Draft European Soil Partnership Implementation Plan 2016/2017

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1 INTRODUCTION AND OVERVIEW

The vision of the Global Soil Partnership (GSP) is to improve global governance of the limited soil resources of the planet in order to guarantee healthy and productive soils for a food secure world, as well as sustain other essential ecosystem services on which our livelihoods and societies depend including water regulation and supply of clean water, climate regulation, biodiversity conservation and cultural services.

The mission of the GSP is to develop capacities, build on best available science, and facilitate/contribute to the exchange of knowledge and technologies among stakeholders, existing multilateral environmental agreements, and technical and scientific bodies of a similar nature. This mission addresses the sustainable management of soil resources at all levels with a view to enhancing food security, protecting ecosystem services, and in this way contributing to poverty alleviation in an era of global demographic growth and unsustainable consumption patterns.

Implementation of the GSP activities is foreseen at a regional level through Regional Soil Partnerships. For Europe this will be performed by the European Soil Partnership (ESP). The ESP will address the priorities and specificities of Europe concerning sustainable soil management and soil protection. Given the very large geographic extent of the ESP, covering all Europe and Eurasia, a sub-regional soil partnership for Eurasia (EASP) has been established. Additional sub-regional soil partnerships can be established as the need arises.

The main priorities for the European region have been identified by the ITPS Status of World's Soil Resources report (SWSRR) and by the regional partners of the ESP. According to the SWSRR, the main problems in Europe are soil sealing, salinization and contamination. This plan will focus on these three major threats and additional priorities identified by the ESP partners.

Additional demands will be put on soil resources by the implementation of the soil and land related SDGs in Europe. Hence the ESP also prioritizes an understanding of cross-border soil-related and land-based demands put on soils by the implementation of the SDGs.

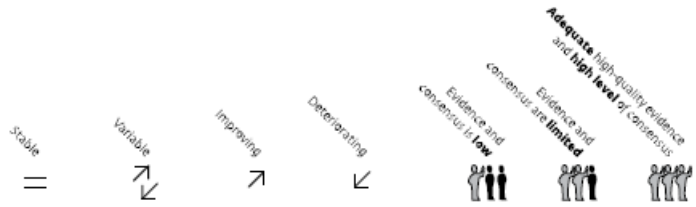

Table 11.4 | Summary of soil threats status, trends and uncertainties in Europe and Eurasia

Threat to soil function	Summary	Condition and Trend					Confidence	
		Very poor	Poor	Fair	Good	Very good	In condition	In trend
Soil sealing and land take	In densely populated Western Europe soil sealing is one of the most threatening phenomena.		↙					
Salinization and sodification	Salinization is a widespread threat in Central Asia, and it is challenging in some areas in Spain, Hungary, Turkey, and Russia.		↙					
Contamination	Soil contamination is a widespread problem in Europe. The most frequent contaminants are heavy metals and mineral oil. The situation is improving in most regions.		↗					
Organic carbon change	The loss of organic carbon is evident in most agricultural soils. Peatland drainage in northern countries also leads to rapid organic carbon loss. In Russia, extensive areas of agricultural lands were abandoned that resulted in quick organic mater accumulation; however, some of these areas are now again used for agriculture.		↗↙					
Nutrient imbalance	In the western part of the region the loss of nutrients is compensated by application of high doses of fertilizers. In the eastern part the use of fertilizers is insufficient, and in most soils nutrient mining results in intensive mineral weathering.		↗↙					
Soil erosion	Water erosion is active in all the cultivated mountainous and rolling areas; the worst situation is observed in Turkey, Tajikistan and Kyrgyzstan. Due to the attention paid to this threat it is controlled in most areas, especially in the EU.			↗				

FAO/ITPS (2015) Status of the World's Soil Resources, p. 357

2 DESCRIPTION OF THE GSP ACTION PLANS

The GSP will support the process leading to the adoption of sustainable development goals for soils. The GSP will contribute to environmental wellbeing through, for example, strategies for preventing soil erosion and degradation, reducing greenhouse gas emissions, promoting carbon sequestration and preservation while promoting the sustainable use of agricultural inputs for soil health and ecosystems management. Through these measures, the GSP will equally contribute to human wellbeing and social equity through improved use and governance of soil resources, finding alternatives to soil degrading practices through participatory experiential processes, and being sensitive to issues of gender and rights of indigenous peoples.

In order to achieve these objectives, it is proposed that the GSP should address five main pillars of action:

Pillar 1: Promote sustainable management of soil resources for soil protection, conservation and sustainable productivity.

Pillar 2: Encourage investment, technical cooperation, policy, education awareness and extension in soils.

Pillar 3: Promote targeted soil research and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions.

Pillar 4: Enhance the quantity and quality of soil data and information: data collection (generation), analysis, validation, reporting, monitoring and integration with other disciplines.

Pillar 5: Harmonization of methods, measurements and indicators for the sustainable management and protection of soil resources.

3 THE STRATEGIC APPROACH AND GOVERNANCE

3.1 Thematic focus and strategic approach

On 31 October 2013, the European Soil Partnership (ESP) was launched; taking the opportunity of the second Global Soil Week, the Global Soil Partnership Secretariat convened a workshop to discuss about the establishment of the European Soil Partnership. The Berlin communiqué was prepared by the participating GSP partners and agreed to establish the European Soil Partnership who's Secretariat would be temporarily hosted by the European Commission (DG JRC) in Ispra, Italy. An ad-hoc steering committee was set up in order to support the different activities that will be implemented for its next meeting during the first semester of 2014.

The first Plenary Meeting of the European Soil Partnership (ESP) was organized by the European Commission at its Joint Research Center in Ispra, Italy from 21-23 May 2014. The meeting allowed for a first overview of needs and ideas for the future implementation of the ESP. The second Plenary Meeting of the European Soil Partnership (ESP) was held from 17-18 March 2015 in FAO HQ, Rome, Italy. It allowed for an in-depth discussion of the views by the European GSP partners on how the ESP should be organized and its main priorities for action.[1]

The establishment of an Eurasian Sub-regional Soil Partnership (EASP)[2] within the European Soil Partnership who's Secretariat would be based in Moscow, Russian Federation was also endorsed. In parallel the Eurasian Soil Partnership convened a series of meetings with the partners of the sub-region and drafted a specific implementation plan for the Eurasian sub-region. For this reason the present document does not address actions for the Eurasian Soil Partnership and focus on the other European countries including European Union.

Discussions at earlier meetings of the ESP and ESP steering committee demonstrated a need for the definition of core activities in Europe within the ESP implementation plan. The Status of World's Soil Resources report has further documented the three main threats to European soils and hence, priorities of action need to be identified for Europe that addresses these key threats to soil functions:

1) **Soil sealing and land take**
   In densely populated Western Europe, soil sealing is one of the most threatening phenomena. Extensive work has already been undertaken by the European Commission in order to raise awareness about the problem and propose guidelines for reversing the negative trend (http://ec.europa.eu/environment/soil/sealing_guidelines.htm)

2) **Salinization and sodification**
   Salinization is a widespread threat in Central Asia, and it is challenging in some areas in Spain, Hungary, Turkey and Russia. Given its high priority in Eurasia, this topic will be addressed within this implementation plan by the ESP and by sub-regional soil partnership for Eurasia (EASP)

[1] http://www.fao.org/3/a-az890e.pdf
[2] http://www.fao.org/globalsoilpartnership/regional-partnerships/europe/en/

3) Soil contamination

Soil contamination is a widespread problem in Europe and manifests most severely in local context settings. The most frequent contaminants are heavy metals and mineral oil. The situation is already improving in most regions and is specifically addressed by the European Environment Agency (EEA) through the EIONET NRC Soil[3] and networks such as the Common Forum and others.

Proposals to be discussed: *i) The most frequent contaminants are also agro-chemicals that impact soil biodiversity and are closely related to ecosystem service and ii) diffuse pollutants*

Additional threats to European soils identified by the Status of World's Soil resources report include organic carbon changes, nutrient imbalance and soil erosion by wind or water leading to a loss of valuable topsoil and pollution of the aquatic environment. These additional threats to the maintenance of a wide range of soil functions that are necessary to meet many of the Sustainable Development Goals should also be addressed by the ESP. At EU level the 2012 Commission report on the implementation of the Soil Thematic Strategy and ongoing activities[4] shows that soil degradation in the EU is increasing[5]:

- **Soil sealing** (the permanent covering of soil with an impermeable material) and associated land take lead to the loss of important soil functions (such as water filtration and storage, and food production). Between 1990 and 2000, at least 275 hectares of soil were lost per day in the EU, amounting to 1,000 km² per year. Between 2000 and 2006, the EU average loss increased by 3%, but by 14% in Ireland and Cyprus, and by 15% in Spain[6]. In the period 1990-2006, 19 Member States lost a potential agricultural production capability equivalent to a total of 6.1 million tonnes of wheat, with large regional variations.
- A recent new model of **soil erosion** by water constructed by the JRC has estimated the surface area affected in EU-27 at 1.3 million km². Almost 20% of these are subjected to a soil loss in excess of 10 t/ha/y. Erosion is not only a serious problem for soil functions (estimated to cost €53 million per year in the United Kingdom alone[7]); it also has an impact on the quality of freshwater, as it transfers nutrients and pesticides to water bodies. For example, agricultural losses of phosphorus exceed 0.1 kg/ha/y across much of Europe, but reach levels in excess of 1.0 kg/ha/y in hotspots[8]. Addressing erosion will thus be a key contribution to achieving EU water objectives. Soil erosion is particularly intensive in forest fires areas, estimated at 500,000 ha/y by the European Forest Fire Information System (EFFIS)[9] and leads to a loss of soil carbon[10].
- It is difficult to quantify the full extent of local **soil contamination**, as the majority of Member States lack comprehensive inventories and comparable information. In 2006, the European Environment Agency estimated that there were a total of three million

3 European Information and Observation Network (EIONET) – National Reference Centres (NRC) for Soil
4 COM(2012) 46
5 http://www.eea.europa.eu/soer
6 http://ec.europa.eu/environment/soil/sealing.htm
7 DEFRA 2009: Safeguarding our Soils. A Strategy for England, p. 11.
8 http://www.eea.europa.eu/soer/europe/freshwater-quality
9 http://effis.jrc.ec.europa.eu
10 http://www.eea.europa.eu/soer-2015/europe/soil

potentially contaminated sites in the EU, of which 250,000 were actually contaminated. Remediation is progressing, although there are wide variations between Member States, reflecting the presence or absence of national legislation. It has been estimated that, in 2004, the turn-over of the soil remediation industry in EU-27 amounted to €5.2 billion, of which 21.6% spent in Germany, 20.5% in the Netherlands, and 5.9% each in France and the United Kingdom[11].

- **Soil biodiversity** provides numerous essential services, including releasing nutrients in forms that can be used by plants and other organisms, purifying water by removing contaminants and pathogens, contributing to the composition of the atmosphere by participating in the carbon cycle, and providing a major source of genetic and chemical resources (e.g. antibiotics). An indicator-based map prepared by the JRC[12] shows a preliminary assessment of where soil biodiversity is threatened. This includes areas of high population density and/or intense agricultural activity (e.g. cereals and industrial crops, animal husbandry, greenhouses, fruit orchards, vineyards and horticulture).

More locally European soils are also affected by:

- As an extreme form of land degradation, **desertification** results in a serious impairment of all soil functions. While there is still no scientifically-sound assessment at European level, one factor that contributes to desertification is an unfavourable trend in productive capacity. Figure 4, produced by the JRC in preparation for the World Atlas of Desertification[13], shows the areas where productive capacity has been constantly decreasing in the past few decades. If confirmed by other factors, this could indicate increasing desertification across Europe.
- While naturally saline soils exist in certain parts of Europe, irrigation water – even if it is of high quality – includes minerals and salts that are gradually accumulated in the soil, causing **salinisation**. The continuing expansion of irrigation – with related problems of water scarcity and the increasing use of groundwater of marginal quality – accelerates salinisation, thereby affecting soil productivity. However, there are no systematic data available on trends across Europe.
- Deposition of acidifying air pollutants (e.g. ammonia, sulphur dioxide and nitrogen oxides) contributes to **soil acidification**, which lowers the pH of the soil, thereby modifying the soil ecosystem, mobilising heavy metals and reducing crop yields. While air deposition models predict a significant improvement in the period 1990-2010, at least a quarter of the measured samples in a recent assessment of forest monitoring plots showed that critical limits for acidifying substances were being exceeded to a substantial degree. The situation for other soil cover types is not known, as there is no systematic monitoring of soil acidification across Europe for non-forested soils[14].
- **Landslides** are a major threat in mountainous and hilly areas across Europe (land abandonment being an aggravating factor), often producing serious impacts on

11 http://ec.europa.eu/environment/enveco/eco_industry/pdf/ecoindustry2006.pdf (Table 3, p. 30).

12 http://eusoils.jrc.ec.europa.eu/library/maps/biodiversity_atlas/index.html p. 62-63.

13 http://wad.jrc.ec.europa.eu The Atlas is due at the end of 2012.

14 http://www.eea.europa.eu/soer/europe/soil p. 16.

population, property and infrastructure. Over 630,000 landslides are currently registered in national databases.

3.2 Enhancing synergies with EU soil policy

In September 2006 the European Commission adopted an EU Soil Thematic Strategy[15] including a proposal for a Soil Framework Directive[16]. This originated from the need to ensure a sustainable use of soils and protect their function in a comprehensive manner (i.e. Addressing all soil threats and soil functions) in a context of increasing pressure and degradation of soils across the EU. Taking note that the proposal has been pending for almost eight years without a qualified majority in the Council in its favour, the Commission decided to withdraw the proposal[17], opening the way for an alternative initiative in the next mandate. In withdrawing the proposal for a Soil Framework Directive, the Commission indicated that "*The Commission remains committed to the objective of the protection of soil and will examine options on how to best achieve this. Any further initiative in this respect will however have to be considered by the next college*"[18].

The commitment to sustainable soil use is in line with the Seventh Environment Action Programme (7th EAP) [19] which provides that by 2020 "*land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway*" and commits the EU and its Member States to "*increasing efforts to reduce soil erosion and increase organic matter, to remediate contaminated sites and to enhance the integration of land use aspects into coordinated decision-making involving all relevant levels of government, supported by the adoption of targets on soil and on land as a resource, and land planning objectives*". It also states that "*The Union and its Member States should also reflect as soon as possible on how soil quality issues could be addressed using a targeted and proportionate risk-based approach within a binding legal framework*".

A new Soil Expert Group with representatives nominated by the 28 EU Members States has been set up in 2015 to reflect on the 7th EAP commitments. The European Commission has just launched a study for an 'inventory and assessment of soil protection policy instruments in the EU Member States' which will update the knowledge collected during the preparation of the Soil Thematic Strategy. However the policy process itself should remain outside the scope of the European Soil Partnership as it has its own governance and EU policy procedures.

The approach proposed for the Implementation Plan is to build as much as possible on existing soil policy and initiatives at national and EU level, to enhance synergies between the European Soil Partnership and the existing activities. Due to limited resources of the ESP it is proposed to focus on a limited number of specific activities addressing priority areas.

15 COM(2006) 231

16 COM(2006) 232

17 OJ C 163, 21.5.2014, p. 4

18 OJ C 163, 28.5.2014, p. 15

19 Decision N° 1386/3013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 "Living well, within the limit of our planet" (OJ L 354, 28.12.2013, p. 171-200)

The EU Soil thematic Strategy (STS) has 4 pillars which have commonalities with the 5 Pillars of the Global Soil Partnership:

- GSP Pillar 2 awareness action is similar to the EU STS Pillar 4 increasing public awareness of the need to protect soil.
- GSP Pillar 3 (and to some extent Pillar 4) is similar to EU STS Pillar 3 (research and knowledge)
- The GSP Pillar 2 objective to encourage policy share the objectives of the EU STS Pillar 1 (legislative) and 2 but the instruments and the governance are very different between the EU STS (involving the Member States) and the ESP (based on a partnership approach). It is very important to make this distinction (policy actions engaging EU and its MS cannot be decided in the context of the ESP)

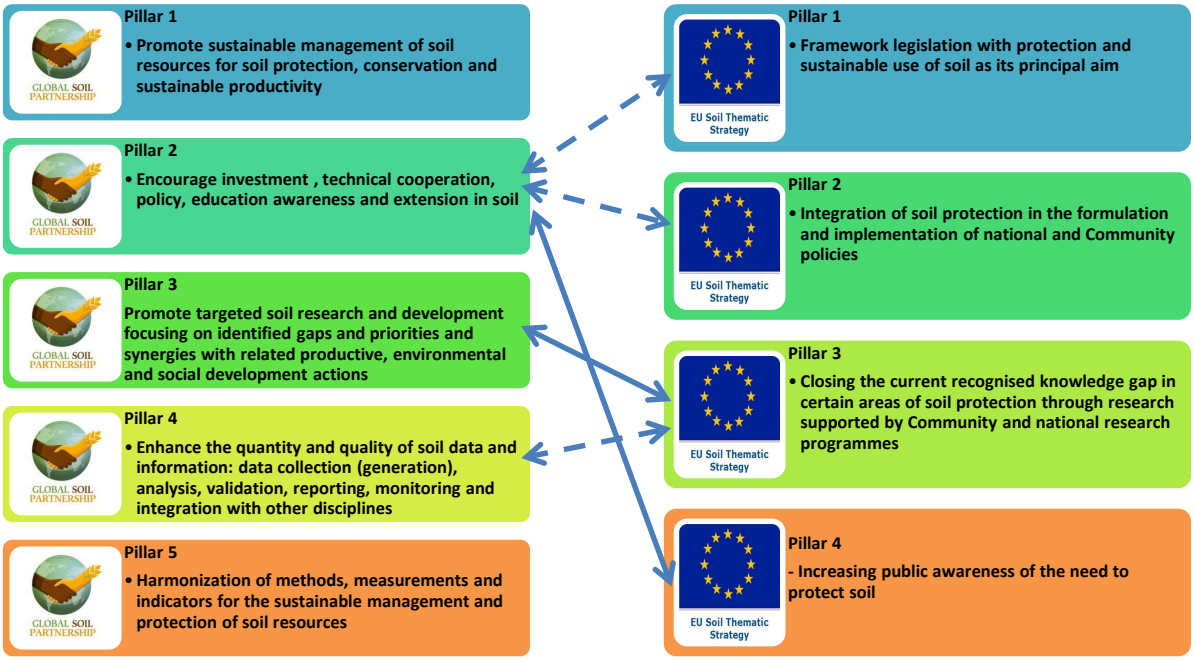

FIGURE 1 COMMONALITIES BETWEEN GLOBAL SOIL PARTNERSHIP AND EU SOIL THEMATIC STRATEGY PILLARS

Since the Soil Thematic Strategy was adopted in 2006 a lot of progress has been achieved on 'non-binding' pillars (integration, research and awareness) at European and national level:

Awareness raising (Pillar 4): a number of activities have been organised by the European Commission and the Member States. The European Commission has organised several public events dedicated to soil, including major conferences on soil, climate change and biodiversity, contributions to meetings on the Convention on Biological Diversity, and several talks at Green Week. Moreover, leaflets and brochures have been made available in a number of EU languages[20]. The Commission has also published a number of soil atlases, including the *Soil Atlas of Europe* and the *European Atlas of Soil Biodiversity*. It has also established a working

20 More information at http://ec.europa.eu/environment/soil/index_en.htm

group on Awareness Raising and Education in the context of the European Soil Bureau Network (ESBN)[21].

The Strategy has acted as an important driver for numerous soil awareness raising tools and networks that have been developed in Member States, including the European Network for Soil Awareness (ENSA).

Moreover in 2015 the European Commission and the Member States have been particularly active in the context of the International Year of Soils with more than 400 events organised at EU, national and local level[22]. The European Commission contributed to the IYS with the participation to many conferences and the organization of several events on soil during the EU Green Week, EXPO 2015 and for closing the IYS.

The IYS (together with the COP-21 and the adoption of SDGs) created a new momentum on soil at international level and it is very important to continue to build on that.

Proposals to be discussed: *The EU STS and the ESP could join efforts and define some common activities to continue raising awareness on soil in Europe beyond 2015.*

Knowledge and Research (Pillar 3):

Since the adoption of the EU STS many research and innovation projects have been funded under the Seventh Framework Programme for Research[23] and LIFE to address soil issues and to improve the knowledge base for action. LIFE[24] has funded 147 soil-related projects covering different aspects of soil protection (soil sealing, soil biodiversity, soil carbon capture, soil monitoring, water and soil, sustainable agriculture and land contamination). This effort should continue under Horizon 2020[25] and LIFE+ projects.The European Innovation Partnership (EIP) on Agriculture also plays a role in this context, in particular the focus groups on "Soil Organic Matter content in Mediterranean regions"[26] and "IPM practices for soil-borne diseases"[27].

Of course research efforts at EU and national level are conditional to the importance given to soil and soil protection knowledge. Research on soil organic carbon will benefit from the high priority of climate change research, boosted by COP-21 and the '4p1000 initiative' launched by France in 2015. In light of recent discussions on research priorities at EU level it seems that cross-cutting themes linking soil, climate change and food security or soil and water nexus have more potential than soil research alone. It should not minimise the need to improve knowledge on soil ecosystem services and economics of soil and land degradation and protection.

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21 http://eusoils.jrc.ec.europa.eu/esbn/Esbn_overview.html

22 More information at http://ec.europa.eu/environment/soil/iys2015/events_en.htm

23 http://cordis.europa.eu/fp7/projects_en.html

24 See http://ec.europa.eu/environment/soil/pdf/LIFE%20and%20Soil%20protection.pdf

25 See e.g. call SC5-8-2014: Preparing and promoting innovation procurement for soil decontamination in Horizon 2020 Work Programme 2014-2015 (http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-climate_en.pdf)

26 https://ec.europa.eu/eip/agriculture/en/content/soil-organic-matter-content-mediterranean-regions

27 https://ec.europa.eu/eip/agriculture/en/content/ipm-practices-soil-borne-diseases-suppression-vegetables-and-arable-crops

Another important knowledge provider at European level is the European Soil Data Centre (ESDAC)[28] hosted by the Joint Research Centre (JRC) of the European Commission. Another source of data is LUCAS, a survey on land cover, land use and agro-environmental indicators[29]. In the 2009 and 2012 surveys, a specific soil module has been integrated in order to provide statistics and indicators. The soil module was part again of the LUCAS 2015 survey which will make possible to compare land use and soil changes for ca. 25,000 points. This could be a starting point for harmonised European monitoring of soil parameters for a whole range of statistical, research and policy purposes.

The European Environmental Agency and the EIONET network are also important data and knowledge providers on soil. Recently an EIONET Working Group on Soil Contamination has been set up to reflect on the soil contamination indicators and the improvement of contamination sites inventory at EU level.

The BIOSOIL project, launched in the context of the Forest Focus Regulation[30], has reported an increase in organic carbon in some European forest soils.

A lot of information also exists at national level; one of the objectives of the inventory of soil policy launched by the European Commission is to collect information on existing knowledge base and monitoring systems at national and EU level.

Proposals to be discussed: *There is a need to reflect on how the research projects and knowledge base at EU and MS level can contribute to the implementation of the European Soil Partnership, e.g. by defining some 'joint' well-defined activities.*

Integration of soil protection in other policies (Pillar 2): different Union policies play a key role in working towards the goal of sustainable use of soil. Since the Strategy was adopted, the Commission has continued its work on soil integration, in particular in the context of:

The **Common Agriculture Policy** (CAP): since the introduction of cross compliance in 2003 aspects of soil protection have been an integral part of Good Agricultural and Environmental Conditions (GAEC) . Emphasis has been placed on limiting erosion, retaining and improving organic matter, and avoiding compaction. Taking stock of the experience gained, in October 2011 the Commission proposed to further clarify and specify soil-related standards in the context of the overall CAP reform to 2020[31]. In particular, it proposed a new GAEC on organic matter protection, including a ban on arable stubble burning and an obligation not to plough wetlands and carbon-rich soils. Member States have a broad margin of discretion in determining national GAEC obligations for farmers provided that the EU framework is respected[32]. Cross compliance provides for minimum soil protection conditions and, by its nature, cannot adress all soil degradation processes.

The protection and sustainable use of agricultural soils is also addressed by greening practices in the CAP and by supporting measures under the Rural Development Programme (RDP). Rural Development provides for agri-environment schemes which may specifically support soil-

28 http://esdac.jrc.ec.europa.eu/

29 Decision No 1578/2007/EC.

30 Regulation (EC) No 2152/2003.

31 http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm

32 http://ec.europa.eu/environment/soil/study1_en.htm

protective operations but have to go beyond the basic standards defined under Cross Compliance. The new RDP includes objectives of sustainable management of natural resources and climate mitigation and adaptation, including by means of improved soil management and enhanced carbon sequestration in agriculture and forestry (Priority 4.C on "Preventing soil erosion and improving soil management" and possibilities offered to national and regional authorities for preventing erosion and improving soil management measures under RDPs).

The CAP soil protection provisions in Pillar 1 and Pillar 2 will be in-depth analysed in the aforementioned inventory of soil legislation just launched by the European Commission.

The **Cohesion Policy** plays an important role for the rehabilitation of certain industrial sites and contaminated land: in the period 2007-2013 €3.1 billion have been allocated to eligible regions (mostly in Hungary, Czech Republic and Germany). The Cohesion Funds and the European Development Fund continue to support the regeneration of brownfield sites under the current programming period 2014-2020. Also, state aids for the remediation of soil contamination can be granted under the Environmental aid guidelines provided that the 'polluter pay principle' is respected.

The **protection and sustainable use of soil**[33] is scattered in different Community policies contributing in various degrees to mainly indirect protection of soil, for example through environmental policies on waste, water, chemicals, industrial pollution prevention, nature protection and biodiversity, nitrates and pesticides, sewage sludge, forestry strategy, climate change adaptation and mitigation, or biofuels. For soil contamination [34]different pieces of EU legislation apply, for example:

- Directive 1999/31/EC on the landfill of waste [35] addresses the presence of toxic substances resulting from a land-filling operation, on the condition that it had not been closed and covered before 16 July 1999.
- Directive 2004/35/EC on environmental liability[36] requests liable operators to undertake the necessary preventive and remedial action for a range of polluting activities provided serious pollution has been caused after April 2007.
- Directive 2010/75/EU on Industrial Emissions[37] aims to ensure that the operation of an industrial installation does not lead to the deterioration in the quality of soil (and groundwater), and requires establishing, through baseline reports, the state of soil and groundwater contamination. However, a large number of installations do not fall under the scope of the directive.

Due to their different scope, existing provisions - even if fully implemented - yield a fragmented and incomplete protection of soils as they do not specifically target the problem, are not demanding enough or do not cover all soil threats. Hence, soil degradation continues.

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33 As mentioned in the Soil Thematic Strategy as overall objective.

34 A discussion is on-going i.e. in the context of EIONET NRC Soil on the terminology of pollution and contamination. Against that background, the present service contract will have to make clear the notions and indicators used in EU, national and regional policy instruments to ensure comparability.

35 OJ L 182, 16.07.1999, p. 1

36 OJ L 143, 30.4.2004, p. 56

37 OJ L 334, 17.12.2010, p. 17

At national level the situation varies a lot from one Member State to the other. Only a limited number of Member States have specific and comprehensive legislation on soil protection; very often it is limited to soil contamination and soil sealing. The others rely on provisions on soil protection in the environmental legal acquis. Moreover, regional or national soil policies do not cover cross-border soil degradation.

The 2012 Commission reports on the implementation of the Soil Thematic Strategy and ongoing activities[38] and on the State of Soil in Europe[39] and the 2015 Status of the Environment Report (SOER) of the European Environment Agency[40] highlight the continuous degradation of soils in Europe, suggesting that existing legislation at national and EU has not succeeded in preventing soil degradation sufficiently across the EU28.

3.3 ESP Governance approach

The governance of the implementation of the Plan of Action will include the major stakeholders of ESP. These stakeholders include:

- The Partners represented by the national focal points and delegates of non-government partners, as a rule, expressing their will at Plenary Assemblies;
- The GSP Secretariat, including FAO staff from regional European, sub-regional, and country offices;
- The ESP leadership: Chair, Vice-Chair, Steering Committee, the ESP Secretariat;
- The members of the Working Groups (WGs) on the Pillars of Action.

The Implementation Plan of Action should be prepared by the WGs, revised by the GSP Secretariat, adopted by the Partners at the Plenary Assembly, and implemented by the ESP Secretariat supervised by the ESP Chair.

This implementation plan based on previous meetings of the ESP plenary and the ESP steering committee in 2014 and 2015 identifies core elements for implementation. These elements are related to recommendations of the respective five pillars and describe potential outputs, respective partners of implementation and provide for a timeline and budget/ funding information.

A logical framework is part of this implementation plan. It takes the form of a series of connected propositions that will later on also facilitate monitoring progress:

- If these Activities are implemented, and these Assumptions hold, then these Outputs will be delivered
- If these Outputs are delivered, and these Assumptions hold, then these Components will be achieved.
- If these Components are achieved, and these Assumptions hold, then this Outcome will be achieved.

To determine the key components to achieve the main outcomes, the main constrains and solutions to develop sustainable soil management have been determined.

38 COM(2012) 46

39 EUR 25186 EN

40 http://www.eea.europa.eu/soer-2015/europe/soil; http://www.eea.europa.eu/soer#tab-synthesis-report

4 IMPLEMENTATION PLAN OF ACTION FOR PILLAR 1

The development of Pillar 1 was initiated during the First Plenary Assembly of the ESP held in Ispra (Italy) on May 21-23 2014. The discussion on priorities for pillar one identified the following areas of action:

- Develop a consistent plan of actions covering sustainable soil management practices, knowledge and adoption, ecosystem services provision, as well as required policy and institutional support.
- Identify the main areas for action towards sustainable soil management through a process encompassing the main challenges and priorities (such as the threats imposed by contamination on sustainable soil management) in European countries and areas.
- Promote better coordination of existing work on sustainable soil management and initiate new activities via mobilisation of resources and effective partnerships;
- Consider the different ground-level user needs in terms of sustainable soil management across all scales, including support in addressing major soil management problems; and puts mechanisms in place for farmer-driven participatory action research;
- Address all land uses in the different areas of Europe;
- Consider socio-cultural aspects of sustainable soil management, including family and youth participation;
- Establish a supporting social, financial and regulatory political framework to ensure that land users have access to appropriate inputs, knowledge, research, finance and planning capacity;
- Promote the conservation of soil resources and the restoration/rehabilitation of soil functions in degraded soils.

This discussion for areas of actions is the foundation for activities in pillar 1 that promote sustainable soil management practices, improve networks of collaboration and enhances farmer-driven, participatory action research approaches at European level.

Proposals to be discussed: *i) Develop mechanisms to support indicators and targets for the SDG implementation in Europe and ii) to gain a better understaing of soil as natural captial and the competing demands put on soil-based ecosystem services.*

	Recommendation	Description of outputs	partners	timeline	Budget and funding
1	Appropriate sustainable **soil management practices and systems** should be identified for all land uses at regional and national levels using	- ESP facilitates establishment of networks among farmers, farmer advisors and other practitioners, farmer organizations etc. including programmes of field visits	Tbd – in partnership with existing Research Project and/or engaging farmer	tbd	tbd

	existing knowledge, adapted according to site characteristics and land user needs, taking cost-benefit analyses and social impacts into account. These practices and systems should be implemented at appropriate levels to restore and maintain soil functions and ecosystem services in Europe across multiple scales.	(building on FP7 projects activities such as LANDMARK). - Identification of SSM adapted to European and national contexts which could be compiled in communication material such as Good Practices of Soil Sustainable Management Practices, videos	associations such as ECAF (European Conservation Agriculture Federation, IFOAM, Agro-ecology association etc.)		
2	In light of the primary importance of food security, sustainable agricultural production should be supported by **balanced soil fertility management using a range of cropping practices**, organic materials/fertilizers, weed and integrated pest management practices, and appropriate agro-physical management practices without causing other negative environmental impacts.	- Improve the dialogue between industry, farmers, research and policy makers on sustainable management of fertilisers and pesticides – organisation of a conference bringing together those stakeholders (could be also organised in partnership with Landmark) - Report based on the outcomes of this conference and dissemination ➔ See also pillar 2	tbd	tbd	tbd
3	All barriers preventing the implementation or adoption of sustainable soil management practices and systems should be evaluated and **policy and technical solutions proposed** to create an appropriate environment for sustainable soil management.	- Report on the barriers preventing SSM application and the recommended SSM practices at European and national levels (technical solutions) - Identification of policy solutions taking account of existing policies at European and national level (taking account of the outcomes of current inventory of EU and national legislations launched by the European Commission) - Adaptation of the Voluntary Guidelines for SSM (currently being developed by ITPS) to European and national context -Dissemination of those Guidelines (workshops, presentations…)	JRC and EC and tbd	tbd	tbd
4	Activities addressing soil contamination – inventory of EU contaminated sites	To be defined - Report on the EIONET NRC Soil proposal to revise the indicator "Progress in the management	JRC – EEA – EIONET	2016+	tbd

	Revision of the indicator "Progress in the Management of Contaminated Sites in Europe"	of contaminated sites in Europe". - Dissemination of the Good Practices and progress achieved in remediating contaminated sites in European Countries (workshops, presentations…) - JRC contributes through its activities with EIONET-SOIL and RemTech on remediation of contaminated sites.			
5	A cost-effective and state of the art **monitoring system** should be developed to measure the evolution of soil quality in long term and to assess the results of implementation of sustainable soil management practices and systems in different areas of Europe.	- Monitoring system based on existing soil inventory at national and European level (in particular LUCAS Soil module). The mapping of existing information system at EU level is included in the inventory launched by the European Commission (update of FP7 ENVASSO project) → See also pillar 4	JRC + ESBN + EIONET-Soil	2016	JRC
6	The ESP should facilitate the development of a **capacity building strategy** amongst all stakeholders to promote an integrated approach to adoption of sustainable soil management goals in Europe	- Summer Schools should be reactivated (JRC has proposal for SS in Bosnia 2016) - Voluntary certification on SSM could be set up - Training on SSM could be embedded in education programme (secondary, university level) - Pilot projects could be set up based on partnerships with universities/agriculture schools	JRC (lead) and partners	tbd	tbd
7	Other threats (erosion, salinization, soil sealing,….) that affect sustainable soil management	JRC contributes through its activities with EIONET-SOIL on soil sealing, RECARE FP project on salinization	JRC	2016+	tbd
8	Develop mechanisms to support indicators and targets for the SDG implementation in Europe	Joint approach on indicators and targets for the follow-up and review for the implementation of the SDGs in Europe	JRC and IASS and others	2016+	tbd

5 IMPLEMENTATION PLAN OF ACTION FOR PILLAR 2

Proposals to be discussed: *Leadership of Pillar 2 by ENSA (European Network on Soil Awareness) and JRC*

Pillar Two of the GSP underpins many of the actions under the other Pillars by addressing the general lack of societal awareness of the importance of soil in people's lives and the well-being of the planet. In many cases, deficiency in education is the specific underlying cause of unsustainable land management practices, of the general lack of investment (both in education and physical measures to protect soil) and, as importantly, of the widespread political reluctance to adopt short- and long-term measures to preserve and enhance soil conditions. The Plan of Action (PoA) for Pillar 2 consists of six interlinked and interdependent components: policy, investment, education, extension, public awareness and technical cooperation.

	Recommendation	Description of outputs	partners	timeline	Budget and funding
1	A key focus of the EU Soil Thematic Strategy is to improve the appreciation of the value and relevance of soil by all levels of civil society. The ESP will continue to expand these elements by developing strategies for communicating soil-related issues to all stakeholders through mechanisms.	Targeted educational resources (multilingual), public outreach material and events (e.g. launch of Soil Biodiversity Atlas, revision of Soil Atlas of Europe, ESOF), definition of best practices that can be applied by soil users (e.g. EUROSOIL 2016), engagement with other scientific disciplines. Specific material to highlight both soil functions and three key threats	JRC + soil community	2016+	JRC will provide funding for Pillar 2 WG, soil atlas events, booth at EUROSOIL and ESOF
2	Support to EU and national soil policy development	Policy briefings (e.g. JRC Technical Report on Soil management and climate change mitigation), support to EU and national initiatives in the development of SDG targets and development, implementation and monitoring of soil protection/ conservation/ restoration policies	All partners	2016+	Self-funding
3	In light of the primary importance of food security, sustainable agricultural production should be supported by balanced soil fertility management using a range of cropping practices, organic materials/fertilizers, weed and integrated	Establish an inclusive dialogue between industry, farmers and others (fertilizer industry, bio waste regulations, bio char, pesticide problems (glyphosate in soils, etc.). And identify how to address soil fertility management at EU level. Link this approach with the Landmark conference on farming systems and soil	JRC and others	10/2016	tbd

	pest management practices, and appropriate agro-physical management practices without causing other negative environmental impacts	functions in Brussels (10/2016)			
4	Extension services should be supported to reflect the multi-functional services of soil and expanded beyond the traditional agricultural community to ensure the sustainable use of soil and to reduce degradation across all land uses. Regional priorities need to be determined in terms of the disparities in agricultural extension knowledge-base,	Improved engagement between soil science community and extension services to enhance soil component in land use advice. Mechanism to ensure dissemination of relevant scientific developments and outreach material to support SMM and expanded knowledge base (link to Pillar 1).	National focus National focus		
5	Scientific and technical cooperation should be promoted and strengthened.	Integrated research calls (targeting of EU and national funding programmes)	EC and all		
6	To foster investments in soils and demonstrate positive return from investments (should reflect EU, national and regional priorities) – high relevance to CAP reform.	Evidence based success stories	All		
7	Global Soil Week 2017	Promote a science-policy interface outreach event on the follow-up and review of the SDGs at the GSW 2017	IASS JRC, EC and others	2016 and 2017	tbd

6 IMPLEMENTATION PLAN OF ACTION FOR PILLAR 3

Proposals to be discussed: *Leadership of Pillar 3 and Input to the implementation plan by University of Wageningen, Chair of EGU in Vienna and JRC*

The Plan of Action of Pillar 3, adopted at the Third Plenary Assembly of GSP in June 2015, focuses on addressing four main recommendations suggested to facilitate interactions between the scientific community engaged in conducting basic and applicable R&D on soils, and end-user communities including decision makers to boost impact through adaptation and dissemination of the knowledge and technologies developed (the recommendations that had practical outcomes in this sub-regional Implementation Plan are underlined):

	Recommendation	Description of outputs	partners	timeline	Budg nding
1	Promote targeted soil research	Launch an implementation plan for research in joint collaboration	Wageningen and JRC plus partners from Turkey (convening the next Eurosoil conference in 2016 in Turkey)		
2	Promote a science-policy interface event at the Global Soil Week 2017	Develop a joint event to gain a mutual understanding in follow-up and review of the SDGs on natural resources in Europe	IASS, EC, JRC and others	Early 2017	tbd

7 IMPLEMENTATION PLAN OF ACTION FOR PILLAR 4

Pillar Four (soil information and data) requires global level governance in order to ensure compatible datasets are generated for each Regional Partnership. Thus, most of the actions will be coordinated at the level of GSP and requires agreement among all the regional partnerships. However, certain actions can be planned at a (sub)-regional level with an understanding that these actions need to take account of the wider commitment to build harmonised or interoperable global datasets. Currently, work is ongoing to derive a global level Implementation Plan for Pillar 4 from the approved Pillar 4 Plan of Action. Until this is completed and approved, the development of a (sub) regional Implementation Plan is difficult.

Currently, the draft Pillar 4 Implementation Plan suggests key activities should be undertaken to derive global and regional scale datasets to address the main aims of answering critical questions at the global scale, providing the global context for more local decisions and supplying fundamental data sets for understanding Earth system processes. Additionally, the soil information collated within Pillar 4 should support, and be available, to those working in the other four pillars.

The Implementation Plan is based on the Pillar 4 Plan of Action endorsed by the second GSP Plenary Assembly (July 2014) and its four recommendations:

1. *"An enduring and authoritative system for monitoring and forecasting the condition of the Earth's soil resources should be established under the auspices of the Global Soil Partnership to meet international and regional needs."*
2. *"The global soil information system should use soil data primarily from national and within-country systems through a collaborative network and the distributed design should include facilities for incorporating inputs from the new sources of soil data and information that are evolving rapidly."*
3. *"The global soil information system should be integrated into the much larger effort to build and maintain the Global Earth Observing System of Systems and close attention should be given to issues relating to the protection of privacy, intellectual property rights and terms of use."*
4. *"Implementation of the global soil information system should include a training program to develop a new generation of specialists in mapping, monitoring and forecasting of soil condition, with an emphasis on countries where improved soil knowledge is essential for food security and restoration and maintenance of ecosystem services."*

The proposed activities within the Implementation Plan are:

1. Monitoring, forecasting, and status reporting (SoilSTAT) – largely lead by FAO *(Recommendation 1)*

2. Information system development to include soil profile/point data, global polygon coverage and global grids.

i. Soil profile/point data

- Comprehensive soil profile and analytical database – Tier 1 *(Recommendation 2)*
- World reference soil profile and analytical database – Tier 2 *(Recommendation 3)*

ii. Global polygon coverage and supporting classification

- Revise and update the digital Soil Map of the World with the design scale 1:1M from national soil polygon data sets and SOTER maps *(Recommendation 4)*

iii. Global grids

- Harmonized World Soil Database *(Recommendation 5)*
- Fine-resolution grid of soil properties (*Recommendation 6)*

Europe has a relative good record in many aspects of soil data collation and dissemination (JRC has been particularly active in this area) though there is always scope for improvement. Europe is data rich but has often been poor at sharing data. Therefore, methods need to be put in place to encourage data sharing, minimise infringements of data sovereignty and protect intellectual property. Building a network of data providers that trust each other and have mutual respect will be important. Equally, developing a distributed system where data is held by the provider and served via web mapping and web feature services will help to overcome issues with data sovereignty. In this respect, the European Soil Bureau Network (ESBN) has been shown to be a good model for such collaboration and can be used to derive the necessary spatial data alongside the International Network of Soil Information Institutions (INSII) which consists of institutions nominated by their governments and other GSP partner organizations. It is envisaged that the GSP- appointed Global Soil Spatial Data infrastructure Centre (GSSDIC) will provide technical support for those countries/GSP partners that cannot provide the required soils data.

Proposals to be discussed: *Formation and composition of Pillar 4 Working Group for Europe in accordance with GSP.*

	Recommendation	Description of outputs	partners	timeline	Budget and funding
1	An affordable and state of the art monitoring system should be developed to measure the evolution of soil quality in long term and to assess the results of implementation of sustainable soil management practices and systems in different areas of Europe.	To integrate knowledge of monitoring of all individual countries in EU. Establishment of an inventory of existing soil policies and soil monitoring. This is ongoing at the DG environment and includes the expert group (at EU level). → Questionnaire and inventory (according to ENVASSO) by EU, DG Environment) and other research projects. Consult with FAO secretariat.	DG ENV and MS	2016	DG ENV
2	Comprehensive soil profile and analytical database	A database of soil profile and analytical data with no	Primarily the **International Network of Soil**	Provisional timeline end 2016	tbd (probably self-funded for European

		requirements for a minimum dataset or standardised methodologies or analytes. A European database already exists and is held by JRC (SPADE). Recently comprehensively revised this could provide a useful starting point and be augmented.	**Information Institutions** (INSII). For Europe, the ESBN, JRC (will release full coverage of SPADE for dominant soils of the EU), INSII and GSP partners would be seen as key data providers. There is also scope for collating soil data from Universities and private advisory laboratories		countries)
3	World reference soil profile and analytical database	This dataset will likely be a subset of the previous but the data will be harmonized and quality-assured morphological, physical and chemical data for soil profiles which are globally representative of geographic regions, major soil types, and ecologically, agriculturally or scientifically significant soils.	Primarily the **International Network of Soil Information Institutions** (INSII). For Europe, the ESBN, JRC and INSII would be seen as key data providers.	Provisional data for completion is end 2020.	tbd (probably self-funded for European countries)
4	Global polygon coverage and supporting classification	Revised and updated digital Soil Map of the World (scale 1:1M) with global scale soil classification system utilising the eSOTER system. The eSOTER system has been developed with EU funding and is currently being applied to the Danube river basin. Europe at a scale of 1:250,000. EU needs to adhere to the meta data soil standards of INSPIRE.	Primarily the **International Network of Soil Information Institutions** (INSII). For Europe, the ESBN, JRC and INSII would be seen as key data providers. A key aspect is that no data needs to be transferred if WMS are utilised (see EU funded GS-Soil project as an example)	2018/19	tbd (probably self-funded for European countries) JRC can provide limited funding for data harmonisation for Danube
5	Harmonized World Soil Database	Harmonized World Soil Database is a 30 arc-second raster map derived from existing polygon maps with	Primarily the **International Network of Soil Information Institutions**	World Soils Day 2017	tbd (probably self-funded for European countries)

		over 15 000 different soil mapping units that combines existing regional and national updates of soil information worldwide (SOTER, European soil map, Soil Map of China, WISE) with the information contained within the 1:5 000 000 scale FAO-UNESCO Soil Map of the World	(INSII). For Europe, the ESBN, JRC and INSII would be seen as key data providers. There is still debate as to whether this product will be required		
6	Fine-resolution grid of soil properties	The fine-resolution grid is a raster dataset based on the up-scaling of validated, measured soil profiles in conjunction with a large number of covariate layers that have some relation to soil forming factors (terrain, vegetation, climate) using digital soil mapping techniques. Predictions are made for a standard set of depths with the uncertainties in the prediction also quantified. A widely-used specification for gridded soil property data maps is from the GlobalSoilMap project.	Primarily the **International Network of Soil Information Institutions** (INSII). For Europe, the ESBN, JRC and INSII would be seen as key data providers especially those with expertise gained from GlobalSoilMap project (eg INRA).	Version 0 by 2018 and Version1 by 2020.	tbd (probably self-funded for European countries)

8 IMPLEMENTATION PLAN OF ACTION FOR PILLAR 5

Pillar Five is the most technical element in the entire Plan of Action of GSP. However, the implementation of other Pillars would be jeopardized in the lack of understanding among the partners because of the lack of common language. Harmonization at a regional level can be counterproductive, because it may lead to the development of several different regional systems poorly harmonized between each other. Thus, efforts at the (sub)-regional level should be aimed at the introduction of universal harmonized approaches rather than to the development of regional systems for scientific communication.

Globally, the recommendations listed in the Plan of Action of the Fifth Pillar are as follows:

Recommendation 1: Develop an over-arching system for harmonized soil characterization as the central objective of Pillar 5. The system builds on and merges existing approaches to describe, classify, map, analyse and interpret soils.

Recommendation 2: As a mechanism for improving the comparability of soil data, all GSP members should be able to reference their information into the GSP harmonization system which includes legacy data as well as newly collected data. It builds on established harmonization principles as well as on current standardization and harmonization activities.

Recommendation 3: Reference systems for soil profile description, soil classification and soil mapping need to be developed. For that, the FAO (2006) Guidelines for Soil Description should be reviewed with the aim to develop it further as a new generic field book. References for international soil classification will be the World Reference Base for Soil Resources or USDA Soil Taxonomy until a new standard system is released. The GSP supports the development of the new Universal Soil Classification System.

Recommendation 4: Review existing practices for field sampling, sample preparation and measurement (including laboratory standardization and QA/QC) and prepare specifications and guidelines for harmonized approaches to the determination of the main functional properties of soils (i.e. chemical, physical and biological).

Recommendation 5: To enable the exchange of digital soil-related data, agreement is reached on a global soil information model, vocabulary service and meta-data standards. Implementation of this model driven architecture will be consistent with the aspirations of the global soil information infrastructure (GSP Pillar 4).

Recommendation 6: Review existing indicator systems and evaluation procedures and develop a harmonized approach based on common criteria, baselines and thresholds with the aim to monitor the state and response of soils under the effect of policies and management.

Proposals to be discussed: *Implementation plan of the working group to be provided by Ronald Vargas and Rainer Baritz in accordance with GSP*

9 IMPLEMENTATION OF THE PLAN: STEPS AHEAD

9.1 ESP working groups for each pillar

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Name	Institution	Country	e-mail ID
Rainer Baritz			
Ronald Vargas			

9.2 Main phases and timeline for implementation of the plan

→ Operationalization of each pillar of the implementation plan

→ Communication and advocacy plan

→ Setting up implementation structures and establish regular meetings of working groups

→ Develop a timeline for all activities

→ Develop a budget plan for each pillar

→ Identify synergies and sources for funding

→ Establish a monitoring and evaluation system that feeds into further strategic program planning of the ESP activities