising the importance of soil protection in strategic terms. Due to its cross-cutting nature, various aspects of soil protection are, however, scattered across many EU policy areas'. 'Soil threats are not comprehensively regulated by the EU legislator and soil protection looks like the by-product of several provisions which mainly set preventative, qualitative and non-strictly binding measures.'

Within the analysis Paleari identified that where provisions existed directly relevant to soil protection the three most common measure types were: good practices; information; and objectives. These are generally non-binding or binding in a limited way. Only 6 out of the 27 pieces of legislation analysed by Paleari explicitly mention soil protection or fighting against a soil threat among their purposes, with soil protection either a tool to deliver another environmental outcome or a secondary issue.

3.1.3. EU Policies Contributing to the Protection of Agricultural Soils

As outlined in earlier Sections Europe does not have a singular policy measure for soil protection, in part due to the failure to adopt legislation to coordinate soil protection and in part due to the multiple policy pathways related to the complexity of protecting soils. This Section, therefore, seeks to analyse the range of policies relevant to soil protection on agricultural land.

Analytical Approach

During the development of the 2016 ‘Updated inventory and assessment of soil protection policy instruments in EU Member States’, in consultation with lead Commission officials, 35 EU level policies were identified as being relevant to soil protection¹⁰⁶. For a measure to be included in the list of relevant EU level policies for soil protection it either: explicitly referenced soil protection; or implicitly would contributed to soil protection through the achievement of other goals - i.e. soil protection may not be the measure’s specified goal or even mentioned in the policy’s text.

It is one question to understand policies with the potential to impact on quality of all soils, it is another to understand those that specifically offer the potential for soil protection on agricultural land. Within this Section the 35 policies have, therefore, been re-reviewed specifically to understand their role in protecting agricultural soils. The detail of this analysis is set out in Table 1. The analysis in the table is based on the original list of 35 policies identified for the inventory, however, analysis and judgements reflected in the table are based on the review of the legislative texts and associated supporting documents such as implementation report. The policies were screened for:

- their relevance to agricultural land i.e. the policies may directly or indirectly impact on soils or management practices taking place on agricultural land;
- their coverage of soil threats (as set out in the Soil Thematic Strategy for Europe);
- the nature of their interaction with agricultural soils; and
- the mechanisms the make use of to delivering change i.e. how the policy is implemented.

Results of the Analysis – What EU Policies have the Potential to Protect Europe’s Soils?

The analysis identified a limited list of policies deemed ‘highly relevant’ to the delivery of protection of agricultural soils (ie that the address issues of soil protection on agricultural land, that include a driver for change and require action to be undertaken). Of the long list of 35 policies 9 were considered in this highly relevant category (identified as *** in table 1). Three of these are actions under the Common Agricultural Policy i.e. delivery of Good Agricultural and Environmental Condition under Cross Compliance, Greening of Pillar I payments and support under the Rural Development Programmes (see Section 3.2 and 3.3 for a full analysis of the CAP measures and their role in delivering the protection of Europe’s agricultural soils). These measures are highly relevant given the inclusion of actions that both directly and indirectly target soil protection combined with the fact that the CAP represents

¹⁰⁶ Systematic analysis of the key policies by IEEP in preparation of the report ‘Updated inventory of soil policies in Europe’ referred to in the references as Frelih-Larsen et al, 2016, the identification of policies was based on discussions with Commission officials, experts in the field and literature review.

a funding stream for farmers i.e.compliance is required in order to receive funds. There is, therefore, a mechanism for eliciting change – assuming the EU, Member States regulators and indeed farmers wish to utilise it (see Section 3.3).

Three of the 9 policies seek to protect soils from contamination: the Environmental Liability Directive (focused on preventing and remedying environmental damage to land, water and biodiversity); National Emission Ceiling Directive (which sets national ceilings for key pollutants based on the ability of soils to deal with contaminants and aims to reduce deposition of air pollutants); and the Sewage Sludge Directive (which seeks to enable the use of sewage sludge as a soil enhancer but under conditions that prevents soil contamination). This group of policies act in very different ways, respectively through the attributing legal responsibility for pollution, by reducing air pollutants and by controlling a product through policy. However, all contribute to alleviating the level of contamination of agricultural soils and/or the threat of future contamination.

Two of the policies identified as most relevant related to the protection of water bodies: the water framework Directive; and the closely related Nitrates Directive. The water framework Directive sets out a framework for River Basin Management Plans, which depending on the coverage and pressures with the relevant catchment, could have a potentially important impact on soil management given the emphasis on water quality (implying control of erosion, soil inputs, etc) and water quantity (include water retaining capacity of soils linked to compaction and soil organic matter content (SOM)). The Nitrates Directive sets out Nitrate Vulnerable Zones within which inputs of nitrogen-based fertilisers are restricted to protect water bodies. The zones can be powerful drivers for change; where inputs are restricted this can push a change in soil management practices beyond simply reducing nitrogen inputs. However, NVZs only cover a portion of agricultural land.

Finally, LIFE+ (an EU level funding instrument for environmental and climate action that can support demonstration projects including for soil protection) was identified as highly relevant. LIFE+ explicitly offers the possibility of supporting actions for soil protection, including demonstration projects on agricultural land. However, it should be noted that Member States determine LIFE+ funding priorities; therefore, while there is the opportunity to invest in soil protection actions, the nature of projects proposed and supported will depend upon national priorities. It should also be noted that, in the absence of a clear driver to deliver soil protection (for example there is no binding target for soil protection as there is for example for water protection or climate mitigation) there may be less political will to promote projects focused exclusively on soil protection.

In the category ** i.e. where measures are potentially relevant but either currently lack links to intervention points on agricultural land, are non-binding or are still under development; some important future opportunities can be identified. For example, there are important developments under negotiation between the European institutions (at the time of drafting) relating to climate mitigation that have the potential to impact on soil protection. Specifically, the evolution of rules on Land Use and Land Use Change and Forestry (LULUCF) and Effort Sharing (where targets are set for GHG emission reductions from non EU Emissions Trading sectors including agricultural emissions of non CO₂ gases) represent potential opportunities to integrate soil protection better with climate mitigation goals. For example, implementing

LULUCF could imply retaining existing soil carbon within agricultural soils and potentially putting in place management measures to further sequester carbon in agricultural soils. However, as yet the connection between delivering soil carbon under LULUCF and the ability of farmers or land managers to be rewarded for such action has not been fully integrated. Climate policies may emerge as important, particularly in light of the ability to offset gains the LULUCF sector with emissions associated with sectors subjected to the effort sharing rules i.e. emission savings in relation to soil carbon could be used to offset other emissions in the agricultural sector or emissions from other sectors covered by the effort sharing rules including transport.

Other policies under the ** relevant but limited category may make important references and set objectives for soil protection, but these are strategic in nature and not linked to binding action to operationalise the goals. This is the case for example for the Soil Thematic Strategy, the Climate Adaptation Strategy and the Guidelines for Soil Sealing. Other policies while important may only cover limited portions of agricultural land, for example, the habitats and birds Directives. Alternatively while EU law may imply that a measure may have the potential to protect agricultural soils key rules and interpretation of these is left largely up to Member States. In some cases the connection is not strong enough between soil needs and the topic in question to know the extent to which soil concerns will be addressed during implementation, for example, Environmental Impact Assessment Directive and the Pesticide Framework Directive.

Although measures addressing soil protection are dispersed across different elements of EU policy it is worth noting that a number of highly relevant policies address the question of reducing pollution of soils and will be highly relevant to agricultural soil contaminate loading i.e. the Liability Directive, National Emissions Ceiling Directive and the Sewage Sludge Directive. In addition there are other measures (listed as relevant or less relevant) that also seek to control external pollution sources, which historically may have impacted on agricultural land. These include the landfill Directive, waste framework Directive and industrial emissions Directive. This body of measures would seem to act collectively to mitigate significantly emissions from external sources that could impact on agricultural land.

In contrast there are fewer measures that deal with possible sources of contamination resulting from agricultural land management or the additions to land made during agricultural production. The sewage sludge Directive deals with contaminants in this potential soil enhancer. In addition proposals (at the time of writing) are under negotiation to amend the fertilisers Regulation to include limits on potential contaminants in soil improvers. The pesticide framework Directive offers a potential basis for controlling potentially negative impacts of inappropriate pesticide use. However, the detail of how objectives and targets are set, training programmes and other actions are rolled out is left to Member States to determine within National Action Plans.

Key Messages

Connecting policy instruments with drivers for change in soil management is an important theme when looking at the policies identified as highly relevant or relevant for soil protection on agricultural land. Under LULUCF, for example, there currently is a disconnect between the high level goal and the ability to record and reward positive action on farm. Very

few would argue that increasing and retaining soil organic matter and soil carbon on agricultural land is important for both climate mitigation and adaptation. However, making the connection between the high level instruments and the drivers of change can be challenging.

In terms of delivery of change the importance of the CAP should be noted. Not only is the CAP a policy in its own right that is highly relevant to protection of agricultural soils, it is also important in delivering a wide range of other policies. In this case many of the other policies have also been identified as highly relevant or relevant to agricultural soil protection. For example, the water framework Directive and the Nitrate Directive both highlight CAP measures as important in delivering their goals. In a recent review of Member States policies (current and future) relevant to the implementation of LULUCF, all Member States highlighted the importance of the CAP for delivery of the policy in their country (Paquel et al, 2017). The delivery of both the Pesticide Framework Directive and the Floods Directive is also noted to be dependent, at least in part, on CAP implementation. Moreover, multiple strategies and policies also rely in part on the CAP to deliver their aims in terms of soil protection including the Climate Adaptation Strategy and the Resource Efficiency Roadmap.

The important role of Member States, national and regional governments, in relation to the prioritisation and implementation of policies that contribute to the protection of agricultural land and its soils should be noted. Multiple policies require Member States to take decisions that determine coverage both spatially and strategically. These include the CAP, Water Framework Directive, Nitrates Directive, LIFE+, the Pesticides Framework Directive, Floods Directive, Habitats and Birds Directives

Table 1 – EU Level Policy Measures Deemed Relevant to Soil Protection¹⁰⁷, Summary of the Measure, Consideration of their Relevance to Agricultural Land (*) highly relevant in terms of coverage and ability to deliver soil quality impacts on agricultural land; ** relevant but limited by non-binding/strategic nature of the policy or lack of clear pathway to change; * low relevance to agricultural land management due to subject coverage and mechanisms for change), their Coverage of Soil Threats and Mechanism for Delivering Change. Policies are classified by area of intervention.**

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
Overarching instruments							
Soil Thematic Strategy (COM2012)46)	Provides a framework for action on soil protection in Europe, identified gaps in coverage including on contamination and soil monitoring, sets out a comprehensive framework for soil protection, and proposed a framework Directive to protect soils.	**	S	D	Objectives focused on all EU soils	Erosion, Floods, Salinisation, compaction, Loss of SOM, Loss of biodiversity, Contamination/diffuse pollution, sealing – all reflected upon in terms of conceptualizing soil threats	Required additional action to bring forward legislation at EU level, legislation subsequently blocked and withdrawn in 2014
7 th Environmental Action Programme (Decision 1386/2013/EU)	Sets the strategic direction for environmental policy in the EU, recognizes the need for soil protection and sets that 'land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway' by 2020	**	S	D	Objectives focused on all EU soils	General statement re condition of soils. Includes explicit reference to contamination including diffuse contamination, soil sealing desertification in the context of delivering the UNCCD, and reduction in soil erosion and calls for increasing effort to address SOM loss	Strategic objective to be delivered via other policies including CAP, water policies, biodiversity and planning policies
Circular Economy Action Plan (COM(2015)614)	Sets out a programme of action to stimulate Europe's transition to a circular economy includes measures including on waste management and fertilizers that may impact on soil quality and SOM	*	S	I	Impact on fertilizer products	Primarily relevant to Loss of SOM and soil contamination in the context of the revision of the Regulation on fertilisers that includes coverage of contaminants and labelling for all fertilising products including organic soil improvers.	Via amends to the fertiliser Regulation
Resource Efficiency Roadmap (COM(2011)571)	Promotes soil and land as key resources and the need to integrate protection of ecosystem services into policy. Sets out strategic objectives for EU policies to take into account their direct and indirect impact on land use in the EU and globally and to achieve no net land take by 2050;	**	S	D	Not specific to agricultural soil protection but clearly relevant given erosion/SOM focus	Specifically highlights soil erosion and SOM maintenance/increase, reduction in soil contamination although seem focused on remediation of point sources not diffuse pollution more commonly associated with agricultural soils	Action continuously required by MS to reduce erosion/increase SOM but no binding requirements for MS action. Commission brought forward guidelines on soil sealing as required under the roadmap

¹⁰⁷ As determined in discussion with European Commission officials to determine the baseline for the 2016 update of the soil policy inventory, judgements regarding coverage and relevance to agricultural land are based on analysis of the policies themselves and do not represent the views of the European Commission.

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
	continuously implement action need to reduce soil erosion and increase SOM and set up schedules to remediate contaminated sites						
Horizon 2020 (COM(2011)806)	Programme for research and innovation from 2014-2020, framework for funding pan European projects.	**	R&D/F	D	Can fund research on soil protection on agricultural land	Supports projects to address societal challenges that may focus on better understanding of soil management	The priorities will depend on the calls that are specified under the research fund
LIFE+ Programme (1293/2013/EU)	LIFE+ provides support for projects for environment and climate action	***	R&D/F	D	Can fund research and demonstration projects related to soil protection on agricultural land	Financial support includes projects focused on soil biodiversity, actions for low carbon and climate resilience, resource efficiency for soils, projects aimed at integrating environmental and climate considerations or action by civil society in relation to soil protection.	Member States are free to propose specific projects related to soil. Outcomes are dependent on MS choice.
Agriculture and forestry							
Common Agricultural Policy (CAP) including action relating to: Cross compliance specifically GAECs, Pillar I Greening and Rural Development Programmes under Pillar II	The CAP represents the framework for support for EU farmers under which payments can be received based on compliance with certain environmental rules and requirements. This includes requirements linked to Pillar I including rules on Good Agricultural and Environmental Condition (GAEC) and Greening – both require certain actions by farmers with strong links to soil protection; under RDPs these national or regional programmes offer funding opportunities for additional investment beyond the baseline of GAEC and greening and includes soil protection activities	***	B	D	Highlight relevant and a mechanism for funding specific soil protection practices and management interventions	Has the ability to address all soil threats linked to the management of agricultural land by the farmer or land manager (as oppose to threats driven by other pressures such as soil sealing, contamination from non-agricultural sources)	Delivered at the national and regional level hence application and requirements may vary and coverage of agricultural land area. Offers an opportunity for proactive management change but it depends on the prioritization and national rules applied. In addition, CAP reform post 2020 looks set to significantly amend the CAP infrastructure and mechanisms for prioritizing investments. See details analysis in Sections 3.2 and 3.3
Forest Strategy (COM(2013)659)	Very relevant to the management of rural land and priorities, but not specifically to agricultural land	*	S	D	*	Very relevant to soil protection, albeit on non-agricultural land but given principles of subsidiary much depends on action delivered by Member States and/or linked to choices in terms of spending of EU funding including under the RDPs	National policies and through spending of EU funds including under RDPs
Industrial (point source) contamination							
Environmental Liability Directive (2004/35/EC)	Enacts the polluter pays principle to prevent and remedy environmental damage to land, water and	***	B	I – word soil is not used but	Applies to all land including agricultural land emissions to	Relates primarily to point source contamination of land and incidents where land management results in the pollution of	Binding measure, requires actions by MSs to implement, identify risks etc

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
	biodiversity – land being any land contamination that creates a significant risk to human health			land contamination	agricultural land or from agricultural activities.	water/impacts on biodiversity. Importantly requires preventative action as well as remediation	and to bring polluters to account if incidents occur.
Industrial Emissions Directive (2010/75/EU)	Proactively seeks to reduce and prevent emissions to land, water and air	*	B	D	Focuses on industrial emissions	May indirectly protect agricultural land from transferred emissions of contaminants from industrial point sources	Binding rules implemented through permit conditions by Member States i.e.to control and limit polluting activities
Landfill Directive (99/31/EC)	Controls all aspects of landfilling of waste including permitting, site management, monitoring and reporting	*	B	D	Limited link, although historically illegal or uncontrolled landfilling often took place on agricultural land	Aims to control pollution from landfilling potentially reducing contamination risk on agricultural land	Binding rules linked to permitting and operating and end of life management of landfill sites delivered by MSs.
National Emission Ceiling Directive (2001/81/EC)	Requires MS to limit their annual national emissions of pollutants including SO ₂ , NO _x , VOC and NH ₃ .	***	B	D	Relevant to the diffuse contamination of agricultural soils	Highly relevant to the diffuse contamination of agricultural soils and loss of soil quality associated in particular with acidification but also wider contamination. NEC is also important as it is a key policy that is determined by the ability of soils to deal with contaminants and consequences of deposition. Agriculture also contributes to emissions under the NEC specifically dominating NH ₃ emissions hence this may provide a mechanism for changing management	Sets national limits on emissions based on the degree of impact on receiving soils. Member States have to develop policy tools to meet their given ceiling.
Waste Framework Directive (2008/98/EC)	Lays down measures to protect the environment and human health by preventing or reducing impacts of the generation and management of waste.	*	B	D	Limited relevance except if historically waste management was taking place on agricultural land in an uncontrolled way	Requires that MS undertake waste management without endangering human health or the environment and in particular without risk to water, air, soil, plants or animals	Requires MS to implement actions relating to the limiting of emissions and permitting of waste management, handling and transportation as well as disposal.
Cohesion Fund (Regulation 1303/2013)	Offers opportunity to invest in soil specifically focused at decontaminating brownfield sites and disaster management including flooding	*	R&D/F	D	Only in that increased brownfield development may reduce (in a limited way) agricultural land losses	Impacts on point source contamination, limited relevance to agricultural land	Provides funds to support investment
European Regional Development Fund (Regulation 1303/2013)	Offers the opportunity to invest in soils but the emphasis is on urban regeneration and decontamination of brownfield sites. There are	*	R&D/F	D	Not focused on agricultural soils and	Contamination but primarily linked to urban point sources	Provides funds to support investment

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
	also potential links in terms of disaster resilience to flooding and adaptation				other competing priorities		
State Aid Guidelines (2014 C200/1)	The guidelines set out how MS may use national support in line with provisions of the internal market	*	R&D/F	D	Limited given single market rule	Focus on remediation of contaminated sites where no third party can be identified/held legally responsible. State aid is also permitted for resource efficiency under certain conditions this may extend to soil protection	Sets out rules within which MS can fund measures nationally.
Diffuse pollution and water management							
Water Framework Directive (2000/60/EC) and linked measures the groundwater and drinking water Directives	Aimed at protecting and improving the qualitative and quantitative status of water bodies. Many aspects of the WFD contribute to positive soil outcomes as: many of the threats to water arrive in water bodies via soils; the management framework of the WFD i.e. use of river basin management plans encourages wider catchment integrated planning which can provide a platform for coordinated soil protection	***	B	D	Depending on the implementation of local river basin management plans and pressures this can push towards changes in soil management practices	The WFD is explicitly relevant to the control of pollutants and nutrients, water erosion, flooding and indirectly relevant to linked threats such as compaction, loss of SOM, soil sealing etc.	Level and nature of soil protection on agricultural land will depend on the quality of water status and priorities set out in local river basin management plans. However, there remains a significant implementation challenge and without this being addressed many of the knock on benefits for soils will not be addressed. The Commission assessment of RBMP (COM(2015)120) found few examples of additional measures to tackle pressure on water bodies.
Nitrates Directive (91/676/EEC)	Aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting good farming practices. Integral part of the water framework Directive. Requires the allocation of nitrate vulnerable zones (NVZs) where measures are adopted to restrict nitrate application.	***	B	E	Limits use of N based fertilizers on agricultural land associated with vulnerable water bodies	Designed to address the specific threat of diffuse pollution, although specifically diffuse pollution of water rather than of soils. However, in delivering dramatically reduced nitrogen inputs to soils or limiting/managing N inputs better other soil benefits can result from the more holistic management of the soil resource.	Delivered by limits on areas designated as NVZs. However, NVZs are designated based on water quality indicators and needs not those of the soil. Can be a strong push to change land management and towards better consideration of soil management but only applies to designated areas of Europe.
Pesticide Framework Directive (2009/128/EC)	Primary focus is to protect human health and the environment from possible risks associated with the use of pesticides. Includes provisions controlling pesticide use, storage, management,	**	B	I	Soil protection is a beneficiary of action rather than the intended primary output.	Focused on reducing pollution (diffuse and point source) associated with pesticide use and management. In addition soil threats including erosion and compaction are noted	Implementation is focused around National Action Plans (which define national objectives, targets, measures and timetables) and strongly linked to

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
	awareness raising re good practice, limits on certain types of practices, training					as risk factors increasing the likely wider impact on pesticide use.	other key policies such as CAP requirements
Sewage Sludge Directive (86/278/EEC)	Places limits upon and sets out provisions for the use of sewage sludge on agricultural land. Aims to protect the environment and health but also specify the conditions under which sewage sludge may be used as a soil additive.	***	B	D	Directly aimed at protection agricultural soils from contamination	Aims to maximize the appropriate use of a soil improver resource and also minimize risk of contamination of agricultural soils.	Delivered through limits to sewage sludge addition and rules of testing for contaminants.
Nature protection, land and soil sealing							
Habitats (92/43/EEC) and Birds Directives (2009/147/EC)	HD – Establishes a framework for the protection of biodiversity in the whole EU including special areas of conservation (SACs) as part of the Natura 2000 network. BD – Framework for establishing the conservation of all species of naturally occurring birds in the EU, requires designation of special protected areas (SPAs) and conservation measures associated	**	B	I	Implies protection and management of land within SACs/SPAs to deliver favorable conservation status, many SACs/SPAs focus on agricultural land	Not specific to soil threats, MS are free to select the most suitable measures to increase conservation status and this may include measures to promote improved soil quality. Types of actions include reduced inputs, reduced fragmentation of habitat, reduced intensity of agricultural management i.e. reduced areas of monoculture	MS are required to deliver the establishment of SACs/SPAs and their management. However, implementation approaches and priorities vary across MSs.
Biodiversity Strategy (COM(2011)0244)	Sets the EU 2050 vision and 2020 targets for maintaining and protection biodiversity	**	S	I	Not specific to agricultural land but potentially relevant	Does not explicitly address soil protection but a number of its targets and actions will indirectly address a number of soil threats given these may be also linked to habitat degradation or loss – including indirectly links to acidification, compaction, contamination, erosion, flooding, loss of SOM	Provides no mandatory requirements but actions delivered via EU biodiversity laws an integration of biodiversity into non-nature policies e.g. agricultural policies including GAEC, Greening and RDPs
Soil Sealing Guidelines (SWD(2012)101)	Guidelines, non-binding setting out options for MS action on soil sealing	**	S	D	Protection of land and potentially agricultural utility	Focus on soil sealing although all action is non-binding, aimed at improving practice and sharing best practices	No mandatory mechanisms, information and up to MS to adopt approaches as they see fit
Floods Directive (2007/60/EC)	Establishes an approach to flood risk management includes a three step process: national preliminary flood risk assessment; producing flood hazard and risk maps; putting in place flood management plans	**	B	D	No mandatory or voluntary requirements are explicitly dedicated to soil but potential to impact depending on approaches taken nationally to flood prevention	Relevant to issues of soil erosion, compaction and soil sealing	Delivered via MS Flood Management Plans and the coverage and focus of these will vary. Likely to rely on CAP actions for example on soil erosion etc

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
Environmental Impact Assessment Directive	EIA is triggered to identify the environmental impacts of a project, this might include soil impacts and potential mitigation measures to be applied to soil management during development and ongoing management of the project.	**	B	I	EIA could be triggered by land use change/ change in agricultural uses.	Not relevant to a specific threat although important for soil threats linked to land use esp for example soil sealing, loss of SOM linked to conversion of land use	EIA is binding on MS i.e. they must conduct EIA's, however, trigger levels can vary in particular in terms of protection afforded to agricultural land uses
Climate and energy policy							
Adaptation Strategy (COM(2013)216)	Provides an overarching framework for adaptation through different voluntary mechanisms, no mandatory requirements for action on soil protection but aim is to increase national adaptation strategies which will include soil protection aspects	**	S	D	**	Explicitly highlights soil erosion, flooding and implied links to compaction, Loss of SOM, soil sealing	Through use of RDPs under pillar 2 of the CAP; through selection of appropriate LIFE programme projects, by MS mainstreaming adaptation into national policies; through MS national action on flooding and spatial planning
Effort Sharing Decision (406/2009/EC)	Sets out the targets for emission reductions from non EU ETS sectors i.e. including agriculture. CO2 emissions from agriculture linked to land uses are managed under LULUCF but ESD covers emissions of NOx and methane which are relevant to soil management regimes	**	B	I	Relevant to the management of soil improves in particularly i.e. fertilizers and manure	There is an indirect link to soil protection as reducing emissions may imply changes to soil management practices or selection of soil management options	Feedback between ESR rules and action on the ground is at present directed through the CAP and management promoted
Land Use Land Use Change and Forests (LULUCF) Decision (529/2013/EU)	Sets out accounting rules applicable to emissions and removals of GHGs resulting from land use and land use change and forestry activities. To 2020 LULUCF is not considered as part of the EU's emission reduction package but provides a basis for reporting the baseline. Post 2020 proposals under negotiation anticipate emissions will need to be 'no debit' in the LULUCF sector and it will be possible to offset a proportion against future emissions covered by the effort sharing agreement.	**	B	D	Relevant to the management of land and land use. Potential link to protection of carbon rich soils and management that promotes SOM retention and other associated soil quality benefits	Directly links to SOM levels in particular reducing loss of SOM, but also accumulation in agricultural soils	LULUCF post 2020 has a potentially important role, however, connectivity between the high level goal and mechanisms for achieving management change currently unclear/mechanisms for recognizing positive intervention. MS will be responsible for their own inventories. Relies on recognition of Ag land needs and monitoring to see change.
Renewable Energy Directive (2009/77/EC)	Promotes the use of renewable energy sources in the European energy mix, but contains specific sustainability criteria for the production of feedstocks for biofuels and bioliquids. Future amends to RED may include provisions for residue retention to secure SOM retention in areas where	*	B	D	Limited relevance at present as rules on soil protection specified did not emerge re sustainability criteria, may be future links associated with residue	Explicitly relates to SOM in that it specifies biomass feedstocks be produced outside high carbon stock areas. Future amends anticipated to include rules on residue management to retain SOM	Implemented via a system of voluntary schemes that oversee management of feedstocks. If a farmer wishes material to be sold for biofuels and energy users wish to claim associated subsidies for

Policy Instrument	Coverage – brief synopsis of policy coverage related to soil protection	Relevance to Soil Protection on agricultural land	Type of instrument - Binding, Strategic, R&D/funding	Directly references soil protection or implied	Interaction with Agricultural land	Threats addressed	Mechanisms for change
	crops or residues are harvested for use as energy feedstocks				retention and SOM management.		renewable energy production feedstocks must be certified.

3.2 Understanding the EU Common Agricultural Policy in the Context of Soil Protection

Note that this chapter was edited in order to provide a policy briefing submitted to side events at COP 23 of the UNFCCC on LULUCF and agriculture's role in Greenhouse Gas emission reduction. It was formally launched by the iSQAPER consortium and IEEP alongside blogs and news items regarding on World Soils Day 2017. The Policy Brief is an educational document regarding the role of the different CAP instruments in soil protection, making the link to climate mitigation and adaptation in Europe. It can be downloaded at - <https://ieep.eu/publications/isqaper-joining-the-dots-soil-health-agriculture-and-climate>.

The points made within the analysis in this Section and Section 3.3 also formed the basis of training delivered by IEEP to the iSQAPER consortium during a webinar (Feb 2016) and training session in June 2016.

3.2.1. Introduction

This chapter provides a brief introduction to the EU Common Agricultural Policy (CAP), focusing on the policy instruments that are most relevant to soil protection. The CAP is now more than 50 years old and its structure, scope, objectives and mechanisms have been 'reformed' many times. It exerts an influence on the land management decisions made every day by the millions of EU farmers in a way that no other policy can because the CAP is about money, how it is distributed in rural areas across the EU and the nature of the requirements attached to the payments to individual farms and rural businesses.

3.2.2. Diversity of the EU agricultural context

EU farmland is found across four climatic zones, Arctic, Atlantic, Continental and Mediterranean and more than 20 major soil types¹⁰⁸. Farming systems include arable (cereals, oilseeds and fodder crops), horticulture and permanent crops (vines, olives, nuts), intensive livestock production (grass-based meat and milk production and housed pig, poultry and dairy systems) and low intensity grazed livestock for meat and/or milk production, sometimes using common pastures. Extensive traditional agroforestry systems, where livestock graze wood pastures, are important in many areas of Europe. There are around 14 million farmers, half of them with small, semi-subsistence farms often less than 1 ha in size, particularly in southern and south-eastern Europe. Commercial farms vary widely in size; most are family businesses but some managed by very large cooperatives and farming companies can run to several thousand hectares. In terms of primary production 80% of agricultural output is from 20% of the farms.

3.2.3. Origins of the CAP and its development in the first 50 years

The CAP came into force in 1962, to address the problem of establishing free trade among the six founding members of the European Economic Community (EEC)¹⁰⁹ when they each had well-established protectionist agricultural policies, which were particularly important to farmers in France.

¹⁰⁸ For details see <https://www.eea.europa.eu/data-and-maps/figures/the-major-soil-types-of-europe>

¹⁰⁹ The European Economic Community (EEC) was created 1957, then renamed as the European Community (EC) and incorporated in the European Union (EU) when this was formed in 1993. In 2009 the EC institutions were absorbed into the wider framework of the EU.

Article 39 of the Treaty sets out five economic and social objectives for the CAP, which have remained unchanged for the past 55 years:

- to increase agricultural productivity by promoting technical progress and ensuring the optimum use of the factors of production, in particular labour;
- to ensure a fair standard of living for farmers;
- to stabilise markets;
- to ensure the availability of supplies;
- to ensure reasonable prices for consumers.

This wording has proved sufficiently flexible to accommodate other Treaty objectives which have been absorbed into the CAP through its many reforms including, for example, promoting employment, environmental protection and sustainable development, consumer protection, animal welfare, public health and economic, social and territorial cohesion.

The three guiding principles for the CAP were Community preference¹¹⁰, common pricing and financial solidarity. The CAP began by supporting high prices for agricultural commodities in the EEC, through intervention purchase from farmers (when the price fell below a threshold) plus import levies and export restitutions on trading outside the Community. For the first 30 years this basic model was adjusted, but not substantially changed. By the early 1990s the combined effect of CAP support, rapid technical and structural change in agriculture and enlargement of the Community to 15 Member States had led to the accumulation of commodity surpluses (of meat, dairy products, wine, cereals), dumping on international markets, rapidly rising costs for the EU and concerns about environmental impacts. The 1992 reform of the CAP replaced price protection with income support payments to individual farmers, based on the area of arable land and number of livestock (for meat production). Further reforms in between 1999 and 2009 led to: expansion from EU15 to EU25 and then 27 Member States, closer alignment of EU commodity prices with world prices; farm income support payments largely 'decoupled' from production, paid per hectare of farmland and conditional upon compliance with basic environmental protection (Pillar 1); and a new rural development policy which also covers the forest sector and rural businesses and communities (Pillar2).

Figure 8 illustrates the changing focus and scale of CAP expenditure from 1980 through to planned expenditure in 2020.

¹¹⁰ Giving preference within the EU to goods produced inside the EU (by applying import levies and/or export subsidies to goods traded with the rest of the world)

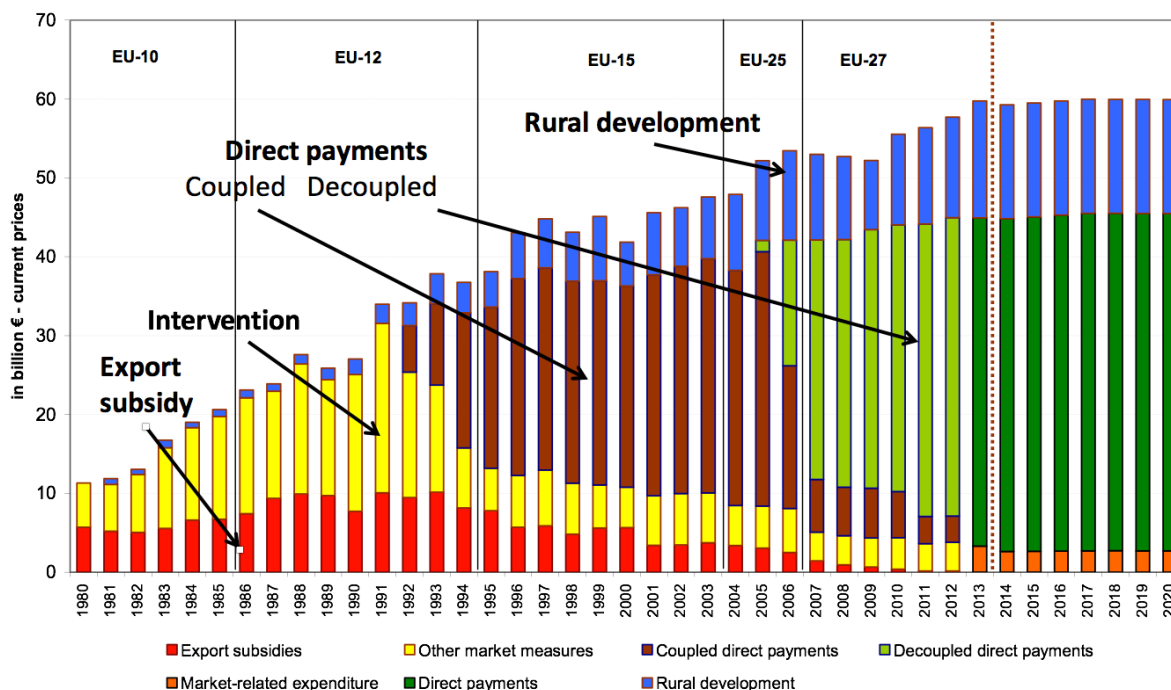


Figure 8: CAP expenditure 1980 to 2020¹¹¹ - Adapted from EC 2011

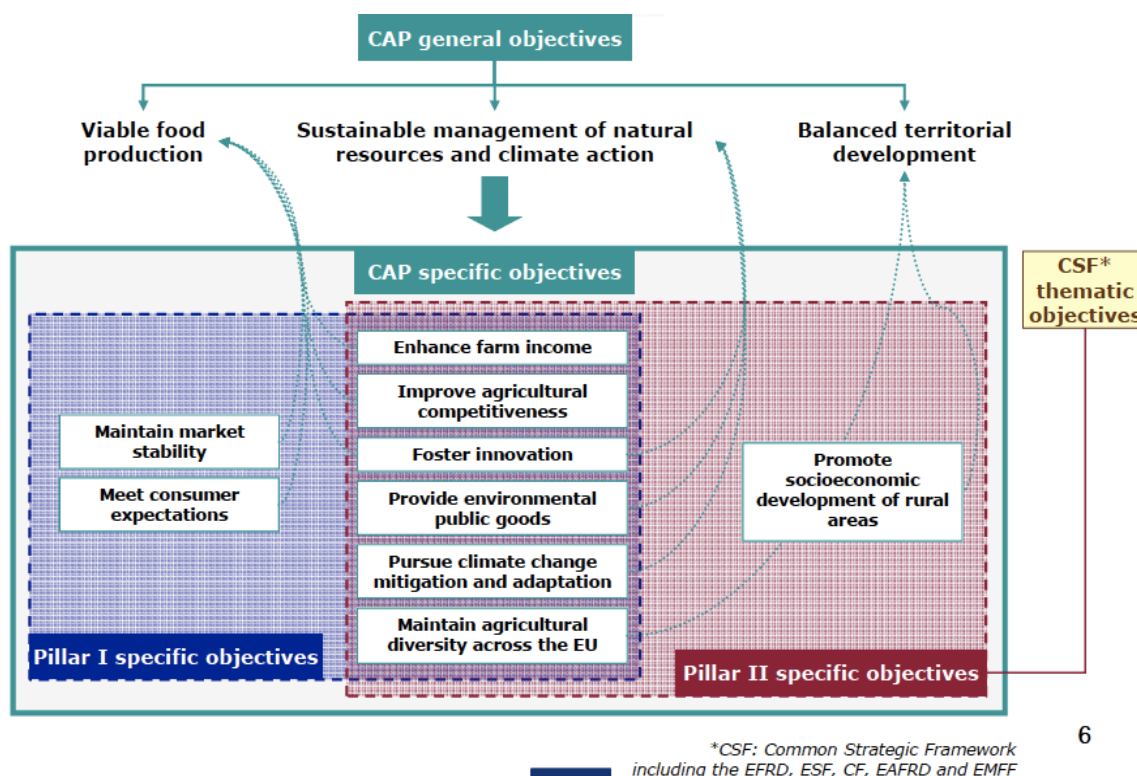
3.2.4. The two pillar CAP today

Despite the growth of the CAP and the enlargement of the EU from ten Member States in 1980 to 28 today, the CAP share of all EU expenditure has decreased very sharply from almost 73% in 1985 to about 38% of the total EU budget today. The annual CAP budget is currently around €59 billion, representing about 1% of all public expenditure in the EU.

The CAP for 2014-2020 has three general objectives of viable food production, sustainable management of natural resources and climate action, and balanced territorial development. Collectively these contribute to the Europe 2020 objectives of smart, sustainable and inclusive growth. There are more CAP specific objectives, some specific to Pillar 1 or to Pillar 2 and others common to both Pillars as shown in Figure 9.

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 soil protection and improvement.

¹¹¹ Based on EC (2011) The CAP towards 2020 legal proposals. DG Agriculture and Rural Development. https://ec.europa.eu/agriculture/sites/agriculture/files/cap-post-2013/legal-proposals/slide-show_en.pdf (accessed 16 January 2018)



6

Figure 9: General and specific objectives of the CAP 2014-20

The CAP two pillar structure consists of:

- Pillar 1, funded by the European Agricultural Guarantee Fund (EAGF): provides direct payments to farmers per hectare of land farmed, and also provides for market related expenditure (now a very small proportion of the total, as shown in Figure 7;
- Pillar 2, which is co-financed by both the European Agricultural Fund for Rural Development (EAFRD) and individual Member States' public funds: this supports seven-year **Rural Development Programmes** (RDPs) throughout the EU with measures addressing environmental, social, and economic priorities;
- 'Horizontal' elements of the CAP apply to both Pillars and include **cross-compliance rules** and a requirement to provide a **Farm Advisory Service** (FAS).
- some flexibility for Member States to transfer part of their national allocation of EAGF and EAFRD funding between Pillars.

There are three elements of the CAP with potential to influence land use and management in a way that could benefit soil protection, depending on the implementation choices made by Member States and individual farmers. These are cross-compliance standards, requirements attached to Pillar 1 greening direct payments, and a wide range of measures that can be supported by Rural Development Programmes (RDPs). How these fit together is illustrated in Figure 10 and the implementation requirements for Member States are summarised below.

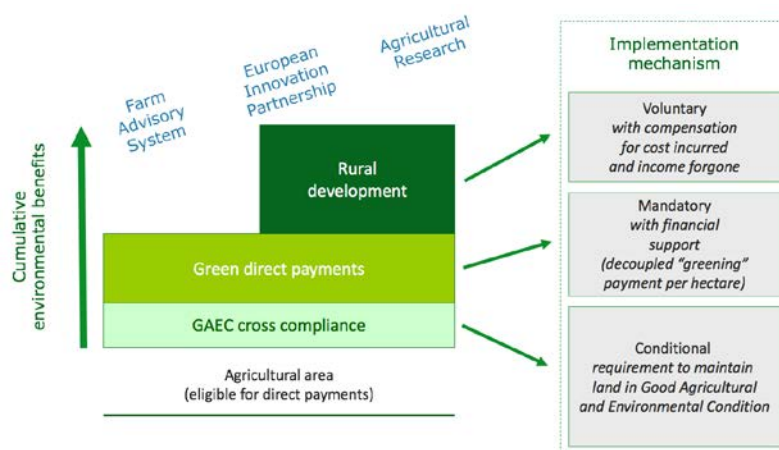


Figure 10: Architecture of the CAP 2014-20

3.2.5. Cross-compliance standards of Good Agricultural and Environmental Condition

Farmers receiving direct payments under Pillar 1 and area-based payments under Pillar 2 must comply with two types of cross-compliance requirements across the whole farm holding, or risk losing part of their CAP payments:

- Statutory Management Requirements (SMR) which are derived from other EU legislation and apply to farmers whether or not they receive CAP support, (these are not reviewed here, because none of them relate directly to soils); and
- standards of Good Agricultural and Environmental Condition (GAEC) defined by individual Member States.

Member States must define seven specific GAEC standards within a framework set out in the CAP legislation and taking into account ‘the specific characteristics of the areas concerned’¹¹². Three standards are specifically for soil protection and two others are relevant as shown in **bold** in Table 2 below.

Table 2: Extract from EU framework on CAP cross-compliance

Main issue		Requirements and standards
Water	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⁾

¹¹² Including soil and climatic conditions, existing farming systems, land use, crop rotation, farming practices and farm structures.

Main issue		Requirements and standards
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
Notes (1) The Nitrates Directive 91/676/EEC does not include an obligation to establish buffer strips along water courses outside Nitrate Vulnerable Zones (see Art. 4 and Annexes II of the Directive). This was one of the reasons for introducing the GAEC standard 1. (2) The requirement can be limited to a general ban on burning arable stubble, but a Member State may decide to prescribe further requirements. Source: Compiled using Regulation (EU) No 1306/2013, Annex II.		

3.2.6. Pillar 1 greening payment requirements

From 2015, Member States must use 30 per cent of their national allocations for direct payments under Pillar 1 for ‘greening payments’, which are aimed at enhancing the environmental performance of the CAP by paying farmers for agricultural practices beneficial for the climate and the environment. The greening payments fall into three groups: crop diversification and Ecological Focus Areas (EFAs) which both apply to arable land: and requirements for maintaining existing permanent grassland. There is some flexibility for Member States in defining the detailed requirements for all three elements, particularly EFAs, and choices for the farmers too (but they cannot opt out of the greening payment and requirements that apply to their land, unless they choose not to claim direct payments). However, there are some exemptions - organic farmers benefit from the greening payment *ipso facto* without having to demonstrate compliance with the requirements; and there is an exemption from greening requirements for all farmers participating in the Small Farmers Scheme.

Crop diversification

This greening requirement affects only farmers that have more than 10 ha of arable land. Farmers with up to 30 ha of arable land have to grow at least two different crops and those with more than 30 hectares of arable land have to grow at least three crops. In both cases the main crop must not cover more than 75% of the arable land. If they already meet these requirements no additional crops will be needed. The definition of ‘crops’ for this purpose includes fallow land and grass or forage crops. The main stated aim of the crop diversification requirement is the improvement of soil quality¹¹³, but in practice the soil protection benefits will depend on which additional crops a farmer chooses from the list of permitted crops defined for their region, and where they decide to grow them.

Ecological Focus Areas

This greening requirement affects only farmers that have more than 15 ha of arable land, who must ensure that an area equivalent to 5% of their arable land is managed as Ecological Focus Area (EFA), as defined by their Member State. The CAP legislation lists 10 types of EFA from which Member States must select one or more to compile a national list, adding more detailed rules on each type of EFA (for example, on the type of crop or tree species and the use of

¹¹³ ‘The obligations relating to crop diversification should be applied in a way that takes into account the difficulty for smaller farms to diversify, while continuing to make progress towards enhanced environmental benefit, and in particular the improvement of soil quality.’ (Regulation (EU) 1307/2013, Recital 41)

fertilisers and pesticides) within limits defined in the CAP regulation¹¹⁴. Farmers are free to decide how to meet their requirements using any of the EFA types on the national list, and can include eligible features that already exist on the farm if these are in the right place (many EFAs have to be on or adjacent to the arable land, as described in Box 1).

Box 1: Types of Ecological Focus Area (EFA) and weighting factors

The ten types of EFA defined in the CAP legislation are:

- Land lying fallow;
- Terraces;
- Landscape features within or adjacent to the arable land, including hedges or wooded strips, isolated trees and trees in lines or groups, field margins, ponds, ditches and traditional stone walls
- Buffer strips, including buffer strips covered by permanent grassland provided these are distinct from the adjacent eligible agricultural area;
- Areas of agroforestry that were established with EAFRD support under the 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 were established with EAFRD support under 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.

The CAP legislation defines weighting factors for each type of EFA, 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. Catch crops or green cover are weighted by a factor of 0.3, so 1ha of a catch crop would count as just 0.3 ha of EFA. Member States must apply EFA weighting factors with a value <1, but can choose whether or not to apply the higher factors.

The stated aim of EFAs is to safeguard and improve biodiversity, although some types of EFA could improve soil cover, organic matter content and erosion protection, especially if new areas of EFA are created. In practice the soil benefits will depend on firstly on what Member States' decide is to be considered as EFA and how it must be managed, and secondly on farmers' choices of EFA type, location and management.

¹¹⁴ Commission Delegated Regulation (EU) 639/2014

Maintaining existing permanent grassland

There are two different Pillar 1 greening requirements for the maintenance of existing permanent grassland¹¹⁵, aimed particularly at protecting soil carbon stores and sequestration potential, and also biodiversity benefits. 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% compared with a reference year. They can choose to apply this at national, regional or sub-regional level; and
- designate environmentally sensitive permanent grassland (ESPG) in Natura 2000 areas¹¹⁶, 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'*. At farm level, ESPG designation prohibits converting or ploughing the grassland, thus protecting soil carbon stocks.

Member States can choose to designate additional ESPG areas elsewhere, offering them an opportunity to protect significant soil carbon stocks under permanent grassland outside Natura 2000 areas.

3.2.7. Pillar 2 Rural Development Programmes 2014-20

Compared to direct payments under Pillar 1 of the CAP, the Rural Development Programmes under Pillar 2 offer far more flexibility to both Member State (or regional) authorities and land managers in how they design and implement RDP support. The EAFRD¹¹⁷ regulations provide a high degree of subsidiarity for Member States, who can choose from a list of 64 different sub-measures¹¹⁸ to design RDP schemes and operations tailored to meet local needs or priorities. Land managers, rural businesses and communities apply voluntarily for individual support schemes on offer through the RDP. The overall aim of CAP rural development policy is to promote sustainable rural development in a way that complements other EU funds and contributes to *'the development of a more territorially and environmentally balanced, climate-friendly and resilient, competitive and innovative Union agricultural sector [and] also contributes to the development of rural territories'*¹¹⁹. RDPs cover the entirety of the EU and normally span a seven-year period, but in practice 2014 was a transitional year and most Member States began implementation of the 2014-2020 RDPs in 2015. There are 118 RDPs in total for this period (see Figure 11), reflecting Member States decisions on the scale at which they choose to implement Pillar 2.

¹¹⁵ 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'* (Regulation (EU) 1307/2013, Article 4(1)b).

¹¹⁶ These are areas of EU importance, designated for wildlife protection under the EU Birds and Habitats Directives.

¹¹⁷ European Fund for Rural Development

¹¹⁸ Not including measures for technical assistance for the RDP managing authority and a special measure for Croatia. For a complete list of all sub-measures see Commission Implementing Regulation (EU) 808/2014 (Annex 1, part 5).

¹¹⁹ Article 3 of 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 repealing Council Regulation (EC) No 1698/2005

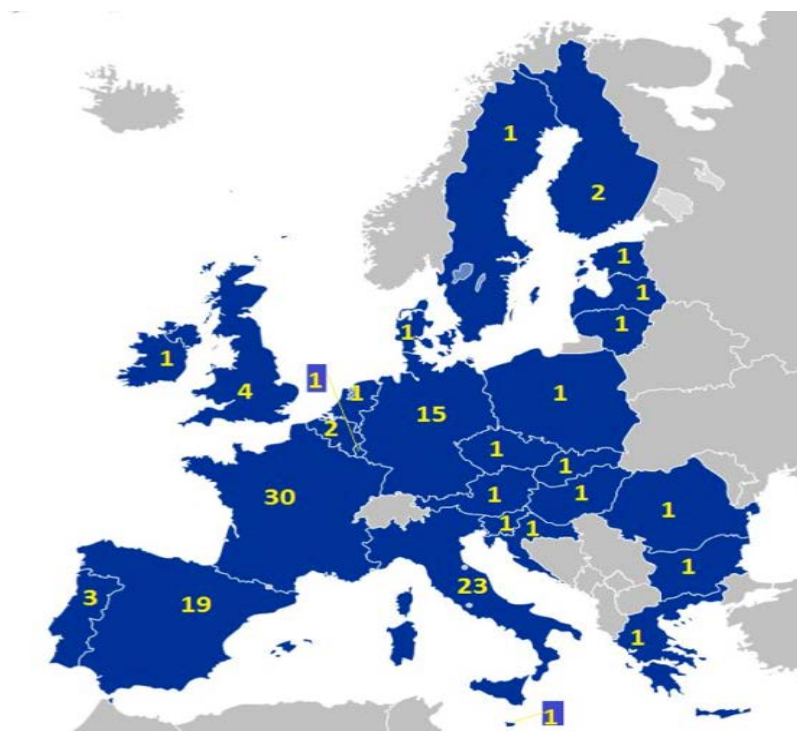


Figure 11 - Number of RDPs by Member State 2014-20

Member States and regions are required to base their RDPs on the needs of their territories and in doing so must addressing at least four of the following six common EU priorities:

1. Fostering knowledge transfer and innovation in agriculture, forestry and rural areas.
2. Enhancing the viability and competitiveness of all types of agriculture, and promoting innovative farm technologies and sustainable forest management.
3. Promoting food chain organisation, animal welfare and risk management in agriculture;
4. Restoring, preserving and enhancing ecosystems related to agriculture and forestry.
5. Promoting resource efficiency and supporting the shift toward a low-carbon and climate-resilient economy in the agriculture, food and forestry sectors.
6. Promoting social inclusion, poverty reduction and economic development in rural areas.

Each of these EU priorities is broken down into several focus areas (18 in total) of which two are 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.

At least 30 per cent of the EAFRD contribution to each RDP must be reserved for specific RDP measures relevant to the environment and climate action¹²⁰. Measures that can support soil protection and management include, for example: annual payments for environmental land management (both in agriculture and forests); investment support for afforestation and agroforestry on farmland; investment in soil-friendly field equipment; and 'soft' measures

¹²⁰ The RDP measures are: environment and climate related investments; investments in forest area development and improvement of the viability of forests; and payments (annually per hectare of land in most cases) under the RDP environmental land management measures - agri-environment-climate, forest environmental and climate services, organic farming, Natura 2000/Water Framework Directive and payments for areas facing natural or specific other constraints (EU Regulation 1305/2013 Article 59(6))

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 an RDP the European Commission is likely to question the absence of soil relevant measures if the Member State has identified soil needs in the preliminary analysis of strengths, weaknesses, opportunities and threats.

The RDP measures most relevant to soil protection are listed in Box 2 below, but only M10 for agri-environment-climate land management contracts must be used in every RDP, all the other measures are optional for Member States or regions to choose if they wish.

In addition, each RDP must identify the indicative target uptake area for environmental land management contracts on agricultural and forest land, which will contribute to the objectives of improving soil management and/or preventing erosion, and contributing to carbon sequestration and conservation. The indicative targets for the whole 2014-20 period, as documented in the 2015 RDPs, are shown in Figure 12 and Figure 13. It should be noted that Figure 12 indicative targets for carbon conservation and sequestration cover *both* agricultural and forest land, and that (although not shown in the chart) 15% of the programmed total RDP public expenditure on this focus area is for the agri-environment-climate measure which applies only to farmed land, while 72% is allocated to forest investment.

The extent to which an individual RDP provides real soil benefits will depend not just on the choice of focus areas, measures and allocation of budgets, but also on the extent to which the chosen measures and sub measures are specifically designed and targeted to address identified threats and priorities, and the degree to which the indicative target uptake is achieved. The same is true, to a lesser extent, of the other two instruments considered here – GAEC cross-compliance and greening payments – which provide a more limited level of subsidiarity for Member States.

The way in which Member States and regions have used the available options under both Pillars of the CAP in relation to soil protection is discussed in the following Section of this report.

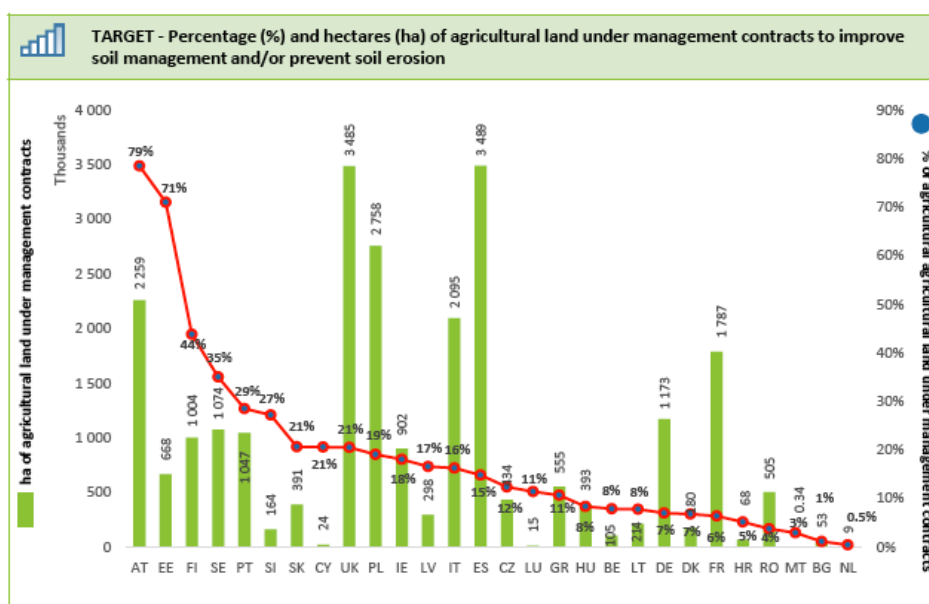


Figure 12: EU-28 Member State RDP targets 2014-20 for agricultural land under RDP contracts to improve soil management¹²¹ and/or prevent erosion - proportion (percentage) and area (ha) of agricultural land

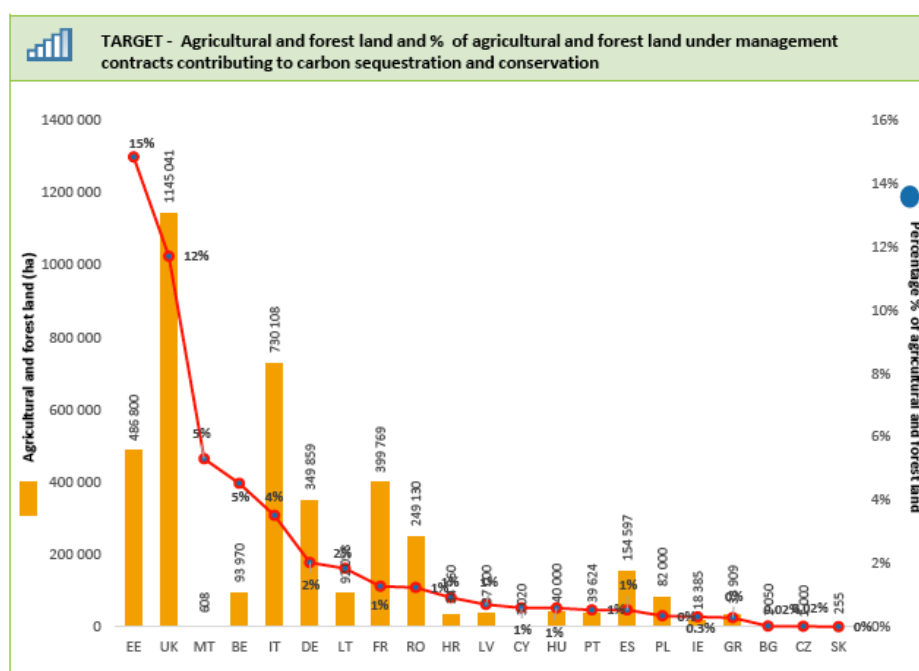


Figure 13: EU-28 Member State RDP targets 2014-20 for agricultural and forest land under contracts contributing to carbon sequestration and conservation¹²² - proportion (percentage) and area (ha) of agricultural land

¹²¹ There is no common definition of an action that improves soil management this is based on the expert judgement of the managing authorities

¹²² This will include investment in improved soil management but also activities such as afforestation and forest management.

Box 2: RDP measures most relevant to supporting soil protection in agriculture

- 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 Water Framework Directive; 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. Sub-measure 4.4 supports environmental investments linked to agri-environment-climate objectives, Natura 2000 protected habitats and species or other high nature value farming 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.
- 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 practices 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 Water Framework Directive 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).

3.2.8. How will the next reform of the CAP support soil management?

Policy makers are already considering what changes may be required to the CAP for the next period 2021-27. This reform will take place in the context of budget constraints, but also the need to address sustainable development goals and the Paris climate accord which are both relevant to soils. It is likely that the overall CAP budget will be reduced for 2017-27, possibly putting further pressure on Pillar 2 funding if Member States choose to use the flexibility to transfer funding between Pillars to maintain direct support payments in agriculture

Responses to a recent public consultation on the future of the CAP showed environment to be a key issue¹²³. Agricultural soils will continue to need protection, both as a resource to support food production as well as a means of sequestering carbon, protecting water resources and providing a range of other ecosystem services. Although there are no specific soil targets in EU legislation, considerable progress is being made in recording and mapping data on EU soils¹²⁴. Member States have varying priorities but also share many challenges, including meeting their obligations under EU climate mitigation, water quality and biodiversity targets, to which sustainable soil management can make an important contribution. The climate dimension of all environmental measures could be strengthened and interactions with soil management objectives may increase in importance.

The greening measures have just been evaluated for the European Commission¹²⁵ and also reviewed by the European Court of Auditors¹²⁶. Both reports concluded that greening as currently implemented delivers limited environmental benefits. It is possible that the CAP greening requirements may be amended or “simplified” in CAP legislative proposals expected in 2018.

¹²³ ECORYS (2017) Modernising and simplifying the CAP: summary of the results of the public consultation. Client: European Commission - DG AGRI Brussels.

<https://ec.europa.eu/agriculture/sites/agriculture/files/consultations/cap-modernising/summary-public-consul.pdf> (accessed 18 Jan 2018)

¹²⁴ For example, see http://www.iass-potsdam.de/sites//default/files/files/soilatlas2015_web_english.pdf and <http://esdac.jrc.ec.europa.eu/content/lucas-2018-soil-component-sampling-instructions-surveyors>

¹²⁵ https://ec.europa.eu/agriculture/evaluation/market-and-income-reports/greening-of-direct-payments_en

¹²⁶ https://www.ec.europa.eu/Lists/ECADocuments/SR17_21/SR_GREENING_EN.pdf

3.3 Implementing of the Common Agricultural Policy – the Role of National and Regional Decision Making in Protecting Soil Health 2015-2020

3.3.1. Introduction

Member States have considerable freedom to choose how to implement key aspects of the CAP related to soil protection including the definition of GAEC cross compliance standards applicable at farm level; and the list of greening payment options and requirements from which farmers can choose. In the case of RDPs, which are designed and implemented at national or regional level, all measures are optional for farmers. For RDPs both the managing authorities and the farmers have even more freedom to decide how (or if) they will address soil protection and which measures to use.

The geographical scale of implementation also differs across GAEC, greening and RDPs. GAEC cross-compliance applies to the majority of farmland (assuming a farm is in receipt of payments under the CAP). In contrast the greening requirements, as implemented, mainly affect arable farms (and/or those converting significant areas of permanent grassland to arable) but require changes in management only on a small proportion of the affected farms. In contrast, RDP measures are much more targeted both spatially and in terms of their focus. They may be focused clearly on soil protection but the scale of implementation on the ground depends entirely on voluntary applications by farmers (ie. interest on the part of farmers) – and on the budget allocation for schemes within RDPs (each scheme will be given an allocation from the overall budget, this may or may not be sufficient to cover all applicants for that scheme).

This chapter presents the CAP implementation decisions relevant to soil protection in 2015, but does not cover subsequent changes, for example in Member State definitions of GAEC standards or in revisions to RDPs. It is intended as a snap shot to show the diversity of implementation and choices made in terms of the implementation of the CAP across the EU Member States and the impact on soil protection.

The chapter considers first the measures most relevant to arable soils (including both crops and temporary grassland) and secondly those affecting permanent grassland and pasture land. It draws on recent studies and analysis for the European Commission, is illustrated by examples from the current RDPs and concludes with a discussion of the extent to which Member States and farmers are using the potential of the CAP to improve soil management.

3.3.2. Arable Soils

The main CAP instruments relevant to arable soils are GAEC cross-compliance standards for soils, the greening payment requirements for crop diversification and Ecological Focus Areas, and RDP land management measures (see Sections 3.2.5 to 3.2.7 for detailed descriptions of their coverage).

GAEC soil standards

Most Member States define these standards at national level, but Belgium and the UK apply the definitions regionally, which means that for EU-28 as a whole there are 32 different sets

of GAEC standards. The analysis below covers the definition of GAEC standards for the claim year 2015.

The EU framework (Table 1 – Section 3.2) requires Member States to define standards for ‘minimum soil cover’ (GAEC 4) and for ‘minimum land management reflecting site specific conditions’ (GAEC 5). Member States’ or regions’ definitions under both standards often apply only in specific site-conditions, for example on erosion prone soils or sloping land or where specific crops are being grown. GAEC 4 is defined mainly in terms of soil cover but GAEC 5 definitions include many different types of arable cultivation techniques and protection features, as shown in Boxes 3-5 below. The third soil standard, GAEC 6, is the only one aimed specifically at maintaining soil organic matter, but there was little ambition in the definition adopted by almost half of the 32 Member States or regions – they chose only to ban burning of arable stubble (which they were required to include anyway).

Box 3 – Interpreting and Implementing GAEC 4 – National and Regional standards for minimum soil cover in EU Member States

Winter soil cover (mainly by crops, grass, stubble or spontaneous vegetation) is the most common seasonal requirement applied to determine the nature of minimum soil cover required. Some Member States require cover only on sloping land, usually defined as a gradient, but Portugal uses a composite indicator of soil erosion risk, based on the morphology of the plot. Not all Member States or regions appear to require complete green soil cover – where they specify a minimum percentage of green soil cover this varies from 30% to 80%, but in some cases this is only in specific locations, for example on the arable land from most vulnerable to erosion, or particularly during the winter.

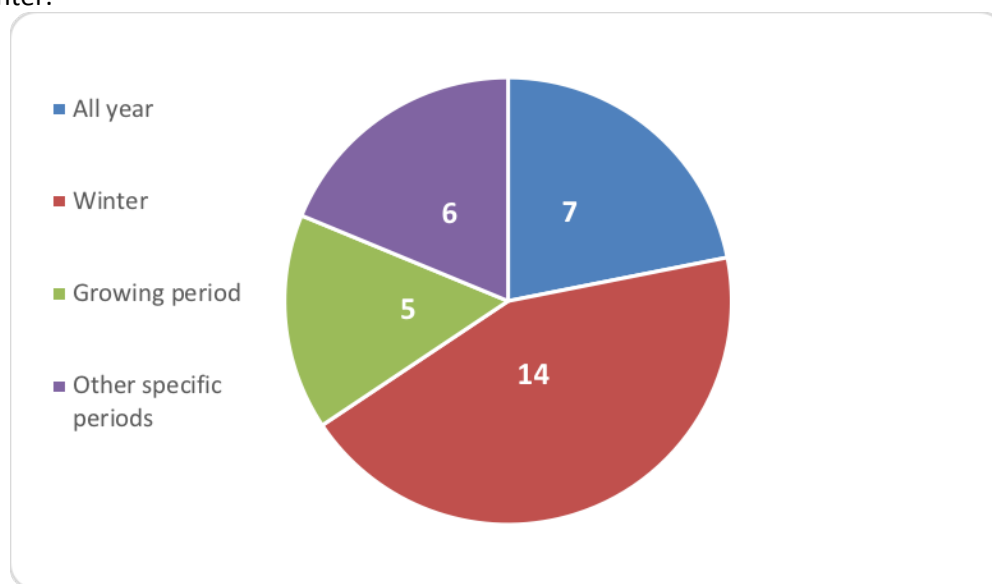


Figure 14: GAEC 4 – the period of the year for which soil cover is required, by number of Member States or regions¹²⁷ in 2015

¹²⁷ For EU-28 as a whole there is a total of 32 different sets of GAEC standards, because Belgium and the UK define their standards at regional level.

Box 4 - Interpreting and Implementing GAEC 5 – National and Regional standards for minimum land management reflecting site specific conditions to limit erosion

More than half of the Member States or regions use slope as the criterion to identify the land where farmers must apply specific management practices including, for example, contour ploughing, ridge planting, reduced tillage, maintenance of grassland or woody vegetation, green winter cover, and restrictions on growing particular crops.

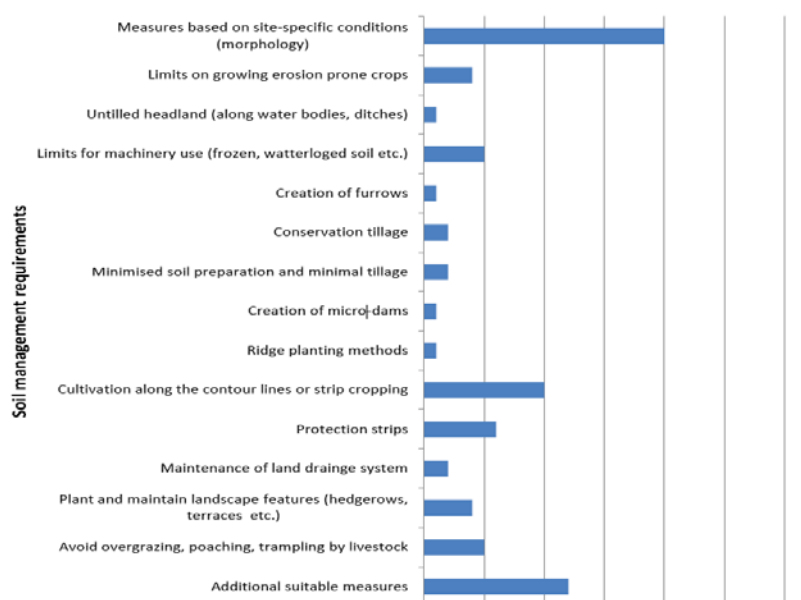
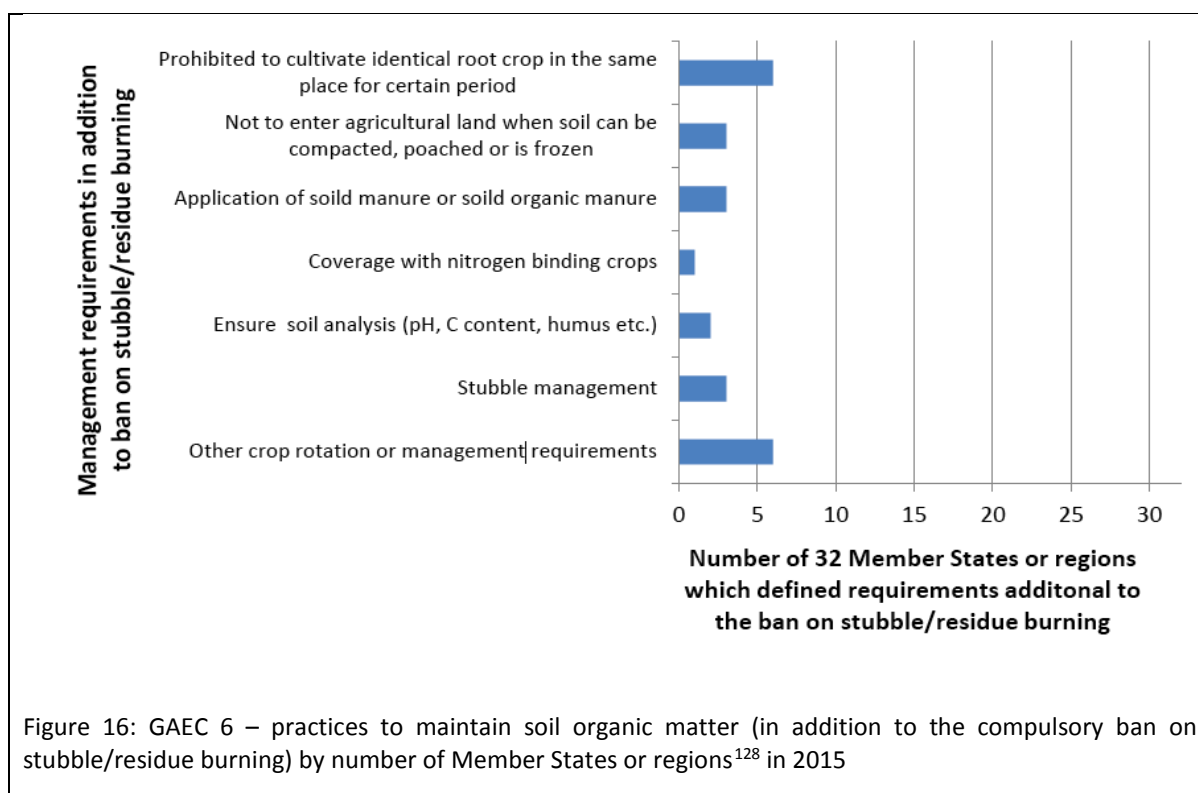


Figure 15: GAEC 5 - management practices to limit soil erosion, by number of Member States or regions in 2015 (Lines indicate numbers of Member States at intervals of 5)

Box 5 - Interpreting and Implementing GAEC 6 – National and Regional standards for maintenance of soil organic matter level through appropriate practices

This is the only GAEC standards for soils which specifies a minimum requirement which Member States must include in their definition of this standard – a ban on burning arable stubble (except for plant health reasons). Only 17 of the 32 Member States or regions in include restrictions on entering land when it is waterlogged or frozen, using crop rotations (including not growing successive crops with a high soil carbon demand), applying of organic matter, soil testing and stubble management).



Implementation of crop diversification greening requirements

The objective of the crop diversification obligation, as stated in the Regulation, is improving soil quality¹²⁹. Evaluation of the first two years of greening implementation shows that, across a sample of ten countries, there was a change in crop on almost 515,000 ha of land (0.8 % of the arable farmland¹³⁰). This figure conceals major differences between countries, the greatest change being in Spain where 2.8% of the arable area changed crop, mainly from barley and wheat to legumes. Given the scale of the changes and the fact that diversification does not necessarily mean crop rotation, the soil benefits are likely to be confined to certain localities, although the study did conclude that crop diversification may have slowed a more general trend towards mono-cropping (Alliance Environnement and Thünen-Institut, 2017).

Implementation of EFA greening requirements

Complying with the EFA requirement does not necessarily mean changing the crop or management, if the farmer already has sufficient land that qualifies as EFA. Overall, in 2016, farmers declared mostly productive EFA, a total of 8.5 million ha or 14% of the EU arable area¹³¹ – this was principally under nitrogen-fixing and catch crops (73%) and fallow (24%). Both have potential soil benefits but realising these in practice depends on the detailed management requirements put in place by Member States, e.g. use of fertilisers, post-harvest management and duration of fallow (Alliance Environnement and Thünen-Institut, 2017).

¹²⁸ For EU-28 as a whole there is a total of 2 different sets of GAEC standards, because Belgium and the UK define their standards at regional level.

¹²⁹ EU Regulation 1307/2013 Recital 41.

¹³⁰ Although this is probably an underestimate because the cropping data used for the analysis does not distinguish between some types of crop (e.g. winter and spring crops) which nonetheless count as different for the purposes of the diversification measure.

¹³¹ See Section 2.6.2 for explanation of EFA weighting.

RDP environmental land management contracts for arable soil management

The baseline for agri-environment-climate contracts under RDP is defined by the existing requirements for GAEC standards and greening requirements in the region concerned. Thus RDPs can offer arable farmers five year contracts to improve their soil management beyond this baseline, specifically tailored to regional or local needs. Some examples of RDP measures are shown in Box 6, including where the objective is biodiversity but where there are also likely to be considerable soil benefits.

Box 6: Examples of soil-relevant agri-environment-climate schemes for arable land programmed in 2014-20 RDPs

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 an additional payment for shredding the olive prunings and spreading these as a 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-Württemberg, 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.

Source: Frelih-Larsen et al (2016)

Members States' use of CAP measures to support arable soil management

A recent study for the European Commission illustrated how Member States and regions have used the flexibility available to them to support arable soil management through different CAP instruments. Figure 16 shows at EU level, for each of 19 typical soil protection practices, how many Member States have chosen to support the practice using GAEC standards, greening requirements or RDP agri-environment-climate contracts (for the latter, contracts designed for soil protection are identified separately from those designed for other objectives but have soil benefits too).

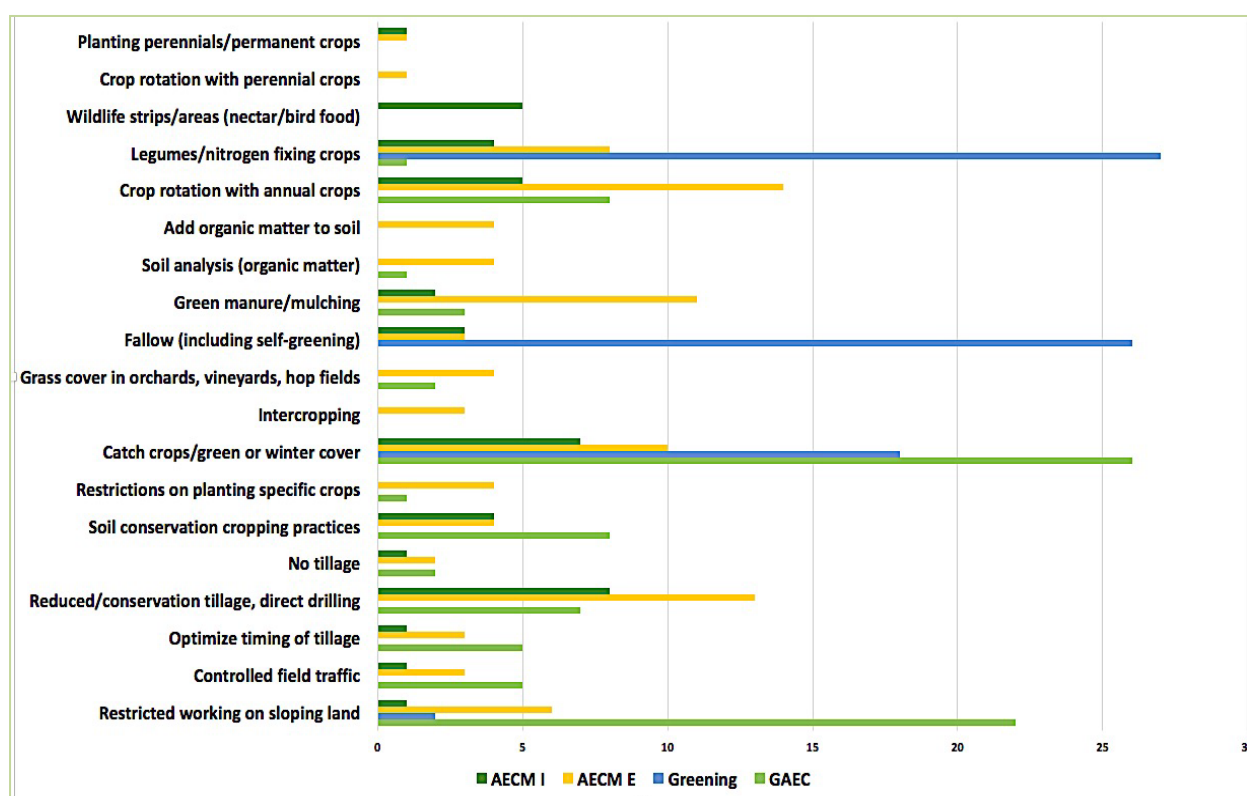


Figure 17: Arable and permanent crops - soil management practices by CAP measure and number of Member States¹³² - Source: Frelih-Larsen (2016) based on analysis of 2015 data presented in Beniak, 2016; EC, 2016, and selected data/extracted from approved 2014-20 RDP

3.3.3. Soils under permanent grassland

In the EU, soils under permanent grasslands are one of the main terrestrial carbon sinks, especially on carbon-rich soils that originated from historical wetlands and mires (fossil peat) or land converted to grassland from drained wetlands and mires (bogs, fens etc). Permanent

¹³² AECM E (dark green) refers to measures specifically designed for soil benefits, AECM I (blue) refers to measures targeted at other objectives, such as water or biodiversity, but which are likely to have soil benefits too.

grassland is mainly used as pastureland, and converting it to arable land by ploughing leads to the loss of carbon at twice the rate at which carbon is sequestered when cropland is converted into permanent grassland. Protecting the soil resources under existing permanent grassland is therefore a priority for the EU (FAO, 2009).

The main CAP instruments relevant to the protection of permanent grassland soils are the greening requirements for permanent pasture and RDP land management contracts and environmental investment measures.

Implementation of greening requirements for the protection of permanent grassland

It is important to note that the area of land classified as ‘permanent grassland’ under CAP rules at EU level reduced by 7% (3.8 million ha) between 2014 and 2015. This resulted from changes in the CAP definition of ‘permanent grassland’ and in the criteria determining what constitutes ‘agricultural activity’. The missing permanent grassland is no longer eligible for CAP support or subject to greening requirements, but the available data do not show if it is still managed as permanent grassland, outside the influence of the CAP (Alliance Environnement and Thünen-Institut, 2017).

As detailed in Section 3.2.6 the greening requirements necessitate Member States to set up two forms of protection for permanent grassland, aimed at carbon sequestration and biodiversity. Firstly, they have to monitor the ratio of permanent grassland to total agricultural area (as classified within the CAP rules) and ensure that this ratio declines by no more than 5% compared to a reference year (if it does go beyond 5% some farmers will have to reconvert land). Secondly, Member States must designate permanent grassland within Natura 2000 areas as Environmentally Sensitive Permanent Grassland (ESPG) which is protected from ploughing, and they can choose to designate further ESPG outside Natura 2000 areas, including grasslands on wetlands and/or carbon-rich soils. It is unclear how much additional protection ESPG designation affords, because some of this land will already be protected from ploughing under other legislation, for example the Habitats Directive.

Both requirements come with significant flexibilities for Member States. These have often been taken up and in some cases in ways that limit the potential effectiveness of the measures to protect permanent grasslands. Almost all Member States manage the permanent grassland ratio at the national level, which could mask significant grassland conversion at sub-regional or local scale. Just four of them (BE, DE, FR and the UK) opted to apply the ratio at regional scale, although a further six (DE, IT, LU, PT, CY, FR) require individual farmers to apply for pre-authorization, which does appear to be a disincentive to grassland conversion in some cases, especially in Germany.

In the first two years of the operation of this measure under greening declines in the relative ratio between the area of permanent grassland to agricultural land of more than 2% have been seen in 10 Member States. In five Member States the level of decline appears to have dropped below the 5% threshold, triggering requirement for reconversion (CY, EE, FR-Haut-de-France, RO, UK-En¹³³). The greening evaluation concluded that the ratio measure is probably beneficial for soils in most Member States but the scale of benefit is uncertain due

¹³³ In UK-En this is thought to be due to data issues rather than a reflection of the actual situation.

to lack of data on the types of grassland affected and the effectiveness of the current protection. (Alliance Environnement and Thünen-Institut, 2017).

The implementation in 2016 of the second permanent grassland greening requirement, ESPG designation, shows that 51% of permanent grassland in Natura 2000 areas was designated as ESPG (approximately 7.7 million ha) and 31% were declared by farmers (i.e. were subject to the requirements of the measure) (Alliance Environnement and Thünen-Institut, 2017). It is unclear how much additional protection ESPG designation affords, because some of this land will already be protected from ploughing under other legislation, for example the Habitats Directive.

Only five Member States designated ESPG outside Natura 2000 areas in 2016 (BE, CZ, LV, LU and UK-Wales). In all of these countries, with the exception of the Czech Republic, there are very large areas of permanent grassland and peatlands outside the Natura 2000 network that remain undesignated as ESPG (Alliance Environnement and Thünen-Institut, 2017).

Implementation RDP measures to protect permanent grassland

Restoration and management of permanent grassland and wetlands can be supported by two RDP measures, agri-environment-climate management contracts and environmental investment support (for example to raise the water table on carbon-rich soils). These may be used in combination or separately, as illustrated by examples from the 2014-20 RDPs in Box 7.

Box 7: Examples of soil-relevant agri-environment-climate schemes for arable land programmed in 2014-20 RDPs

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.

The analysis of Member States' and regions' choice of CAP measures that can protect permanent grassland, shown in Figure 11, suggests that beneficial management practices on permanent grassland are more likely to be supported by RDP management contracts and less by GAEC and greening than is the case for arable soils (see Figure 10 for comparison). This partly reflects that the balance of GAEC and greening requirements at farm-level falls more on arable land. It also has potential cost implications for Member States (who co-finance RDP measures) and for the scale of coverage, because the RDP measures rely on voluntary uptake by farmers. On the other hand, agri-environment-climate contracts can be much more issue-specific and geographically targeted than GAEC or greening requirements.

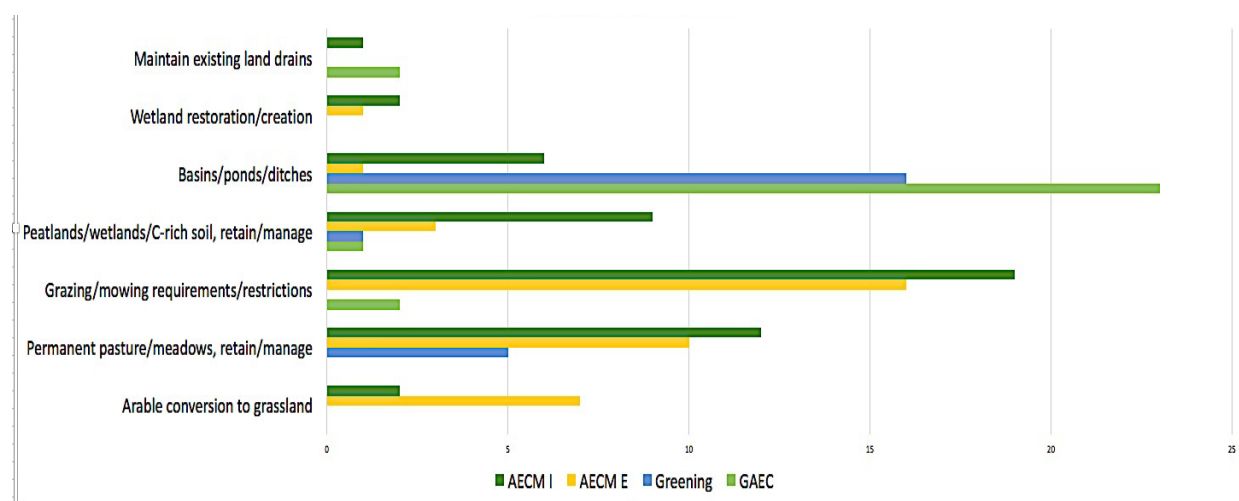


Figure 18: Permanent grassland management practices by CAP measure and number of Member States¹³⁴ - Source: Frelih-Larsen (2016) based on analysis of data presented in Beniak, 2016; EC, 2016, and selected data extracted from approved 2014-2020 RDPs

3.3.4. Will the potential of the CAP be used to support better soil management 2015-20?

The evidence presented here of the choices made by Member States and regions in how they implement these three key CAP instruments suggests an imbalance in addressing the range of soil problems facing EU farmers and governments. The use of GAEC standards for soil cover and for minimum land management to limit erosion, plus relatively high targets for RDP land management contracts under focus area 4C suggest that Member States are addressing the issue of soil erosion using a range of Instruments.

The picture for soil organic matter is very different. Between 2014 and 2015 there was a sharp decline in the number of Member States defining anything more than a ban on stubble burning as a requirement under the soil erosion GAEC. In the first two years of the operation of greening requirements the negative trend in the ratio of permanent grassland to agricultural land seen in 10 Member States is of concern. These two measures have a 'reach' that covers most of the arable and permanent grassland (respectively) in the EU, but are not being used to their full potential for soil protection. Added to this, in 2016 only five Member States have chosen to provide protective ESPG designation for grasslands and carbon rich soils outside Natura 2000 areas. This ESPG option was introduced partly because in the

¹³⁴ AECM E (dark green) refers to measures specifically designed for soil benefits, AECM I (blue) refers to measures targeted at other objectives, such as water or biodiversity, but which are likely to have soil benefits too.

previous CAP reform Member States (the European Council) were unwilling to accept a new GAEC standard defining technical requirements for maintenance of organic matter in agricultural soils. There appears to be continuing reluctance on the part of many Member States to address the need to safeguard the carbon sequestration potential and existing carbon stores in EU peatland soils, many of which are still in arable use. This could affect not just agricultural productivity and sustainable soil management but also the ability of agricultural land to help meet EU climate mitigation obligations.

It would be unreasonable to criticise Member States for failing to address soil problems when they are simply using the flexibility available to them in the Regulations. Theoretically there are significant opportunities to improve the soil achievements of both GAEC standards and greening requirements, for example by defining minimum requirements for all soil GAEC standards in the framework of the Regulations, ensuring the additionality of EFA requirements by excluding afforested areas and agroforestry that have already been funded by the CAP, and requiring the identification and targeting of protective measures at carbon rich soils. However, all of these would have an impact on farmers' costs or on their freedom to use land in response to market opportunities (for example to convert permanent grassland to arable). To achieve progress the EU will have to find ways of balancing the economic needs of farmers with the need to protect carbon rich soils, including making an effective link between positive action linked to land management and the delivery of Land Use and Land Use Change Forestry climate goals.

3.4 Scoping soil policy action in European Member States

3.4.1. Introduction

This chapter provides an overview of the policies used by EU-28 Member States to limit degradation on or to protect agricultural soils. Rather than commenting on the policies individually it seeks to identify trends in the way soil protection is delivered. This is intended to provide a picture of policy action taking place within Member States. Often analysis of European soil protection efforts focus on EU level initiatives, it is important to also understand the contribution at the national and regional level. This is key in light of the lack of a coordinated, EU level law to protect European soils or deliver their monitoring.

In the process of drafting this chapter the authors:

- Analysed the nationally or regionally initiated policy instruments aimed at protecting soil health on agricultural land across EU-28 Member States. The instruments reviewed are either not linked to the implementation of EU requirements or linked only in a limited way i.e. would exist in the absence of EU action;
- Examined how policy instruments operating in different areas of intervention (e.g. biodiversity, water, climate) interact to support agricultural soils protection;
- Developed key messages and conclusions as well as a rationale for further research work needed as part of the continuing effort to promote the development of a policy within the iSQAPER project and input and add value in the context of understanding soil protection policies and needs.

The subsequent analysis focuses on national and regional policy instruments that both directly and indirectly impact on agricultural soil conservation in EU Member States. It is designed to complement previous analysis of EU level instruments relevant to soil protection (see Section 3.1).

3.4.2. Methodology

In 2016 the European Commission conducted a review, in collaboration with Member States, of policies in Europe that protect soils both directly and indirectly. Data were gathered on the basis of a thorough literature review and reviewed by experts from national and regional bodies. This process produced an updated inventory of soil protection instruments in EU Member States and the publication by Frelih-Larsen et al, 2017 - Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States. The analysis in this chapter builds on the inventory data set to specifically focus on the policies relevant (see definition below) to agricultural soils across Europe's Member States.

681 policy instruments were included in the inventory in total. Of these 252 were identified as relevant for this analysis. To be considered for this analysis they had to be:

- a - nationally or regionally initiated i.e. are the result of a national action to address a threat or goal rather than the result of EU level policy drivers; and
- b - relevant to the protection of agricultural soils whether directly targeting soil protection on agricultural land or indirectly resulting in the improvement of soil condition or understanding of soil condition (i.e. monitoring and research activities) on agricultural land.

It should be noted that the soil inventory represents a good basis for analysis and the most comprehensive data set across all Member States available at the time of drafting. It should be noted, however, that there are some elements of bias in the inventory data set. Firstly, the inventory was intended to provide a picture of all actions in a Member State focused on soil, therefore, there was not an exclusive and fixed focus on agricultural soils. Secondly, the multiplicity of policies that impact on soil required researchers and national experts to focus effort on specific areas of interest or expertise, there was also an emphasis in the data collection process towards recording binding, regulatory measures rather than outreach or research programmes per se. This analysis, therefore, does not seek to compare or contrast coverage across Member States or the effectiveness of national laws. It is intended to review, in the context of agricultural soils, the diversity of action that exists and the types of tools in use. This is intended to inform understanding in terms of future policy design, policy options and the ability of iSQAPER to provide input into different policy futures.

The 252 policy measures identified were analysed according to: the area of intervention, and the type of policy instrument employed. Monitoring approaches were reviewed and collated.

The type of policy instruments analysed in this paper were categorised as follows and according to definitions commonly used in the European context (see Annex – Section 2 for further information):

1. Regulatory (i.e. soil protection laws and strategies, environmental legislation and strategies, environmental impact assessments, standards, targets, guidelines, bans, permits and quotas, land planning and zoning instruments);
2. Economic (i.e. liability schemes, taxation, pricing, public-private voluntary agreements);
3. Information (i.e. farm advisory services, innovation groups, public information, training and qualifications, participation actions);
4. Research & Innovation (i.e. assessments of soil status and ecosystem services, research projects);
5. Monitoring (i.e. monitoring and reporting schemes that are required by public institutions to identify environmental quality or compliance with wider legal requirements).

This classification method is in line with most up to date policy analysis on the subject (Kutter, T. et al (2011), Louwagie, G. et al (2010), Frelih-Larsen, A. et al (2016)).

3.4.3. Policy trends and areas of intervention in Europe

Among the 252 measures and policies identified as relevant to agricultural soils, 17 areas of intervention have been identified as associated with Member States' action on agricultural soil (Figure 19). It is important to note that some measures or policies fall under more than one area of intervention; there is therefore a degree of overlap between the areas of intervention identified.

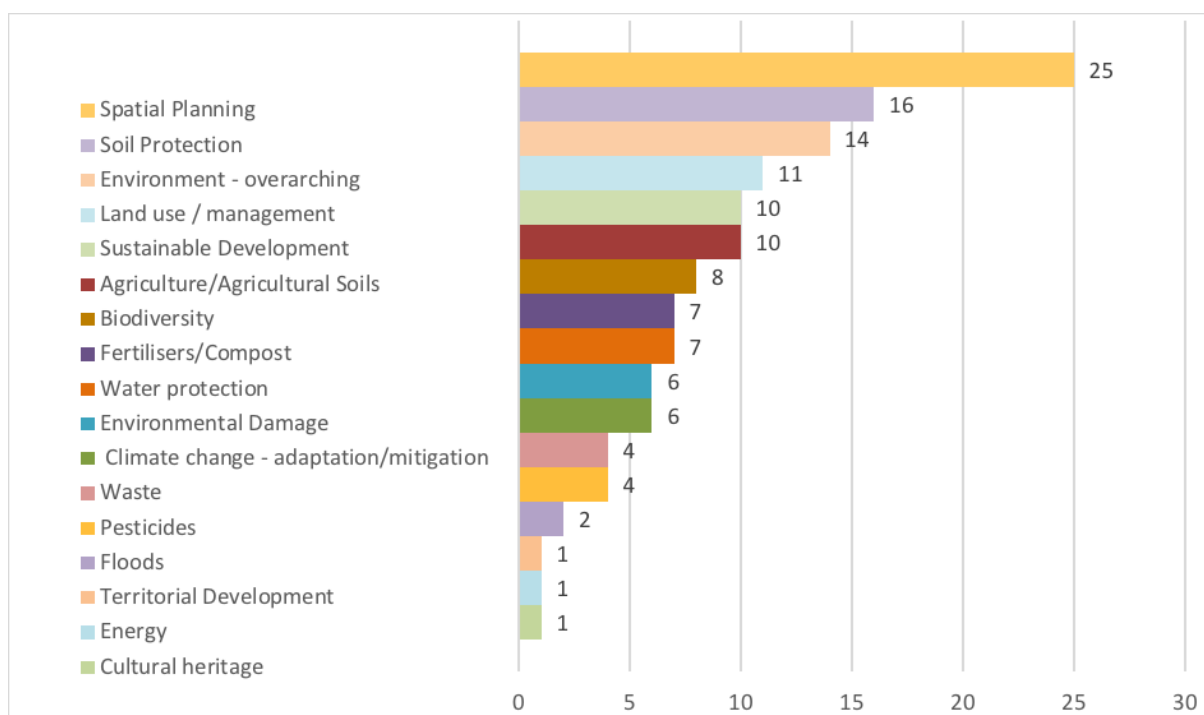


Figure 19: Number of EU Member States per area of intervention – own compilation based on inventory data sets, IEEP 2018

Soil, and agricultural soil in particular, is increasingly recognised as a key environmental resource. Some EU Member States already promote or are planning on promoting sustainable and efficient use of soil and sub-soil in agriculture through dedicated regulatory instruments (e.g. acts, ordinances, laws). More specifically, these policies aim to prevent changes in soil quality (the Netherlands) or fertility (Germany, Estonia), protect soil terrestrial ecosystems (Romania), or promote changes in the management of agricultural land with benefits for soil (France). These instruments are often used to provide a framework for soil protection and a basis for mainstreaming soil considerations into other policies.

Beyond policy approaches targeting soil as a primary objective, it is noted that a mix of policy instruments is used at Member state level to require or encourage soil protection. These instruments aim to support/limit certain land management practices; support sustainable development; coordinate land use planning; promote action in the agricultural sector to mitigate and adapt to climate change including flood prevention.

With regard to land management practices, some Member States have chosen different approaches to support soil protection in agriculture. Regulating, limiting or banning the use of certain substances on agricultural soil (e.g. chemicals, fertilisers, pesticides and wastewater) seeks to prevent pollution of soil or linked water resources (for example in Slovakia, Malta, Italy, Germany, France, Wallonia – Belgium, Ireland). Alternatively, support is offered for specific management practices that are considered beneficial to soil protection such as organic farming (Finland), or more broadly changes to the way land is managed in agriculture (Croatia).

The promotion of sustainable development as an overarching policy goal in national strategies or action plans commonly encompasses support for land management practices that fosters the protection of ecosystems and natural resources, including agricultural soils. Within this broad objective, the approaches taken at national level vary according to the respective Member states' priorities – be it to support overall soil quality (Cyprus) or certain aspects such as soil organic matter concentration (Hungary), setting targets for land take (Germany and Austria) or organic farming (Germany), or increasing land resilience and its ability to provide ecosystem services (France).

Protecting agricultural soil from uncontrolled spatial development is another key trend observed in the majority of Member states. Although varying in nature, there are a number of initiatives to extend the scope of more established approaches to land use planning and zoning to integrate agricultural soil considerations. For instance, these are aimed at ensuring the protection of agricultural land and soil and reducing land take and urban sprawl (Flanders – Belgium), preventing the impacts of uncontrolled spatial planning on soil health in agriculture (Cyprus) maintaining an adequate balance between the use and management of land for agriculture and for urban development (Hungary, Finland), and preserving environmental resources such as landscapes, arable land and green networks (Estonia). A number of initiatives aim to protect agricultural soil from contaminants and improve soil fertility (Portugal, the Netherlands and Romania).

Agricultural soils can act as a sink for carbon. The contribution of agriculture to climate change mitigation and adaptation, including the promotion of carbon storage in soils, is prioritised in a number of Member States (for example Malta, Italy, Finland and Wallonia – Belgium) as a basis for the protection of soil functionality.

Phenomena such as desertification and flooding are location-specific, hence most relevant to specific regions of Europe. In Southern European Member States there are a number of initiatives expressively focused on combating desertification (including in Portugal, Spain, Greece, Cyprus and Bulgaria) as a threat to agricultural soils. These mostly stem from international initiatives (i.e. the UN Convention to Combat Desertification).

Economic instruments are used to promote change relevant to agricultural soils in a number of Member States. It should, however, be noted that the consequences for the agricultural soils specifically are mixed. Some instruments promote changes in land use potentially away from agricultural uses, while others promote management change and soil improvement. For example, afforestation of agricultural land is supported through national level funds (Spain and Romania) as a means to increase carbon sequestration into soil and avoid other specific soil threats, such as erosion. Other initiatives provide state aid for agricultural land drainage (Finland) or local-level subsidies to prevent and reduce floods (Wallonia – Belgium). In addition, charges are established in the event of soil pollution (Hungary) or taxes applied on pesticide use to reflect their environmental impacts (Denmark – where the tax on pesticides is intended to reflect their environmental and health impact and includes the effect of pesticides on earth worms in tax calculation).

Finally, there are a number of policies focused on improving knowledge among farmers, decision makers and the wider public community intended to promote soil protection. These

outreach programmes focus on a variety of themes, including combating desertification (Portugal), moving from traditional to organic farming (Germany), promoting environmentally-friendly agriculture with likely benefits for soil (France) and enhancing soil fertility and limiting contamination of ground- and drinking water as a consequence of pollution from nutrients and pesticides (Austria).

3.4.4. Type of instruments used in Europe to secure soil health and ecosystem services

The majority of instruments identified across EU Member States relevant, directly or indirectly, to soil protection on agricultural land are regulatory in nature (Figure 20). Of these two thirds of the measures identified are binding i.e. requiring action by a third party; one third is made up of strategic measures and guidelines setting out and coordinating thinking on agricultural land, soils specifically or on environmental issues more generally.

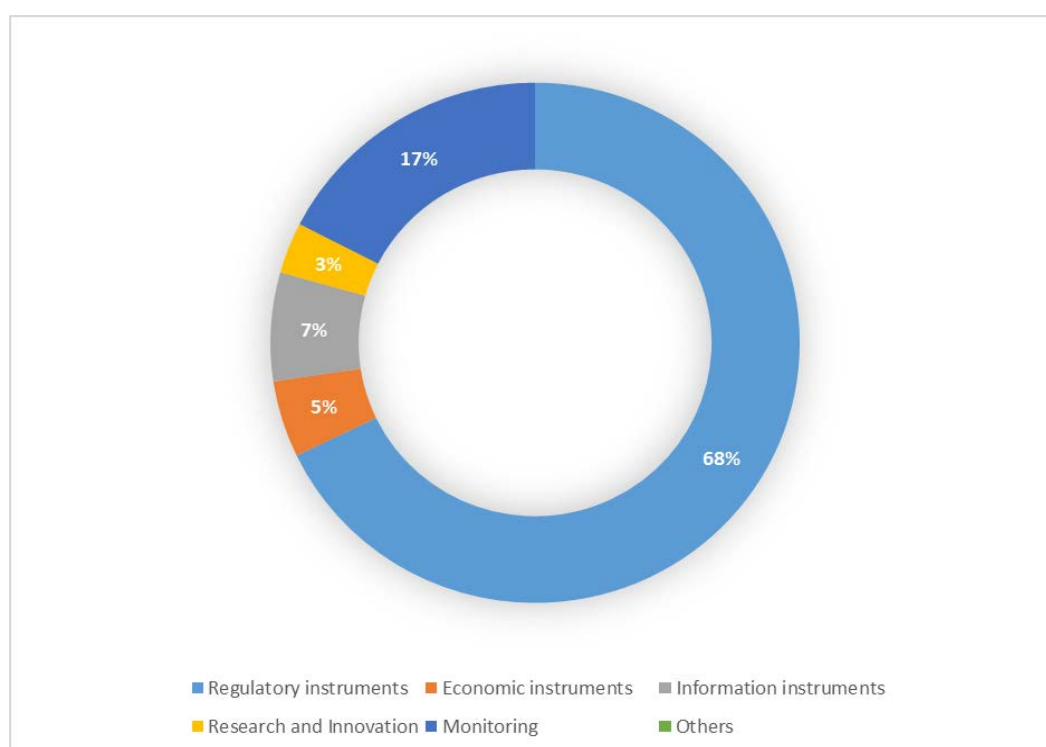


Figure 20: Type of instruments used in Europe to secure soil protection - own compilation based on inventory data sets, IEEP

Regulatory instruments

Dedicated soil protection legislation and strategies

A subset of 13 EU Member States¹³⁵ (Figure 21) have adopted or are in the process of adopting dedicated legislation and strategies relevant to the protection of agricultural soils. By nature, the aim of these policies is to set a framework for soil protection, also for those policies (as examined in the following Sections) that have more tangential relevance to soil or certain specific aspects of it.

¹³⁵ Austria, Belgium (Flanders and Wallonia), Bulgaria, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Portugal, Slovakia, Slovenia and the UK.

The scope and type of the instruments adopted varies substantially across Europe, starting from whether dedicated soil protection instruments have a binding or non-binding nature. Out of 13 in total, 9 Member States¹³⁶ have approved dedicated, binding legislation to protect agricultural soil. Such legislation takes the form of a Charta (Austria), an Ordinance (Germany), an Act (Bulgaria, Hungary, the Netherlands and Slovakia), a Law (Portugal) or a Decree (Flanders and Wallonia – Belgium) (Box 8).

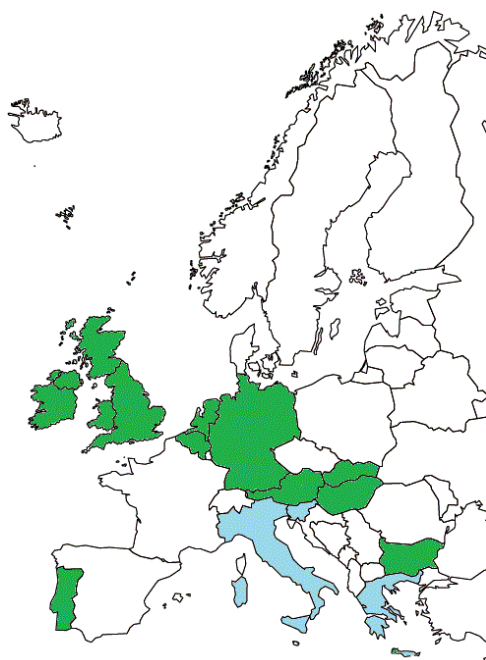


Figure 21: Dedicated soil protection legislation and strategies in Europe - Own compilation based on data from 2016 Note: Member States having adopted dedicated legislation = green; Member States in the process of adopting dedicated legislation = light blue

Box 8 - Dedicated soil protection legislation in Germany, Hungary and the Netherlands

In Germany, the Federal Soil Protection Ordinance sets out guidelines for good management of agricultural land, with particular emphasis on ensuring the protection of soil fertility and functions. Hungary holds a dedicated binding piece of legislation on agricultural land, the Act on the Protection of Cultivated Soil. This Act includes obligations on and duties of the soil protection authority, protection measures that should be undertaken on cultivated soil, requirements related to investments and fines and a fee set to protect organic matter in soils. The Netherlands has in place the Soil Protection Act, which as from 2018 is foreseen to be merged with the Environmental and Planning Act.

In a number of Member States soil protection appears to be increasing in importance within the political debate within a number of Member States; during the period of data collection dedicated legislation for soil protection was under development in Greece, Italy and Slovenia. For instance, two ordinances were being developed in Slovenia. In Greece, approval of a legislative proposal for framework legislation on the protection and sustainable use of soil

¹³⁶ Austria, Belgium (Flanders and Wallonia), Bulgaria, Germany, Greece, Hungary, the Netherlands, Portugal, Slovakia, Slovenia.

was pending. Based on information available, it sets out a wide number of measures relevant to agricultural soil, including aimed at preventing pollution from land use, reducing sealing, producing an inventory of areas under major soil threats and raising public awareness.

On top of binding legislation, strategies and action plans dedicated to the protection of soil have been adopted in many European countries, including in Austria, Belgium (Flanders and Wallonia), Cyprus, Germany, Hungary, Ireland, the Netherlands, Spain and the UK. These do not set out requirements that oblige change but set the policy direction at a strategic level.

Environmental legislation and strategies

Beyond dedicated soil protection policies, support to the protection of various aspects of agricultural soils is offered through a wide variety of other environmental regulatory tools. The majority of Member States have in place a range of environmental legislation and strategies that, while often not dedicated to soil protection, address certain aspects helping mitigate soil threats. These include overarching instruments on environmental protection and agriculture and sectoral policies relating to water management, climate change, biodiversity, the use of fertilisers, land use, energy, waste and sustainable development.

The pollution of agricultural soils is dealt with by a number of different methods both across and within Member States. For example, overarching environmental laws are used in Greece and Finland to limit soil pollution. In Greece the Law for the Protection of the Environment allows ordinances to be passed to address soil threats, including pollution from the use of fertilisers and pesticides and the use of sludge on agricultural land. Similarly, the Finnish Environmental Protection Act focuses on the maintenance of agricultural soil quality by establishing provisions on the sustainable use of fertilisers and by-products of fertilization.

Other Member States have dedicated legislation relating to the use of certain products and substances on agricultural soil to avoid detrimental soil effects or enhance certain functions. For example, Italy passed the Decree on Technical Rules and Criteria for Agricultural Use of Manure and Production of Agricultural Use of Digestate, as well as quality standards for soil nutrients and monitoring obligations for wastewater use in agriculture. The German Federal Government issued the Circular Economy Act, which regulates the use, recycling and application on land of bio-waste and sewage sludge with implication for soil protection on agricultural land.

International environmental agreements and initiatives are a powerful driver for addressing certain threats to agricultural soils within some EU Member States, i.e. desertification, erosion and floods. For instance, the UN Convention to Combat Desertification and international agreements on Sustainable Development¹³⁷. In relation to the former, Southern European Member States – including Greece, Portugal, Cyprus and Spain – emphasise addressing desertification as a key issue for agricultural soils. This is done through guidelines attached to action plans fulfilling duties under the UN Convention on Combating Desertification. Delivering international commitments on sustainable development has been

¹³⁷ The latest iteration of this is the 2030 Agenda including the Sustainable Development Goals, reaffirmed the commitment to National Sustainable Development Strategies, however, these were initially developed as part of earlier international efforts to deliver Agenda 21 and the commitment to sustainable development made in 1992 at the Rio Earth Summit.

explicitly linked in some Member States, not only in terms of delivering protection of agricultural soil but also in terms of monitoring progress towards key goals. For example, the Hungarian Strategy for Sustainable Development (2012 to 2024) highlights the importance of agricultural land as a resource for Hungary and includes as a specific objective that soil organic matter should be sustained. The German National Sustainable Development Strategy, as part of its core goals, includes a land take target and a target for areas of land farmed organically.

Land planning and zoning legislation

Protecting agricultural soil from uncontrolled spatial development operations is another key trend among many European Member States (Figure 22). Although varying in nature, there are a number of initiatives to extend the scope of established approaches to land use planning and zoning and integrate agricultural soil considerations. This includes action aimed at ensuring the protection of agricultural land and soil and reducing land take and urban sprawl (Flanders – Belgium), preventing the impacts of uncontrolled spatial planning on soil health in agriculture (Cyprus), maintaining an adequate balance between the use and management of land for agriculture and for urban development (Hungary, Finland), and preserving environmental resources such as landscapes, arable land and green networks (Estonia). There are also a number of land use planning initiatives that aim to protect agricultural soil from contaminants and improve soil fertility (Portugal and Romania).

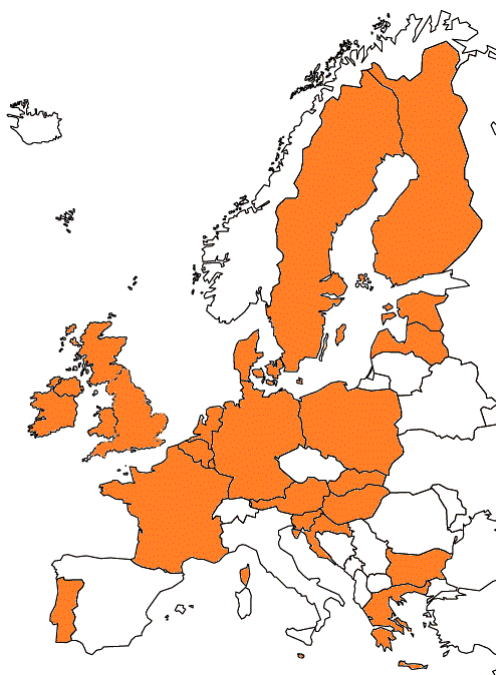


Figure 22: Map highlighting Member States where the protection of agricultural land and/or soils is included within land use planning rules; Source: Own compilation.

Economic instruments

Beyond regulatory drivers, the use of economic incentives that are outside the scope of the Common Agricultural Policy plays a role in supporting agricultural soil protection. However, their use is limited to a subset of Member states (Figure 23). Economic support may be in the form of payments for activities undertaken to protect agricultural soils (Flanders – Belgium, Germany, Greece, Ireland, Romania, Spain), the use of liability schemes (Estonia and Ireland) or of pricing for certain activities (France, Germany, Hungary), and the establishment of voluntary agreements (the Netherlands) (Box 9). In Denmark a tax on pesticides has been targeted to reflect the effect of the pesticide on health and on the environment in order to guide the use towards the least harmful pesticides. Soil protection is not directly targeted, but the effect of the pesticides on earth worms is included in the calculation of the tax.



Figure 23: Economic instruments for soil protection - Own compilation. Note: Member States having pricing instruments = orange; Member States having voluntary agreements = blue; Member States having payments instruments = green.

Box 9: Green Deals in the Netherlands

The Green Deals in the Netherlands represents an innovative approach to encourage cooperation among different actors within the economy are the. They are an accessible approach for companies, stakeholder organizations, interest groups and local and regional governmental bodies to work synergistically with the central government on pursuing green growth. If appropriately designed, the Green Deals may be a powerful approach to bring stakeholder cooperating in relation to soil protection on agricultural land.

Information instruments and Research & Innovation

Enhancing farmers, policy-makers and the wider public's knowledge on the importance of soil protection is key to informed land management decision making. To this end, information instruments are made use of (Figure 24) and Research & Innovation supported to facilitate the protection of agricultural soils.

Within the information instruments, the use of farm advisory services (Austria, Finland, the Netherlands), innovation groups (the Netherlands), participatory actions (Austria (Box 10), France, the Netherlands), public information (Austria, Flanders – Belgium, Estonia, France, Germany, Italy, the Netherlands) and training opportunities and knowledge exchanges (Austria, Germany, the Netherlands) are used. In addition some Member States have developed programmes specifically tailored at the promotion of specific farming models, for example, organic farming, intended to promote awareness of more sustainable land management and access to associated products (see Box 11).



Figure 24 - Member States identified as having in place national instruments aimed at providing information to stakeholders in an innovative way – own compilation

Box 10 : Austria's Soil Advisory Forum

The Forum advises on soil fertility and soil protection at Federal level. The advisory board produces guidelines that are non-binding but are used as a technical basis for promoting soil conservation during the implementation of other policies, including the Rural Development Programmes.

Box 11: Supporting organic farming in Finland and Germany

With the aim of promoting more sustainable management practices in agriculture, the Finnish 'Development Programme for the Organic Production Sector to 2020' sets out provisions aimed at developing the sector and improving access to organic products, with positive implications for soil protection. In Germany, the 'Federal Programme for Organic and Sustainable Farming' sets out a vision to realize sustainable agriculture and food production. The programme support research studies and practical advice to farmers on how to transition from traditional to organic farming. This is foreseen to have positive implications for soils, especially reducing erosion and halting soil organic matter loss.

Research & Innovation projects have high potential to provide up-to-date information and data on soil conditions and techniques in order to enhance its protection. The extent and focus varies across Member States. Examples include the French Agro-ecological project (Box 12) which aims to promote environmentally-friendly agriculture, including benefits for soil, through improved knowledge, capacity building and encouraging cooperation between scientists and practitioners. Lithuania is being running a research programme (2016 – 2020) on Agro-chemical soil properties and the creation of a related database. Similarly, the Polish National Centre for Research and Development runs a project aimed at developing efficient and sustainable management techniques to increase crop productivity in organic farming.

Box 12: The French Agro-ecological project

The French Agro-ecological Project sets a strategy towards the promotion of environmentally-friendly agriculture. It aims to raise awareness and increase knowledge and training opportunities for farmers, land owners and agricultural actors, encourage collaboration between the scientific community and land managers, and promote environmentally-friendly changes in farming practices, with benefits for soils. One of the proposed 'toolboxes' is specifically on soil conservation, while others are indirectly related to it (e.g. crop diversification, use of fertilisers and use of plant protection products).

3.4.5. Soil monitoring approaches across Europe

Soils as a natural resource are highly heterogeneous, both in relation to the variation of soil types in Europe and their resilience to external pressures. Systems that measure and monitor changes in soil quality and status are key to understanding pressures experienced and focusing policy and practical action. Spatially-located and historic data can provide the information needed to assess the effects of current farming systems and land use on soil quality, support the development of new farming systems that are beneficial to soil, and guide the development of related policies.

According to the Thematic Strategy for Soil Protection, EU Member States are encouraged to rely on existing monitoring schemes available at national level¹³⁸. A more harmonised

¹³⁸ European Commission (2006) 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, COM(2006) 231 final, p. 6.

monitoring approach has yet to be developed at EU level. Across EU Member States (see Table 2 for information on types of approaches employed), monitoring systems are both public and private, although the majority are publicly-funded systems. Public funded systems include those in Austria, Belgium (Flanders and Wallonia), Bulgaria, Croatia, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Romania, Slovakia, Slovenia and Spain. Cyprus and the Netherlands have private monitoring systems in place.

Some Member States have programmes of soil monitoring that cover all soils; while others combine this with monitoring specific to agricultural land. For example, in Wallonia, the Soil Information System is a comprehensive soil database that provides ancillary geo-data relevant to CAP payments and a wider set of instruments – a national soil map and up-to-date data on soil organic matter content and compaction – relevant to monitoring agricultural soils. Similar is the Environmental Survey in Austria (Box 13).

Box 13: The Austrian Environmental Survey

The Environmental Survey in Austria is based on approximately 6,000 plots and provides information on the variability of soil across the country. The soil monitoring parameters of the Environmental Survey are used to implement a significant number of policies, including the sustainable development strategy on land take, erosion and pollutants, and the biodiversity strategy touching upon soil biodiversity and sealing.

Examples of more focused approaches to monitoring agricultural land include the following. In Germany long term soil monitoring is required under the Federal Soil Protection Act this includes specific information on the status of cropland/agricultural soil across the country. It monitors crop yields and environmental parameters with the aim to identify both physical and legislative and regulatory gaps in soil and water conservation. The Croatian Ordinance on the 'Methodology for monitoring the state of agricultural land' prescribes the permanent monitoring of the state of agricultural land and soil and their changes. Similarly, the Hungarian Soil Information and Monitoring System (SIMS), which was established through the Act on the protection of Cultivated Soil, provides yearly data on the condition of soils nation-wide. Agricultural soils are particularly well monitored as most sampling points (864 out of 1235) are located on arable land.

A number of Member states have developed monitoring systems focused on specific soil functions. For instance, the French Earthworms Programme is undertaken by the Observatory of Rennes and produces national-wide data on soil biodiversity status on agricultural and natural land. Observations of soil biodiversity are undertaken through a participatory process, in collaboration with the wider public, including farmers, naturalists, land managers, and gardeners. The Survey of Agricultural Soils (2008 – 2018) undertaken in Germany by Thünen Institute aims to take stock of the status of organic carbon content in agricultural soils country-wide and feed into the reporting obligations required by the United Nations Convention on Climate Change. The Italian Landslides Inventory realized by ISPRA has the aim to support landslide prevention and localization, including on agricultural land, and it is of use for planning mitigation measures. The Spanish National Inventory of Soil Erosion is a Geographical Information System for monitoring and assessing soil erosion processes.

With regard to soil remediation, the Land Information Register (LIR) is a key monitor instrument to steer the Flemish soil remediation policy. It monitors progress in soil remediation and provide prospective landowners with information on soil quality, including on agricultural soils. In Bulgaria, the Liability for Prevention and Remedying of Environmental Damage Act (article 11) requires that a national database on the status of soil is created and maintained.

Table 3: Examples of soil monitoring systems in place in EU Member States and considering parameters relevant to agricultural land Source - Own compilation

Member State	Detail of the monitoring system
Austria	Environmental Survey including coverage of soil pH, carbonate concentration, nutrients, heavy metals, humus content, particle size distribution
Flanders (Belgium)	Land Information Register (LIR) including information on soil contamination
	Web Portal to Data and Information on the (Sub)Soil of Flanders including information on erosion
Wallonia (Belgium)	Soil Information System includes national soil map, pedologic information, soil organic carbon, sealed areas, soil compaction, erosion by water, ancillary geo-data
Bulgaria	Land and Soil Monitoring system includes information on heavy metals and metalloid, total nitrogen, phosphorus, soil organic carbon, pH, soil sealing, soil contamination
Croatia	Permanent Monitoring of the State of Agricultural Land and Soil
	Long-term Data on total SOC stock changes, nitrogen and organic carbon trends
	Soil Protection Information System and a soil and land inventory (forthcoming)
Estonia	National Environmental Monitoring Programme includes monitoring of pHKCl, P, K, Ca, Mg, Cu, Mn, B, humus content, soil organic carbon stock in humus, porosity, bulk density, textural class, heavy metals Cd, Pb, Cr, Cu, Ni, Zn, Hg content and chemical analyses of pesticide residues in the soil
France	Earthworms Programme to consider soil biodiversity
	National Observatory for the Sealing of Agricultural Land
Germany	Long Term Soil Monitoring system includes consideration of crop yields and environmental parameters
	Survey of Agricultural Soils includes organic carbon content
Hungary	Soil Information and Monitoring System includes acidity and carbonate status, texture, depth of humus layer, hydrophysical categories, available moisture content, phosphorous, potassium, heavy metal content in relation to As, Zn, Hg, Cd, Cr, Co Mo, Pb, Cu
Romania	Soil Quality Monitoring System includes the detailed analysis of soil on 8x8 km grid
Slovenia	Monitoring of the Status of Soil (forthcoming)

3.4.6. Key messages from the analysis

A number of EU Member States make use of dedicated soil protection legislation or strategic instruments to protect agricultural soils. These can also be used to mainstream soil considerations into other policies, e.g. other environmental legislation or land planning instruments. In addition, others have measures under development (e.g. Italy, Greece). However, coverage across Member States is inconsistent and incomplete. In some cases, dedicated legislation and strategies linked to the treatment of soil protection, and specifically the protection of agricultural soils, are absent or focus only on specific functions - i.e. decontamination of soil pollution or enhancing soil organic matter.

The vast majority of Member States rely on environmental policies not dedicated to soils or agricultural soils to address agricultural soil health. These instruments include measures

focused on land use planning, biodiversity protection, water management, sustainable development, climate change mitigation and adaptation, energy and waste. Although this approach allows specific aspects of soil protection on agricultural land to be addressed it appears rather uncoordinated.

In a limited number of Member States economic incentives from national funding sources, (beyond the support provided by the Common Agricultural Policy) play a role in supporting agricultural soil protection. Economic support is provided by Member States in a number of forms: as payments for activities on agricultural land (Germany, Greece, Ireland, Romania, Spain), in the form of liability schemes (Estonia, Ireland), as a charge on certain activities taking place on agricultural soil (Greece, France, Germany, Hungary), and as public-private partnerships (the Netherlands). In addition knowledge enhancement tools are supported with public funds by a number of Member States, as a mean to facilitate better informed soil protection choices. These include the use of advisory services (Austria, Finland, the Netherlands), of innovation groups (the Netherlands), of participation actions (Austria, France, the Netherlands) and of training opportunities and knowledge sharing (Austria, Germany, the Netherlands). Economic and information actions provide an opportunity to respond to national soil needs.

While some Member States have detailed and wide-ranging monitoring systems of soil quality (e.g. Hungary, Romania), because such systems reflect soil threats and priorities that are specific to national or regional conditions, comparing results and data quality is challenging. Moreover, coverage of systems in some Member States appears less systematic in terms of data and spatial coverage.

3.4.7. Conclusions

The analysis of the national initiatives in the European Member States confirms that there are a number of comprehensive or dedicated policies in place that elevate agricultural soil protection as a key priority. In absence of strategic political direction at national level, support to the protection of agricultural soil is offered through overarching environmental legislation, policies or land planning legislation. International efforts on desertification and sustainable development also act as drivers for protecting agricultural soil in certain EU Member States, as well as economic incentives and information actions support tackling specific aspects of soil protection in agriculture.

However, the lack of strategic coordination is an important theme and many national policies that currently deal with soil are sectoral (i.e. only taking into account specific aspects of soil protection). Moreover, few Member States systematically, strategically and specifically deal with questions of soil management on agricultural land in a way that, for example, contamination of land is increasingly dealt with.

In absence of an EU-wide approach to monitoring soil quality on agricultural land, the number and quality of monitoring system relevant to soil protection varies widely across Member States. While some Member States appear to have comprehensive monitoring systems for agricultural soils, others appear limited or fragmented.

3.4.8. Rationale for further work

In order to understand better and draw some commons threads on the extent to which the policies in place across EU-28 Member States deliver soil protection on agricultural land, it is

necessary to take a further step. This aims to scope and understand the scale at which the policies identified are applied at national level and the drivers of uptake on the ground.

One way to address this is through more in-depth, national case studies. In discussion with project partners, the aim is to undertake a range of national case studies across Europe, with particular interest for Portugal, Estonia, Slovenia and Italy. The cases studies would take a bottom-up approach and seek to understand the following:

- The Member State's context with regard to soil degradation processes on agricultural land;
- The importance of soil management issues at political level and the institutional set-up in place;
- The main drivers of soil management on agricultural land (e.g. policy, economic, social, technological) and the likely scale of delivery (e.g. field, farm, region, landscape, catchment level), with particular emphasis on:
 - What policies and policy settings are most influential in driving soil management decisions at farm level.

Beyond Europe, this paper has been shared with partners in China. It has formed the basis for structuring a comparable analysis of the types of instruments used in China to protection soil on agricultural land. This analysis is being conducted as a collaborative effort between IEEP and Chinese partners of the project. The aim is to provide a common frame for analysing the policies in place for the protection of agricultural soils to allow common trends, differences and potentially useful case examples to be identified to inform potential exchange of practices and approaches.

Section 4 – From Initial Research Findings to Next Steps

The analysis within this report is intended to provide a first scoping of policies and policy developments relevant to soil protection flowing from the international level, through the EU level to the national and even regional levels. As highlighted in the original project specification, rather than purely providing an overview, the analysis focuses upon specific aspects of policy relevant to soil protection: the Sustainable Development Goals; EU policies for soil protection relevant to agricultural land; a focus on the Common Agricultural Policy (CAP) and the opportunities it offers for soil protection; and EU nationally initiated laws that help to protect soils.

As identified in Section 1 of the report there are multiple drivers, objectives, pressures and threats that both offer opportunities to drive the protection of agricultural soils and risk their degradation. This results in a potentially complex mix of interactions and challenges to be addressed within policy. Some can be addressed through measures that promote changes in land management or soil management techniques; others require potential changes in land use and coordination linked to land use planning, nature conservation and water management priorities. Some can be solved at the local level while others require higher-level goals to drive transformation of thought and the coordination of action needed to better value soils. As a result, it was decided to focus on a range of different policies that exist at multiple governance layers i.e. international, EU and national and within different spheres of environmental law making.

Within the research delivered to date and based on discussions internal to the team and with external experts, a number of themes that warrant additional investigation have been identified (Table 4). Further exploration of these topics will provide a better picture of policy dynamics for the protection of agricultural soils. They have been selected to allow the project to explore more deeply: the role of soil protection in the context of delivering international goals; the role of soil monitoring and indicators; the nature of soil protection policies in China; and to provide a focus on potential future policy trends and changes anticipated to impact on the management of, and value placed on agricultural soils.

The policy analysis under iSQAPER will continue to run throughout the project term. During this time, we would like to explore the topics set out in Table 1. These will be presented in a further report, but also form the basis of future policy briefs to be published as a mechanism for sharing learning from the iSQAPER project more widely.

Table 4– List of topics identified for analysis under WP8 post February 2018, coverage and justification for selection. This list was developed on a collaborative basis following on from the Plenary meeting in China, 2017, WP8 meeting in Brussels Nov 2017 and the WP leaders meeting in Evora 2018.

Title of Analysis	Coverage	Reason for Selection
Analysis of soil protection policies in China	A comparable analysis will be conducted of policies relevant to soil protection in China, based on the methodology and policy classifications used to analyse national policies in EU Member States	The project explicitly needs to span international, EU and national laws in Europe and China. At the plenary session in Sept 2017 partners expressed a desire to engage with this work collaboratively and develop analysis that can be read in conjunction with the EU analysis.
Linking management practices to policy	Reviewing the Agricultural Management Practices considered in WP5 of the project and other relevant examples based on the WOCAT materials and identifying the policy tools that could or already promote them.	Connecting policies at the international, EU and national level to AMPs that deliver change in on farm soil management.
Understanding indicators and monitoring for SDG delivery – a specific focus on the definition of sustainable agriculture linked to the implementation of SDG 2.4	This analysis will look in more detail at the indicators relevant to soil protection important to assessing the delivery of the SDGs. In particular, it was noted that under SDG 2.4 there is an important concept that is yet to be defined i.e. sustainable agriculture and the proportion of agricultural land considered to be managed sustainably.	During the SDG training session in September 2017 and during subsequent WP planning meetings it was identified that given iSQAPER's focus on monitoring and indicators this is a potentially important issue to engage with and also defining 'sustainable agriculture' in the context of soil management and iSQAPER findings could facilitate effective policy development. A discussion and training session is scheduled to focus on this in June 2018.
Reviewing the soil protection opportunities associated with the CAP post 2020	To review final proposals and measures for the CAP post 2020, once adopted, to understand the opportunities, needs and risks for soil protection on agricultural land and how these differ or are comparable to existing measures analysed in Section 3.2 and 3.3.	The policy brief, internal training and analysis on the CAP were considered by iSQAPER partners as highly useful and important to their understanding of context for the use of project outcomes. This analysis would provide understanding of opportunities in the forthcoming CAP period.
Understanding the potential role of climate policy in protecting soils – opportunities, risks and limitations	Review of action related to climate mitigation and adaptation internationally and in Europe relevant to soil protection (Chinese examples to be included if possible). To examine more the emerging role of climate legislation, likely importance for supporting soil protection and the potential opportunities and limits to delivering land management change. The analysis will look explicitly at the role of the protection promotion and monitoring of soil organic matter.	Within the analysis in Section 3.1, during discussions with iSQAPER partners and within the wider global debate on soil health, climate policies and the role of soils in sequestering carbon has been highlighted as an opportunity. This analysis rather than looking at the high level would review in depth the potential policies of relevance and how change can be delivered through land management practices and improvements to soil quality on agricultural land. To make links to WP7 coverage.
National EU Member State case studies	Reviewing the policy context in up to four Member States in the EU to understand the drivers and pressures and role of policy in determining land management decisions related to soil management. Understanding	Several national case study experts have expressed a desire to engage with the policy analysis. Moreover, based on analysis in 3.1 and 3.4 there is a desire to explore further the drivers of land management change, the

Title of Analysis	Coverage	Reason for Selection
	the policies in place that drive change and why.	role of policy and to link this to wider messages within iSQAPER on AMP adoption
Review of monitoring approaches to soils and indicators	Working collaboratively with WP3, WP4 and WP5 to understand the indicators emerging as important under iSQAPER for understanding soil quality and comparing these to monitoring approaches adopted at the EU, international and national level.	At the WP leaders meeting in January 2018 it was identified that there are potentially common messages highly relevant to policy makers emerging.
Consideration of contamination in the context of agricultural soils	Review of policies that exist targeting agricultural soils at the EU and national level in Europe	This was informed by discussions at the WP leaders meeting 2018 where a desire to better understand policies specifically focused on contamination of agricultural soils including protection in place to address the question of pesticide content of soils.

Reference List

Alliance Environnement and Thünen-Institut (2017) Evaluation study of the payment for agricultural practices beneficial for the climate and environment, European Commission Directorate General Agriculture and Rural Development

Beniak M (2016) Mapping of cross-compliance implementation: GAEC standards analysis. For DG Environment, unpublished. Brussels 19/02/2016

Berge, H.F.M. ten, Schroder, J.J., Olesen, J.E. and Giraldez Cervera, J.V. 2017, Research for AGRI Committee – Preserving agricultural soils in the EU, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels

Bourma, J. and Droogers, P. (2007) Translating soil science into environmental policy: A case study on implementing the EU soil protection strategy in The Netherlands, Environmental Science and Policy 10 (2007) 454 - 463

European Commission (2006) 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, COM(2006) 231 final http://ec.europa.eu/environment/archives/soil/pdf/SEC_2006_620.pdf

European Commission (EC) (2016) Review of greening after one year. Staff Working Document, SWD(2016) 218 final, 22/6/2016, European Commission, Brussels.

EEA (2016) 'The direct and indirect impacts of EU policies on land' EEA Report No 8/2016 <https://www.eea.europa.eu/publications/impacts-of-eu-policies-on-land>

EEA (2012) 'The Major Soil Types of Europe' <http://eusoiils.jrc.ec.europa.eu/Awareness/SoilTypes.html>

European Parliament (2009) Policy Department Economic and Scientific Policy, Land Degradation and Desertification, <http://www.europarl.europa.eu/activities/committees/studies/download.do?language=en&file=24833>

FAO – Definition of Soil Degradation - <http://www.fao.org/soils-portal/soil-degradation-restoration/en/> (accessed August 2017)

Food and Agricultural Organisation of the United Nations (2015) 'Soil functions' <http://www.fao.org/resources/infographics/infographics-details/en/c/284478/>

FAO (2009) Grassland carbon sequestration: management, policy and economics, Plant Production and Protection Division Food and Agriculture Organization of the United Nations (FAO), Integrated Crop Management, Volume 11, 2010 - <http://www.fao.org/3/a-i1880e.pdf>

Food and Agricultural Organisation of the United Nations (2015) Soil functions <http://www.fao.org/resources/infographics/infographics-details/en/c/284478/>

Farmer, A.M. (2012) (Editor). Manual of European Environmental Policy. 1043pp. Routledge, London.

Frelih-Larsen, A., C. Bowyer, S. Albrecht, C. Keenleyside, M. Kemper, S. Nanni, S. Naumann, R., D. Mottershead, R. Landgrebe, E. Andersen, P. Banfi, S. Bell, I. Brémere, J. Cools, S. Herbert, A. Iles, E. Kampa, M. Kettunen, Z. Lukacova, G. Moreira, Z. Kiresiewa, J. Rouillard, J. Okx, M. Pantzar, K. Paquel, R. Pederson, A. Peepson, F. Pelsy, D. Petrovic, E. Psaila, B. Šarapatka, J. Sobocka, A.-C. Stan, J. Tarpey, R. Vidaurre (2016). Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States. Final Report to DG Environment. Berlin: Ecologic Institute. http://ec.europa.eu/environment/soil/pdf/Soil_inventory_report.pdf

Frelih-Larsen, A., MacLeod, M., Osterburg, B., Eory, A. V., Dooley, E., Kätsch, S., Naumann, S., Rees, B., Tarsitano, D., Topp, K., Wolff, A., Metayer, N., Molnar, A., Povellato, A., Bochu, J.L., Lasorella, M.V., Longhitano, D (2014). Mainstreaming climate change into rural development policy post 2013. Final report. Ecologic Institute, Berlin.

Fullen, M.A. (2003) Soil erosion and conservation in Northern Europe, Progress in Physical Geography, 27.3 (2003)

Joint Research Council (2008) Addressing Soil Degradation in EU Agriculture: Relevant Processes, Practices and Policies – An Outcome from the Project, Sustainable Agriculture and Soil Conservation, <http://soco.jrc.ec.europa.eu/documents/EUR-23767-web.pdf>

JRC (2009) 'Addressing soil degradation in EU agriculture: relevant processes, practices and policies' Report on the project 'Sustainable Agriculture and Soil Conservation (SoCo)' http://eusoils.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/EUR23767.pdf

JRC (2012) 'The State of Soil in Europe' A contribution of the JRC to the European Environment Agency's Environment State and Outlook Report – SOER 2010 <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC68418/lbna25186enn.pdf>

Kutter, T., Louwagie, G., Schuler J., Zander P., Helming K. and Hecker J.-M. (2010) 'Policy measures for agricultural soil conservation in the European Union and its member states: Policy review and classification' <http://onlinelibrary.wiley.com/doi/10.1002/ldr.1015/abstract>

Louwagie, Gay, Sammeth, Ratinger (2010) The potential of European Union policies to address soil degradation in agriculture, Land Degradation and Development, 17 September 2010

Paleari, S. (2017) Is the European Union Protecting Soil? A critical analysis of Community environmental policy and law, Land Use Policy 63 (2017) 163-173

Panos Panagos, Pasquale Borrelli, Jean Poesen, Cristiano Ballabio, Emanuele Lugato, Katrin Meusburger, Luca Montanarella, Christine Alewell, The new assessment of soil loss by water erosion in Europe, Environmental Science & Policy, Volume 54, 2015, Pages 438-447, ISSN 1462-9011, <http://dx.doi.org/10.1016/j.envsci.2015.08.012>. (<http://www.sciencedirect.com/science/article/pii/S1462901115300654>)

Paquel, K.; Bowyer, C.; Allen, B.; Nesbit, M.; Martineau, h.; Lesschen, JP.; Arets, E.; (2017) Analysis of LULUCF actions in EU Member States as Reported Under Article 10 of the LULUCF Decision, a report for DG CLIMA of the European Commission

Schiefer, J., Lair, G., Blum, W. (2016) Potential and limits of land and soil for sustainable intensification of European agriculture, *Agriculture, Ecosystems and Environment* 230 (2016) 283-293

The Royal Society (London), 2009, Reaping the Benefits Science and Sustainable Intensification of Global Agriculture. The Royal Society London

Turpin N., Perret E., ten Berge H., Guzmán G., Vanderlinden K., Giráldez J.V., Laguna A., Werner M., Raschke I., Krüger J., Steinmann H., Grigani C., Zavattaro L., Costamagna C., Siebielc G., Ruysschaert G., Spiegel A., Schlatter N., Berthold H., Lehtinen T., Baumgarten A. (2015) 'Policy bundles framing agricultural soil protection in EU and selected Member States' <http://www.catch-c.eu/deliverables/D5.524-Inventory%20of%20policies%20affecting%20agricultural%20soil%20management.pdf>

Vrebos, D., Bamp, F. Creamer, R. E., Gardi, C., Ghaley, B. B., Jones, A., Rutgers, M., Sanden, T., Staes, J., Meire, P. (2017) 'The Impact of Policy Instruments on Soil Multifunctionality in the European Union' www.mdpi.com/2071-1050/9/3/407/pdf

Annex - Section 2 - Discussion and Follow-up iSQAPER & the SDGs

iSQAPER Annual Meeting, Beijing, 13 September 2017 – Discussion and Training Session

The Sustainable Development Goals (SDGs) embody the interconnectivity between soil health, land use and land governance. The 17 goals aim to advance sustainable development globally by employing a holistic approach in simultaneously advancing social inclusion, environmental sustainability and economic development, while “Leaving No One Behind”.

Both ENDS undertook an analysis of the Sustainable Development Goals (SDGs), its targets and the indicators on land use and soil health as part of the iSQAPER project. This analysis was both used as a basis for work and sessions taking place at the UNCCD meeting (Sept 2017) and as a basis for a training and discussion session with the iSQAPER partners during the Annual Meeting 2017.

Main outcomes

The brainstorm discussion with the iSQAPER consortium during the Annual Meeting 2017 was focused on the role of academics and iSQAPER partners in the SDG implementation and monitoring. We identified three areas of outcomes: knowledge development, advice to governments and monitoring.

Knowledge development

- Evidence-based research is needed on how to set indicators at a more granular level, from a national level to a field scale). The evidence-based research of iSQAPER partners adds value to the development of the indicators.
- iSQAPER cooperation can be a vehicle to publish material to inform the wider public, including farmers, on the impact of the implementation and monitoring of the SDGs/SDG targets, which translates the technical language into a comprehensive package for a wider public.
- Research within iSQAPER can forecast the technological developments in land management which are relevant to the implementation and monitoring of the SDGs in 2030 and beyond.
- iSQAPER researchers can contribute to the discussion on how to ensure food production while protecting the environment: by determining soil quality and develop knowledge on alternative agricultural management, while putting farmers central in this discussion
- Within iSQAPER consortium, most knowledge is available on SDG 1: no poverty, 2: zero hunger, 12: responsible consumption and production and 15: life on land. There is less knowledge available within the iSQAPER consortium on SDG 5: gender equality, 10: reduced inequalities and 16: peace, justice and strong institutions.
- The iSQAPER consortium provides access to a network of scientists
- iSQAPER cooperation can strengthen the insights on the linkages between soils and the SDGs

- Experiences on iSQAPER's Agricultural Management Practices can feed into the debate on how to achieve Land Degradation Neutrality.
- iSQAPER consortium can contribute to the process of further developing and defining the notions of *sustainable agricultural practices* and *land that is degraded* to strengthen the implementation of the SDGs (especially target 2.4 and 15.3)
- Outcomes of the iSQAPER project can show that the world can be more ambitious in implementing the SDGs
- iSQAPER cooperation proves that working directly with people who manage the land is crucial: real change comes with people changing

Advising

- iSQAPER partners can give support to national governments to assess whether the current national policy framework and data collection is fit to for the implementation of the SDGs.
- iSQAPER partners can support national governments by sharing information and unlocking expert knowledge and databases that are relevant to monitor implementation of the SDGs
- The iSQAPER partners can support national governments with insight in and advice about iSQAPER's Agricultural Management Practices
- iSQAPER partners can link up with farmer associations and share and discuss the iSQAPER outcomes and recommendations and jointly have a dialogue with policy makers at the national government
- iSQAPER research partners can clarify and conceptualise sustainable food production systems and resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality to people who are part of the national and international decision-making processes.
- iSQAPER partners can help to make the case for providing (financial) means to the implementation of land and soil related SDGs and targets at national and international level.
- In order to effectively influence policy makers, iSQAPER partners need more knowledge and insights on the precise decision-making processes and governmental focal points of for instance the SDGs (or more specifically SDG15.3) to see when and how to support the implementation of the SDGs
- International science-policy debates, like the Global Soil Week give opportunities to spread iSQAPER knowledge, as many different stakeholders are present there. As a first step, we can use the opportunity of the Global Soil Week, Global Landscape Forum and other international science-policy debates to inform policy makers on what we have to offer

Monitoring

- iSQAPER partners can advise on monitoring tools and methods for the SDGs in general and more specifically target 15.3, either to set the baseline for Land Degradation Neutrality or to ensure ongoing monitoring. iSQAPER partners can contribute to the set-up of a monitoring methodology and so that SDG15.3 moves from Tier 3 to Tier 1.

- A better definition of indicators is needed. Although indicators are set already, challenge remains to move from Tier 3 to 1. iSQAPER can play a role here by bringing in their expertise on technologies and monitoring tools (such as a soil quality index which can overcome the rigid dichotomy between degraded vs non-degraded lands).
- It is not the role of scientists to monitor themselves, but rather to contribute to the methodology, indicate where data are available or provide data for monitoring throughout the year.
- As many iSQAPER researchers work with farmers, they can be a link between governments and farmers. For instance when sampling is needed for monitoring, as governments would usually need permission of farmers for sampling (for example: on soil organic carbon and on Net Primary Productivity).
- SDG3.9: soil pollution and contamination cannot be monitored by looking only at indicators related to mortality due to toxics and pollution. iSQAPER can help to make the link with soil health and SDG15.3/ LDN.
- Would iSQAPP be fit to be used as a monitoring tool?

Annex - Section 3 - What are the policy instruments?

In Europe, the term 'policy' encapsulates a wide range of binding and non-binding instruments that are made by public authorities to achieve outcomes that conform to the objectives of public policy.

The (environmental) policy instruments, as intended in this paper, are defined as follows:

- **Regulatory** – These are defined as 'command-and-control' instruments through which public authorities (including the EU institutions) mandate a specific objective(s) to be achieved. These include (binding or non-binding) laws, acts and ordinances, strategies and action plans, impact assessments, standards, targets, guidelines, bans, permits and quotas;
- **Economic** – They are a means of considering 'external costs' (e.g. the cost to the public of environmental degradation incurred by pollution) and aim to affect or influence behaviour through their impact on market signals. These include taxation, pricing, liability schemes and voluntary, private-public agreements;
- **Information** – These instruments aim to improve the quality of information, data and knowledge on particular issue, in order to allow for better-informed decisions. They include advisory services, training and actions to improve knowledge and qualifications, innovation groups, public campaigns or information actions or participatory actions;
- **Research & Innovation** – These include research projects, joint research initiatives or wider assessments of natural resource status, funded through public and private investment;
- **Monitoring** – These include both public and private monitoring systems in place at national, regional or local level. Of relevance are either those monitoring systems that are comprehensive in their coverage or those that are aimed to monitor a specific aspects of a natural resource, both at national or regional level.

Annex - Section 4 - Notes and Future Priorities – Taking WP8 Forward - Messages for WP Leaders Meeting, Evora

To Note - on 20 November 2017 WP8 met to discuss the next steps with the workpackage. This note includes the outcomes of this meeting. The agenda for this meeting is attached to this note along with summary notes of discussions in each session.

Key messages for discussion on WP8 next steps are presented below:

- Emerging key issue in Europe and under SDGs is the definition of sustainable agriculture. SDG 2.4 requires this as an indicator and debate is ongoing as to how to define this. In Europe questions on the CAP discussion open up this too.
 - Questions for iSQAPER – what would we conceptualise sustainable agriculture as encompassing, what do we know about how this will be analysed, what do we think about this, what would be sustainable agriculture in the context of iSQAPER and soil health, what are the national debates looking like in relation to this.
 - how can data developed within iSQAPER help towards the evidence base to provide evidence for SDG 2.4 delivery (and other SDG indicators potentially); and/or help support results and output orientated indicators in Europe into the future
 - Proposed that at the June Estonia meeting that we could hold a discussion, brainstorm session around these issues? iSQAPER final outputs on data will have to speak to both these issues
- Coordinating communication –
 - Policy opportunities and upcoming events – drip feeding messages and ideas, making the most of opportunities from iSQAPER work. WP8 team developed an initial list of key international and EU opportunities to highlight iSQAPER – attached.
 - To add to
 - Decide with project leads and WP9 re how to take this forward
 - Potential resources to support comms esp in BothEnds as part of WP9 as well as WP8
 - Already started to try to coordinate with World Soil's Day policy briefing launch and communication ahead of COP 23 between Both Ends and IEEP.
 - Extracting key messages or a standard 2 page format around deliverables or outputs. When and how to be done? What are the messages to communicate from iSQAPER at present, something beyond the leaflet.
 - Understanding the broader project goals – question to project leads and other WP leaders, what are the goals, outcomes that want to see, would like to see in policy, would like to see being discussed by stakeholders. Link to timeline, what we want to say and when
- Inputting policy messages into WP7 – Discussed with Ana some form of policy vision/input to the scenarios for the model and how policy might drive soil provisions. Capture high level policy direction. To confirm details with Ana at the WP leaders meeting, provisional date for inputs April.

- Making more of AMPs – building on discussions with Gudrun and Abdullah we have started investigating WoCAT entries made in relation to iSQAPER and beyond iSQAPER to try to make a link between messages from write ups of AMP use, motivations and policy intentions and opportunities.
- WP8 emphasis in 2018
 - Soil monitoring – policy needs (including debate on sustainable agriculture and results based evidence), rules, app results, indicators, challenges of role out – possible discussion in Estonia. Link to the idea of data fiches linked to WP outputs i.e.what data, coverage, potential usage, potential transferability, limitations of use, mechanisms for funding improvements. Build towards D8.2
 - China Policy Paper – Building on EU policy analysis complete a comparable analysis for China, Professor Xu provided initial insights and paper, complemented by insights from the literature – next steps to discuss with Chinese partners and develop a final paper setting out policies in different fields as per the EU paper.
 - Soil and Climate Policy – opportunities and risks linked to the emerging climate debate for soil protection, key actions and important interventions. Link to IPPC land report timeline and publication of new EU rules relevant to this area. Focus on the role of soil carbon, examples of AMP results (if we have them on SOM, and messages from wider iSQAPER on this/monitoring accuracy? WP2/3/5); look at the role of new policies and their limitations in the field of carbon – review EU international scale.
 - Policy motivations and AMPs – what motivates AMP adoption, the role of policy and the opportunities in existing and future policy for AMP promotion (int, EU) also importantly links to what is useful for App to say re use of AMPs. Review of WoCAT and AMPs under iSQAPER. Understand how support for such actions might fit into models of policy support now and into the future.
 - SDG implementation – building on SDG conceptualising note, understand SDG implementation and the role of soil protection. Focus on indicators and the needs, opportunities, risks associated with soil monitoring/definitions of sustainable agriculture and the role of soil protection within this. Consider the indicators in use for delivery of SDG 15.3 and the opportunities, challenges associated with implementation.

Agenda and notes of key points from discussion - Work Package 8 – Planning Meeting - 20 November 2017 - Location – IEEP’s Brussels Office, 4 rue de la Science, 1000 Bruxelles, nearest metro Trône/Troon 5 mins walk from office

Meeting Objectives:

- Discuss goals by end WP8 – BothENDs/IEEP, start to develop a shared vision where want to get and how, confirm working arrangements
- Continue to build links between WP8 and other WPs esp WP5, 7 and 9
- Discuss wider policy context of our work

Timing

11.30-12.00	Arrival, coffee etc
12.00 – 12.30	<p>Exchange on IEEP and BothENDs aims, what want from iSQAPER by the end of the project, what hoping for when joined project. Key issues to note on where we go now</p> <p>Notes</p> <p>IEEP aims – raise profile of soil protection in Agricultural policy thinking and make connections (agriculture, climate, wider env protection); understand the barriers and solutions to regulating soils and land</p> <p>IEEP – by end of the project:</p> <ul style="list-style-type: none"> - developed a body of evidence on soil protection on ag land - consolidated messages on opportunities, risks, key tools - communicated AMPs and links to policy tools, key messages for uptake and to future CAP - Soil monitoring – principles of what you can and can’t say about the state of soils and at what scale it is possible to note these; what is reliable process for monitoring and how to integrate into results or output driven policies <p>BothEnds – emphasising the need to communicate science to policy makers, making stronger links and building knowledge base. Emphasis on SDG delivery, indicators for this and how iSQAPER can work on these and impact/support policy decisions with evidence.</p>
12.30-13.30	<p>Lunch and informal discussion between IEEP and BothENDs on our organisations roles in the SDG debate. IEEP Director Céline Charveriat – - 5 mins by BothENDs introducing the organisation and their perspectives on SDGs</p> <ul style="list-style-type: none"> - 5 mins from IEEP - informal exchange and discussion on SDG opportunities.
13.30 – 14.00	Brief internal exchange on messages to other WPs based on note from CB
14:00 – 15.30	<p>Expand meeting – skype meeting with Abdullah, Gudrun, Jane and Ana to discussion links between key WPs</p> <ul style="list-style-type: none"> - WP5 – Discussion on how to link AMPs to the policy discussions, presentation (ideally screen share) of information emerging from case studies and AMPs, data we have and how we might use this - WP7 – Timelines for WP and key developments in terms of need for input. Understanding was some form of policy vision on future of policies by March? To check. Ana to inform re developments in WP7 framework - WP9 – Discussion on how to focus formal dissemination from WP8 under iSQAPER

	<ul style="list-style-type: none"> ○ How to represent WP8 visually online, ideas for mini videos Silvia to present others to input ○ Making the most of dissemination pathways for outputs ○ World Soils Day?
15.30 – 16.00	<p>Take away messages for WP8 from wider WP discussions, list of next steps to be circulated to other WPs</p> <ul style="list-style-type: none"> - Communication – using and coordinating outputs more, taking forward policy summaries of key iSQAPER outputs/deliverables and keeping track of what is public for use. - AMPs – core of iSQAPER need to understand how we want to communicate these to policy makers and share the information we have on them as part of the data outputs from the project. Make use of them as well in the context of the wider WOCAT database, link to AMP motivation and policy consider and review possible ways to integrate this. - Environmental Footprint – handle on what is needed in terms of policy directions futures, understood need input from April. Structure, length, timeline? - Question of upscaling and external impacts, question raised re whether we are looking at open or closed systems for ecosystem footprinting - Would be good to gain an understanding from Violette, Luuk, Coen re the policy ambition of the project i.e.who, why, when do they want to influence
16.00 – 16.30	Coffee and cake with IEEP Brussels team
16.30 – 18.00	<p>Formalising next steps and meetings under WP8</p> <ul style="list-style-type: none"> - Key upcoming dates – to discuss policy windows - Planning for 2018 outputs and ideas <ul style="list-style-type: none"> ○ Intro to compatible work ongoing at IEEP and opportunities, ECF, ENRD and Pegasus ○ Discussion fora small group external discussion on soil protection needs, opportunities, challenges – CB to intro idea - Initial WP 8 timeline next 12 months including team catch up meetings