



## **EU Soil Protection Policy: Current Status and the Way Forward**

**Background Paper to the  
Dutch Ministry of Housing, Spatial Planning and the Environment (VROM)  
Thematic Assistance to the Conference  
“Vital Soil: the next step towards a European Soil Strategy”  
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## Summary and Conclusions

Soil has a central position as an environmental media and has a close link with other major environmental media like air and water. Soil fulfils various functions important for the environment and human beings and thus is an essential part of the ecological system on which our society depends. Against this background, soil policy should be a key element of the environmental policy in the context of sustainable development.

In order to create a comprehensive soil protection policy, the European Commission is currently preparing a Thematic Strategy for Soil Protection. For this reason, technical working groups have carried out research on all soil threats identified by the Communication "Towards Thematic Strategy for Soil Protection". The outcomes of their work point out that much research is needed. One of the issues to be considered by the Thematic Strategy is the integration of soil protection requirements into the Community policies and activities. The integration of environmental protection requirements into the definition and implementation of all Community policies and activities is required by Article 6 of the EC Treaty. Environmental integration is the process of giving environmental (soil) considerations an important place in the decision-making in other policies and promotes sustainable development.

This Background Paper aims to review the integration of soil protection aspects in European environmental policies such as water, waste, air, chemicals, biodiversity conservation, climate change and several horizontal legal instruments, e.g. Environmental Impact Assessment and Strategic Environmental Assessment and other policy fields such as the Common Agricultural Policy, Internal Market regulations on product quality, the EU Financial Instruments with an impact on soil protection, and Research and Development. For this reason, the existing and forthcoming policy instruments and measures at the European level are assessed considering how soil protection and land use issues are considered.

The analysis showed that though, the European Union has an extensive body of environmental legislation, generally however there is little explicit reference to soil protection, management or sustainable use. Nevertheless, many existing environmental policies at the European level establish instruments and measures that have a potential to improve or protect the quality of soil in a direct or indirect manner.

The legal instruments that explicitly address soil issues are found in the area of waste, water chemical and air policies and are as follows:

- in the field of waste policy; the Sewage Sludge Directive (86/278/EEC) is the most important directive for the protection of soil as soil protection from sewage sludge used on agricultural land is one of the main goal of this directive.
- in the field of water policy; the Water Framework Directive (2000/60/EC) and the Nitrate Directive (91/676/EEC) have a significant potential to contribute to the protection of soil through on the one hand the implementation of the programmes of measures to obtain good ecological status in all water bodies, and on the other hand the implementation of the codes of good agricultural practices in vulnerable zones.
- in the field of air policy; the Directive on Integrated Pollution Prevention and Control (96/61/EC) which considers soil as a media. This Directive establishes a cross-media approach with the main aim of achieving a high level of environmental protection taking

into account the whole environmental performance of the plant, i.e. emissions to air, water and land.

- In the field of chemical policy; the legislation related to plant production products (PPP) and on biocides e.g. set requirements for applicants for a new PPP or a new biocidal product to carry out a risk assessment where soil issues are specifically addressed.

In addition, instruments and measures of other European policies, such as the Common Agricultural Policy, have a crucial impact on soil as well. With the last CAP reform, soil related issues have been addressed in a more coherent way, especially through the introduction of the compulsory cross-compliance scheme.

On the other hand, the policy measures and instruments in biodiversity conservation and climate change policy areas address soil only indirectly.

It can be concluded that the instruments and measures directly addressing soil issues are rather fragmentary. Furthermore, the indirect measures and instruments are not designed specifically for soil protection and are thus not as efficient and effective as they might (or should) be. Therefore, both direct and indirect measures and instruments are not coherent and sufficient to halt current trends in soil degradation or to reduce soil degradation. In addition, the impact of these pieces of legislation depend strongly on the implementation in the Member States.

Another gap is that there is neither a definition of soil protection as an explicit objective at European level nor soil indicators that are necessary to guarantee the coherency of all environmental legislation and related policy initiatives. It can be concluded that the lack of a definition of soil protection and soil indicators has hindered and hinders the comprehensive integration of soil protection objectives into the Community policies.

Moreover, it can be noted, that some threats to the soil have been addressed by various pieces of legislation, especially as regards soil contamination, which is addressed by almost all presented legislation related to waste, water, air and chemicals. However, even if many pieces of legislation are relevant to soil contamination, there is no coherent framework for the instruments; therefore the overall effectiveness of these instruments and measures is questionable. Soil erosion, loss of organic matter and loss of soil biodiversity are also addressed, although rather indirectly, by some of the presented legislation, such as by the Nitrates Directive or the legislation related to plant protection products. On the other hand, some threats to soil, such as soil sealing and salinisation are vaguely considered by the existing Community legislation.

Another aspect is the discrepancy in the existing body of EU legislation. The existing policy instruments and measures address mainly qualitative soil protection issues and there are very few instruments at European level addressing land use planning and management. The increasing trend in soil sealing in European countries points out the ineffectiveness of the existing instruments. Moreover, in addition to the reduction of land consumption, the integration of soil quality objectives into land use planning stays a challenge.

Soil is a complex issue, due to its heterogeneity, multifunctionality and its relations with other environmental compartments, like water and air, what thus leads to the complexity of the soil protection discussions. Therefore, soil protection is best addressed with a well co-ordinated mix of policy instruments. Up to now, there is no agreement on common approach to soil policy between Member States. At the European level, various levels of policy making exist,

including Community legislation, the Open Method of Co-ordination; intergovernmental forums, transnational activities and concerted actions. While the legislative measures are best suitable to the areas where a relatively high degree of harmonisation is required in order not to interfere the EU Internal Market (e.g. pesticides, fertilisers, and building materials), the Open Method of Co-ordination is better suitable in areas where harmonisation is not required or politically unrealistic; where European Commission competence is questionable (referring to EC Treaty and unanimity); the European dimension of solution is unclear, or where the time has not yet come to for legislation. The OMC and the other three options could be used as supporting activities for future developments.

Last but not the least, in order to develop a coherent European Policy on Soil Protection, a further in-depth analysis might be needed focusing on the implementation of the respective legislation in the Member States, in particular addressing the soils directly, e.g. sewage sludge Directive, including the related requirements for soil protection, monitoring, control and reporting.

## 1 Introduction

Soils are highly complex, multicomponent systems of interacting materials (water, air, rock strata and living materials), and the properties of soil result from the net effect of all these interactions.<sup>1</sup> Soil is composed of both inorganic materials and living organisms. It provides the basis for life, giving nutrients to plants, which allow animal and human life to exist. Therefore, soils are an essential part of the ecological system on which our society is dependent.

Throughout human history, soil has been repeatedly destroyed leading to abandonment of various settlements in the past. Nowadays, various threats, from erosion, soil contamination and sealing, loss of organic matter and biodiversity to other imminent threats due to unsustainable use of soils and global climate change, endanger soils. On the global scale, the significance of soil degradation is comparable to climate change and the decline of biodiversity. Due to the central position of soil as an environmental medium, soil policy should be one of the key elements of environmental policy in the context of sustainable development. Against this background, the European Union is now creating an European Strategy on Soil Protection.

In order to give momentum to the process of developing a European Soil Strategy, the European Commission Directorate General for the Environment and the Dutch Council Presidency organise a Conference "Vital Soil: the next step towards a European Soil Strategy" to be held in the Netherlands from 18 to 19 November 2004. This Conference is intended to present the work results of the technical working groups (TWGs) established under the Soil Thematic Strategy<sup>2</sup> initiative in order to assess the current status of development of the Thematic Strategy for Soil Protection and, on the basis of this information, develop options for the further development. The Conference will focus on ways to improve the protection, management and sustainable use of soil and the role the European Union can play in this. In addition, the priority objectives and targets to be included in the Soil Thematic Strategy will be discussed.

This Background Paper aims to contribute to the Conference presenting the integration of soil protection into the environmental (e.g. water, chemicals, air) and other policies (e.g. the Common Agricultural Policies) of the European Union. The Background Paper, for this reason, reviews the existing and foreseen policies and initiatives at the European level and assesses how qualitative objectives of soil protection and land use and management and sustainable use of soil are considered. Within the scope of this Background Paper, it is not possible to present all policies and initiatives at the European level, which have a direct or indirect influence on soils. Therefore, emphasis will be placed on those policies and initiatives having the most important impact on this issue.

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<sup>1</sup> The following definition for soil will be used in this background paper: Soil: Upper layer of the earth's crust composed of inorganic particles, organic matter, water, air and organisms (ISO 11074-1). Working Group (WG) on Research 2004.

<sup>2</sup> COM(2002) 179 final, 16 April 2002.

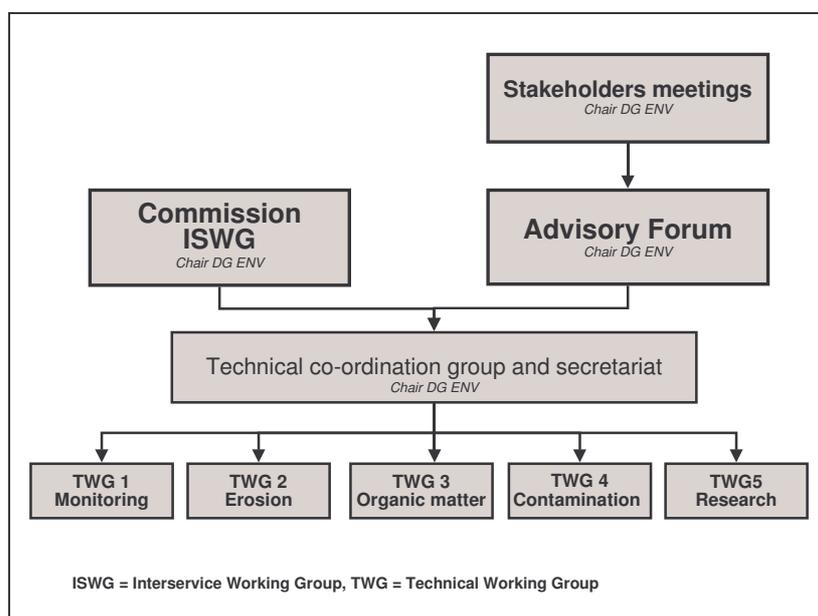
## 2 State of Play: Soil Protection at the European Level

Degradation of soil has been one of the core environmental issues in many European countries for a long time. Due to the unsustainable use of soil and its pollution as well as climate change impacts, the soils within Europe are under threat from erosion, loss of organic matter, contamination, loss of biodiversity, compaction, soil sealing, floods and landslides and salinisation.<sup>3</sup>

Although soil degradation can be considered as a significant threat at European level, there is no legal instrument at the EU level that is directly concerned with soil protection. In 2000, the European Union gave a prior significance to soil protection by the 6<sup>th</sup> Environmental Action Programme of the European Union. In 2002, the European Commission recognised soil protection as a specific policy area in the European Union and published the Communication "Towards a Thematic Strategy for Soil Protection",<sup>4</sup> in order to achieve a comprehensive soil protection policy.

In the last two years, intensive efforts have been devoted on the European level to create a comprehensive and integrated Strategy for Soil Protection. For this reason, technical working groups (TWGs) on the core soil issues, namely **erosion**, **organic matter**, **contamination**, **monitoring** and **research** were established alongside the **Advisory Forum** and various stakeholder meetings (see Chart 1 below).

**Chart 1 Established organisation to develop the Thematic Strategy for Soil Protection**



The objectives of the TWGs were to address all soil threats identified by the Communication Towards Thematic Strategy for Soil Protection. In April 2004, the TWGs prepared the final reports,<sup>5</sup> which will contribute to the development of the Soil Strategy.

<sup>3</sup> As recognised by the Communication on Soil Thematic Strategy (COM(2002) 179 final).

<sup>4</sup> COM(2002) 179 final, 16 April 2002.

<sup>5</sup> The Final Reports from the Working Groups can be found under the following address: [http://forum.europa.eu.int/Public/irc/env/soil/library?l=/reports\\_working&vm=detailed&sb=Title](http://forum.europa.eu.int/Public/irc/env/soil/library?l=/reports_working&vm=detailed&sb=Title)

### **3 Integration of Soil Protection Aspects in EU Policy**

#### **3.1 Integration of Soil Protection Aspects into Other Policy Areas at EU Level**

As it was indicated in Chapter 2, work on a Thematic Strategy for Soil Protection started in 2002. However, so far there is no specific soil legislation at the European level. On the other hand, the central position of soil as an environmental media and the close link between soil and the other major media, like water and air, is reflected in specific environmental and other policy legislation. Thus the protection of soil is to some extent integrated into other policy areas of the European Union.

The integration of environmental protection requirements into the definition and implementation of all Community policies and activities is required by the EC Treaty (Article 6). Environmental integration is the process of giving environmental considerations an important place in the decision-making in other policies.

The following Table 1 gives an overview of integration of soil protection aspects into other policy areas at EU level. For this reason, the selected most relevant legislation and the existing or forthcoming European policy initiatives within the European environmental and other policies were analysed. In addition, Table 1 presents what threats<sup>6</sup> to soil are addressed by the legislation; not showing marginal impacts to soil. The detailed analysis of how the existing legislation and planned policy initiatives consider soil protection, management or sustainable use is provided in more detail in the Annex. The review covers seven environmental policy areas such as (waste, water, air, chemicals, biodiversity conservation, climate change and horizontal legislation on impact assessment) as well as selected policies from other sectors, such as the Common Agricultural Policy, Internal Market regulations on product quality, as well as the EU financial instruments and Research and Development programmes.

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<sup>6</sup> As recognised by the Communication on Soil Thematic Strategy (COM(2002) 179 final).

Table 1 Integration of soil protection aspects into other policy areas at EU Level

REPRESENTATIVE POLICY AREAS and related LEGISLATION		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil	
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Compaction Soil	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly		Indirectly
WASTE	<b>Waste Framework Directive</b> (75/442/EEC as amended by 91/156/EEC)										<b>Aim:</b> to harmonise waste management standards, and to ensure that waste management activities (recovery or disposal) do not pollute the environment, including soil, through e.g. waste management plans, technical requirements, suitable disposal sites and treatment methods.	
	<b>Directive</b> (86/278/EEC) on <b>Sewage Sludge</b>										<b>Aim:</b> to protect the environment/soil, when sewage sludge is used in agriculture. The directive sets maximum limit values for concentrations of heavy metals in soil and the sludge while taking into account e.g. nutrient needs of plants, pH of soils or prohibits use in case of exceeding the limit values. Soil protection is one of the main goals.	
	<b>Directive on the Disposal of Waste Oils</b> (75/439/EEC as amended by 87/101/EEC)											<b>Aim:</b> to create an effective and coherent system for the treatment, storage, collection and disposal of waste oils. Discharge of waste oils to waters and drainage systems is prohibited as well as any deposit and/or discharge harmful to the soil.
	<b>Landfill Directive</b> (1999/31/EC)											<b>Aim:</b> to prevent and control the landfilling of waste in order to establish a high level of environmental protection, in particular for surface water, groundwater, soil and air.  The directive imposes requirements e.g. for water control and leachate management, protection of water and soil, gas control, stability and barriers.

<sup>7</sup> As recognised by the Communication on Soil Thematic Strategy (COM(2002) 179 final).

<sup>8</sup> Dark Grey = most important impact on soil; Light Coloured Grey = side effect.

REPRESENTATIVE POLICY AREAS and related LEGISLATION		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Compaction Soil	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly	
WATER	<b>Water Framework Directive</b> (2000/60/EC)										<p><b>Aim:</b> to establish the goal of a ‘good status’ for all waters (surface waters and groundwater) by the year 2015. The directive mandates programmes of measures for river basin districts aiming to reduce the influx of e.g. nutrients and pesticides and thus contributes to soil protection;</p> <p>Measures may include the reduction of nutrient application, the proper handling of pesticides and the prevention of soil erosion through erosion-minimising soil cultivation.</p>
	<b>Proposal for a Directive</b> on the protection of <b>Groundwater</b> against pollution										<p><b>Aim:</b> to improve the management of groundwater. The directive sets criteria for defining good chemical status of groundwater as well as methods for identifying significant and sustained upward trends of groundwater pollution and trend reversals. Due to the strong interdependencies of groundwater and soil eco-systems, all methods and measures will have a direct impact on soil as well.</p>
	<b>Nitrates Directive</b> (91/676/EEC)										<p><b>Aim:</b> to mitigate the negative effects of fertilisation on drinking water and ecosystems by limiting input of organic fertilisers and manure on farmland.</p> <p>Measures for identified vulnerable zones aim to reduce the influx of nutrients to water bodies – at the same time over-saturation of soils with these substances and a possible ensuing degradation is avoided.</p>
	<b>Urban Wastewater Treatment Directive</b> (91/271/EEC)										<p><b>Aim:</b> to reduce the pollution of freshwater, estuarial and coastal water resulting from urban wastewater. Inter alia, the directive regulates the disposal of sewage sludge and encourage its re-use</p>
	<b>Proposal</b> (COM(2002)581) for a <b>Directive</b> on quality of <b>Bathing Water</b> (would repeal Directive (76/160/EEC))										<p><b>Aim:</b> to ensure the good quality of bathing water by reducing sewage effluents and other urban wastewater. An amended proposal requires a prior assessment of contaminant sources at each bathing site as well as information and involvement of the public, possibly raising awareness for soil-related problems as well.</p>
	<b>Communication on Flood Risk Management, Flood Prevention, Protection and Mitigation</b> (COM(2004)427 final)										<p><b>Aim:</b> concerted EU action on flood risk management to improve protection against flooding, for example flood risk management plans for affected river basins and coastal zones, flood risk maps showing the areas at risk of flooding, co-ordination of information exchange, ensuring the contribution of all relevant EU policies and increasing public awareness.</p>

REPRESENTATIVE POLICY AREAS and related LEGISLATION		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Compaction Soil	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly	
AIR	<b>Air Quality Framework Directive</b> (96/62/EC)										<b>Aim:</b> to set basic principles e.g. to define and set standards and objectives for ambient air quality, to assess air quality and the development and implementation of programmes to maintain or improve ambient air quality. Measures shall take into account an integrated approach (air, water, soil).
	<b>First Daughter Directive</b> (1999/30/EC)										<b>Aim:</b> to improve the ambient air quality. The directive sets air quality standards for sulphur dioxide (SO <sub>2</sub> ), nitrogen dioxide (NO <sub>2</sub> ) and oxides of nitrogen (NO <sub>x</sub> ), particulate matter and lead. It thus reduces air born pollution through these substances in soils (i.e. soil acidification and eutrophication and pollution with heavy metals).
	<b>Fourth Daughter Directive</b> (Formally adopted: 15 November 2004)										<b>Aim:</b> to improve the ambient air quality. The directive sets thresholds for heavy metals in ambient air, namely arsenic (As), cadmium (Cd), mercury (Hg), nickel (Ni) and a target value for benzo(a)pyrene. It takes into consideration the deposition and accumulation of the named pollutants in soils and sets the provision to monitor the state of the environment also with a view to local and diffuse soil contamination as a relevant cause for soil degradation.
	<b>Directive on National Emissions Ceilings</b> (2001/81/EC)										<b>Aim:</b> to improve the protection of the environment against risks of adverse effects of acidification and eutrophication (water and soil). The directive establishes national emission ceilings of acidifying and eutrophying pollutants and ozone precursors, namely SO <sub>2</sub> , NO <sub>x</sub> , VOCs and ammonia (NH <sub>3</sub> ), to be attained by 2010 and 2020. It is expected to reduce soil eutrophication by about 30 per cent compared with the situation in 1990.
	<b>Directive on Large Combustion Plants</b> (LCPD) (2001/80/EC)										<b>Aim:</b> to reduce the emissions of acidifying pollutants and ozone precursors from combustion plants. The directive sets emission limit values for SO <sub>2</sub> , NO <sub>x</sub> and dust, thus contributing to soil protection due to reduced emissions of acidifying and eutrophying pollutants (SO <sub>2</sub> and NO <sub>x</sub> ).
	<b>Directive on Integrated Pollution Prevention and Control</b> (96/61/EC)										<b>Aim:</b> to prevent or minimise emissions to air, water and land and to avoid waste production in order to achieve a high level of environmental protection. The directive introduced an integrated cross-media approach, concerning highly polluting industries, such as energy or metal production and processing. Under the IPPC directive, firms must obtain a single permit for all arrangements made, including soil protection requirements.

REPRESENTATIVE POLICY AREAS and related LEGISLATION		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Compaction Soil	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly	
CHEMICAL	<b>Proposal on a Thematic Strategy for sustainable pesticide use</b>										<b>Aim:</b> to reduce the impact of pesticides on human health and the environment (including soils), whilst ensuring crop protection. The directive requires Member States to establish national plans in order to e.g. abate risks of water and soil pollution and to reduce pesticide-use in environmentally sensitive areas and suggests compulsory training for users and measures to promote low-input or pesticide free crop farming and an EU-wide levy on plant protection products.
	<b>Directive on the Authorisation and Marketing of Pesticides</b> (91/414/EEC)										<b>Aim:</b> to set up rules for authorisation and placing on the market of plant protection products (PPPs) including composition, marketing, usage and control of PPPs. The directive requires Applicants for a new PPP to submit two detailed dossiers (risk assessment) where soil issues are specifically addressed e.g. rate of degradation in soils, mobility in soils, adsorption and desorption in soils.
	<b>Directive on the Use Restrictions of Pesticides</b> (79/117/EEC)										<b>Aim:</b> to ban or restrict plant protection products containing certain active ingredients, so that water, air, soil and human beings should not be negatively affected. The directive prohibits the use of 22 substances.
	<b>Directive on Biocidal Products</b> (98/8/EC)										<b>Aim:</b> to harmonise the European market for biocidal products while ensuring a high level of protection for humans, animals and the environment. Applicants for a new biocidal product have to deliver two detailed dossiers including a risk assessment addressing soil issues, e.g. ecotoxicological studies on effects, fate and behaviour in soils, studies on the rate and route of degradation as well as on distribution and dissipation. 23 different product types are covered.
	<b>POPs - Persistent Organic Pollutants</b> (EC No 850/2004)										<b>Aim:</b> to eliminate the production and use of internationally recognised POPs. Soil protection issues are directly addressed where they seriously endanger the environment and human health through, for instance, contamination of soil.

REPRESENTATIVE POLICY AREAS and related LEGISLATION		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Compaction Soil	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly	
BIODIVERSITY	<b>Birds Directive</b> (79/409/EEC)										<b>Aim:</b> to ensure a long-term conservation of all bird species naturally living in the wild within the European territory of Member States. Member States have to designate “Special Protected Areas” (SPAs) and establish measures to preserve, maintain and re-establish biotopes and habitats.
	<b>Habitats Directive</b> (92/43/EEC)										<b>Aim:</b> to ensure biological diversity through the conservation of natural habitats and of wild flora and fauna within the European territory. The directive defines a number of protected terrestrial habitats that depend on specific soil characteristics, such as dunes, peat lands, calcareous grasslands and wet meadows. It requires an impact assessment for plans or projects likely to have negative effects on the protected habitats, including impacts on soil.
	Convention on Biological Diversity: <b>European Community Biodiversity Strategy and Biodiversity Action Plans</b>										The Strategy focuses specifically on the integration of biodiversity concerns into relevant policies, e.g. conservation of natural resources, agriculture, regional policies and spatial planning. The Biodiversity Action Plan is most relevant to soil protection as it defines concrete actions that focus on soil, e.g. to establish an information base with respect to soil erosion, organic matter and heavy metals or to raise overall awareness about the need to protect European soils for preserving biodiversity.
CLIMATE CHANGE	<b>Framework Convention on Climate Change</b>										<b>Aim:</b> to stabilise the greenhouse gas concentrations in the atmosphere. The UNFCCC recognises that land degradation and land use changes can exacerbate the emission of gases to the atmosphere, and recognises the importance of terrestrial ecosystems as sinks of greenhouse gases. It calls for the sustainable management, conservation and enhancement of sinks.
	<b>European Climate Change Programme</b> (ECCP)										<b>Aim:</b> to identify and develop all instruments necessary for the EU to implement its commitments under the Kyoto Protocol. The WG on sinks recognises that measures to enhance carbon sequestration in agricultural soils are potential tools for mitigating global warming and add to soil protection – e.g. organic farming or conservation tillage.

REPRESENTATIVE POLICY AREAS and related LEGISLATION		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Soil Compaction	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly	
IMPACT ASSESSMENT	Environmental Impact Assessment Directive (85/337/EEC as amended by 97/11/EEC and 2003/35/EC)										<b>Aim:</b> to ensure that environmental consequences of projects are identified and assessed before authorisation is given. The directive requires identification, description and assessment of the direct and indirect effects of a project on e.g. humans, fauna and flora, soil, water and air (environmental impact assessment), including projects directly related to soil (e.g. open-cast mining and peat extraction). So far little recognition of soil issues in EIAs due to lack of data and methods for evaluation.
	Strategic Environmental Assessment Directive (SEA) (2001/42/EC)										<b>Aim:</b> to ensure that environmental consequences of certain proposed policies, plans and programmes are identified and assessed during their preparation and before their adoption. The SIA covers i.a. biodiversity, human health, fauna, flora, soil, water and air the interrelationship between those. It may enhance the consideration of soil protection issues, especially soil sealing, by evaluating the best option for land uses already at the land use planning stage, independently of a planned project.
CAP	Agri-Environmental Programmes (2003/1783/EC)										<b>Aim:</b> to promote environmental friendly farm practices. The programmes offer significant opportunities for favouring e.g. the build-up of soil organic matter, the enhancement of soil biodiversity, the reduction of soil erosion, contamination and compaction. They comprise measures to reduce the use of pesticides and fertilisers (soil contamination); limitations on the use of machinery or the setting of stocking limits (soil compaction), measures to promote specific crop rotations, to maintain terraces or to restrict ploughing (soil erosion), and measures to promote organic farming.
	Cross-Compliance (2003/1782/EC)										<b>Aim:</b> to link all direct payments to the compliance with requirements of 19 EC legislation related to the environment, food safety, animal and plant health, and animal welfare as well as requirements to keep the land in good agricultural and environmental condition (GAEC). Minimum requirement for the GAEC include, soil erosion (e.g. minimum soil cover or retain terraces), soil organic matter (e.g. arable stubble management), soil structure (e.g. appropriate machinery use) or minimum level of maintenance (e.g. minimum livestock stocking rates).

		Threats <sup>7</sup> addressed by legislation <sup>8</sup>							Addressed		Objectives and Requirements related to Soil
		Erosion	Decline of Organic Matter	Contamination Soil	Soil Sealing	Compaction Soil	Decline in Soil Biodiversity	Salinisation	Floods and Landslides	Directly	
<b>REPRESENTATIVE POLICY AREAS</b> and related <b>LEGISLATION</b>											
<b>CAP</b>	<b>Organic Farming</b> (Regulation 2092/91 and Regulation 1804/99) European Action Plan for Organic Food and Farming										<b>Aim:</b> set rules for defining the methods of agricultural production, regulate labelling, processing, inspection and marketing of organic products. The Action Plan for Organic Food and Farming aims to facilitate the ongoing development of organic farming in the EU by providing 21 concrete policy measures. Both measures contribute to the protection and maintenance of soils by increasing soil biological activity or maintaining long-term soil fertility.
<b>INTERNAL MARKET</b>	Regulations on pesticides, fertilisers and building materials										A number of internal market regulations have a particular impact on soil protection policies. Among the most important interdependencies are the trade of pesticides and fertilisers, the trade of building materials, and the trade in decontamination and remediation services.

The European Union has an extensive body of the environmental legislation. However, based on the results of the analysis on the integration of soil protection issues in the European environmental legislation (see table 1 and the Annex), it can be concluded that there is little explicit reference to the protection, management or sustainable use of soils in the legislation. Nevertheless, almost all existing environmental policies at the European level establish measures or instruments that have a potential to improve or protect the quality of soil in a direct or indirect way. From a soil perspective, the most important of them are the waste, water chemical and air policies.

Table 1 indicates the legislation that explicitly (**directly**) address soil issues and the legislation that may have some **indirect** effects on soil.

Policy measures and instruments explicitly (**directly**) addressing soil issues are found for example in the field of waste policy. In this policy area, the Sewage Sludge Directive (86/278/EEC) is the directive most relevant to soil protection, as it targets directly the use of sewage sludge on agricultural land. As regards the European legislation related to water, the Water Framework Directive (2000/60/EC) and the Nitrate Directive (91/676/EEC) have a significant potential to contribute to the protection of soil through on the one hand the implementation of the programmes of measures to obtain good ecological status in all water bodies, and on the other hand the implementation of the codes of good agricultural practices in vulnerable zones. In addition, the Communication on Flood Risk Management, Flood Prevention, Protection and Mitigation (COM(2004)427 final) explicitly addresses the floods issue. Another example is the Directive on Integrated Pollution Prevention and Control (96/61/EC). This Directive establishes a cross-media approach with the main aim of achieving a high level of environmental protection taking into account the environmental performance of the plant across all media, i.e. covering emissions to air, water and land. However, the instruments and measures directly addressing soil issues are rather fragmentary (see Table 1). Moreover, the impact of these pieces of legislation depends strongly on the implementation in the Member States.

On the other hand, other policies (see Table 1) that do not explicitly address soil issues may have **indirect** effects on soil. For example, the legislation related to air, such as the first or the fourth daughter Directives, aim to improve the ambient air quality and sets air quality standards for various pollutants, e.g. sulphur dioxides, nitrogen dioxide or heavy metals. Through the reduction of air born pollution, these Directives contribute to the reduction of soil acidification, eutrophication and contamination with heavy metals. However, as the indirect measures and instruments are not designed specifically for soil protection, thus they are not as efficient and effective as they might (or should) be.

The instruments and measures of other European policies have a crucial impact on soil as well. The Common Agricultural Policy, for instance, should have a huge potential to contribute to soil protection policy. However, up to now, the instruments established by the Common Agricultural Policy have led to more negative impacts on the soil than positive ones, with the exception of particular measures such as the agri-environmental programmes or measures to support organic farming. With the 2003 CAP reform, new instruments have been introduced which might have a significant potential to contribute soil protection, such as the compulsory cross-compliance scheme. Furthermore, other policies pay little attention to soil protection, focusing on other aims and therefore affecting soil quality negatively. One example for that is the Cohesion Fund, which supports the development of transport

infrastructure, and has been criticised in the past for adding to soil sealing, soil compaction and contamination along roads and railways.

The existing policy instruments and measures explicitly (directly) addressing soil issues are not sufficient to halt current trends in soil degradation, and are certainly not sufficient to reverse them. Neither direct nor indirect policy instruments and measures are overarching or comprehensive; considering soil issues in a rather fragmentary way if at all. In addition, they treat the different soil threats in an unbalanced way, giving most attention to contamination, some attention to soil erosion, loss of organic matter, loss of soil biodiversity and floods and landslides, but rarely addressing, soil sealing, salinisation and compaction.

Moreover, the existing policy measures and instruments address not only a particular soil threat. Since certain soil degradation processes initiate other degradation processes, e.g. loss of soil organic matter makes land more vulnerable to soil erosion, the implementation of a particular measure might lead to the solution of several problems, i.e. **synergetic** effects (e.g. increases organic matter and biodiversity in soil and prevents erosion).

### **3.2 How far EC legislation or initiatives tackle the main threats of the soils?**

As recognised by the Communication on Soil Thematic Strategy,<sup>9</sup> the soils within Europe are under threat from erosion, loss of organic matter, contamination, loss of biodiversity, compaction, soil sealing, floods and landslides and salinisation. The following chapters will summarise how far European Community legislation and initiatives address each of the indicated eight threats to the soil considering soil protection, management and sustainable use.

#### **3.2.1 Erosion**

At the European level, few policies address in a direct or indirect manner the problem of soil erosion. As regards the European Environmental legislation, issues related to soil erosion are included within the Sewage Sludge Directive in a way that this Directive aims to protect and improve the quality of soils which might contribute as well to a reduction of soil erosion, especially in the southern regions of Europe. Within the Water Framework Directive, soil erosion issues are addressed through the aim to establish a "good status of all waters" by 2015. In order to reach this aim, Member States are required to develop Programmes of Measures for river basin districts by 2008. Thus, Member States have the opportunity to include erosion-minimising measures, e.g. for agricultural practices, in case of erosion problems in a certain river basin. As regards the other policies, the Common Agricultural Policies accounts for the most important policy mainly through the cross-compliance scheme and the rural development programmes. Member States are required to include soil erosion measures within the minimum requirements to keep all agricultural land in good agricultural and environmental conditions (cross-compliance) which will be conditional from 2005 onwards. Moreover, measures to reduce soil erosion can be included within the afforestation scheme and the agri-environmental programmes. However, the effectiveness of these measures depend strongly on the willingness at Member State level to include these measures in areas of high erosion risk, the design of these measures as well as monitoring

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<sup>9</sup> COM(2002) 179 final.

and control. In order to assess the impact of the existing policies on the reduction of soil erosion, more information on existing policies and its implementation is needed.

### 3.2.2 Decline in organic matter

From the existing policy areas in the European Community, three of them, the Common Agricultural Policy, Climate Change policy and Waste policy, address the issue of organic matter in soil. The most important is the Common Agricultural Policy, since it sets a number of measures supporting the build-up of soil organic matter. One of them are the agri-environmental measures, aiming to reduce the negative pressures of farming on the environment, and thus offer a significant opportunity for favouring the build up of soil organic matter. Under the agri-environmental programmes, the measures aiming to promote organic farming also contribute significantly to build-up soil organic matter. Moreover, the cross-compliance scheme sets the requirement to keep all agricultural land in good agricultural and environmental conditions (GAEC). For this purpose, Member States have to define at national or regional level minimum requirements for GAEC taking into consideration the specific characteristics of the area concerned. Under the GAEC, Member States, among other issues, have to maintain soil organic matter levels through appropriate practices. Moreover, climate change policy, adds to build-up of soil organic matter. The measures foreseen under the European Climate Change Programme enhance the measures for carbon sequestration in agricultural soils as a potential tool to reduce greenhouse gases and at the same time add to soil protection. Among the promoted measures there are e.g. organic farming and conservation tillage with the aim to increase soil organic matter. Furthermore, under the waste policy, the Directive on Sewage Sludge is the most important instrument which addresses the depletion of organic matter by promoting the re-use of sewage sludge on agricultural land.

### 3.2.3 Soil contamination

The majority of the policies at the European level which have been evaluated in this background paper, address in a direct or indirect way the problems related to soil contamination. A broad spectrum of contaminants is addressed, such as heavy metals, organic compounds, eutrophying and acidifying compounds, pesticides, etc. Waste, water, air and chemicals policies are the main policies addressing the problem of soil contamination.

Soil-oriented environmental protection makes a distinction between **local** (or **point source**) and **diffuse pollution**.

### 3.2.4 Local soil contamination

Local sources having impact on soil contamination implies mainly waste landfills (in operation and after closer),<sup>10</sup> including improperly designed septic tanks, underground oil storage tanks, storage places for chemicals and pesticides and leaching from construction materials. As regards waste policy, objectives and measures related to the reduction of local soil contamination are included in the Waste Framework Directives, the Directive on the Disposal of Waste Oils and the Landfill Directive. The Waste Framework Directive regulates waste

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<sup>10</sup> WG on Contamination 2004.

management activities (recovery or disposal) and adds to the reduction of the pollution to the environment, including soil. The Directive on the Disposal of Waste Oils regulates the treatment, diversion, storage, collection and disposal of waste oils. Member States have to ensure the safe management of waste oils including their recovery, storage and burning. In addition, the Directive prohibits any deposit and/or discharge of waste oil harmful to the soil. The Landfill Directive regulates the amount and the quality of waste going to final disposal in landfills and in this way reduce the possible soil contamination.

### **3.2.5 Diffuse soil contamination**

Diffuse sources are generally associated with atmospheric deposition (e.g. due to emissions from industry, energy production, traffic, households and agriculture), certain farming practices (e.g. problem of heavy metals such as cadmium and copper in fertilisers and manure; also antibiotics and pesticides) and inadequate waste and wastewater recycling and treatment (application of bad quality sewage sludge and compost) and may result in diffuse pollution. In addition, air and water pollution lead to accumulation of contaminants in soil sediments and groundwater.

In waste policy, the relevant objectives and measures related to the diffuse soil contamination are included in the Sewage Sludge Directive. The Sewage Sludge Directive regulates the amount and quality of applied sewage sludge on agricultural land and in this way limits the possible contamination of soil. In water policy, all the directives described in this background paper - the Water Framework Directive, the Nitrates Directive, the Urban Waste Water Directive and the Bathing Water Directive – address the issue of soil contamination, focusing more on eutrophying pollutants as well as pesticides. In order to achieve a good quality of water, the Water Framework Directive requires particular land management measures that regulate the amounts of nitrogen, phosphorus and pesticides and thus might lead to a lower contamination of soil as well. In air policy, all the directives described regulate the ambient air quality or emissions into the air, and in this way might add to the reduction of diffuse soil contamination. Air policy addresses acidifying and eutrophying pollutants, heavy metals and organic compounds. Measures to comply with ambient air standards reduce the amount of the mentioned pollutants in the ambient air and in this way reduce the amount of these pollutants reaching the soil. Chemicals policy also might contribute to reducing and preventing diffuse soil contamination. The described legislation in chemical policy regulates the application of plant protection products and biocides; as well as the use of persistent organic pollutants in agriculture and industry; and in this way addresses the issue of soil contamination. Finally, the cross-compliance scheme and the agri-environmental programmes of the Common Agricultural Policy might contribute as well to the reduction of diffuse soil contamination through its various requirements and measures addressing the use of pesticides and fertilisers.

### **3.2.6 Soil sealing**

Although the European Union is one of the most densely populated regions in the world with an increase of sealed land by two percent every ten years and taking into account that this process is almost irreversible, there are so far no legally binding instruments at the European level to address soil sealing. The problem of soil sealing is mainly addressed by the Environmental Impact Assessment Directive and the Strategic Environmental Assessment Directive through the requirement to assess the impact of a certain project respectively

programme on the environment. Although this assessment shall include soil protection issues, the effects of irreplaceable soil losses are often not sufficiently taken into account partly due to a lack of available data and methods for evaluation. As regards the European level, there is also a significant lack of data, e.g. the type of soil sealing, and data are often not comparable. Although soil sealing is hardly considered by legally binding instruments, the issue is addressed by various strategies and programmes such as the strategies for the integrated coastal zone management<sup>11</sup>, on the sustainable use of natural resources<sup>12</sup> and on urban environment<sup>13</sup> as well as by the European Spatial Development Perspective (ESDP) or the Community Initiative Urban II.

### **3.2.7 Soil compaction**

So far, soil compaction is not addressed by European environmental legislation but is tackled by certain instruments of the Common Agricultural Policy (CAP) as well as by the Environmental Impact Assessment Directive and the Strategic Environmental Assessment Directive (see chapter soil sealing). As for soil erosion, the cross-compliance scheme and the rural development scheme are the most important instruments within the CAP. Member States are required to include measures for maintaining the soil structure, e.g. appropriate machinery use or livestock density, within the minimum requirements to keep all agricultural land in good agricultural and environmental conditions (cross-compliance). Moreover, measures to reduce soil compaction can be included within the agri-environmental programmes, e.g. management of low-intensity pasture systems and lowering the stock density. As mentioned above, the effectiveness of these measures depend strongly on the design of these measures as well as monitoring and control. At European level, there is a lack of data for assessing the extent of soil compaction. Moreover, few data are available on the effectiveness of agri-environmental instruments to reduce soil compaction.

### **3.2.8 Decline in soil biodiversity**

Various legal instruments of the European environmental policy are addressing indirectly soil biodiversity issues by regulating the use of certain substances with the aim to reduce their impact on the environment, including the soils. This includes the European policies on waste and water, such as the Sewage Sludge Directive and the Nitrate Directive, as well as the European chemical policy, e.g. the legislation and directives related to plant protection products, biocidal products or fertilisers. A further positive impact on soil biodiversity can be expected due to implementation of the Natura 2000 network, especially concerning the soil-based habitats, such as dunes, peat lands or wet meadows, and the Biodiversity Action Plans, especially the Action Plan for the Conservation of Natural Resources. In addition, a positive impact on soil biodiversity can be expected due to the implementation of the good agricultural and environmental conditions of the cross-compliance scheme as Member States have to define minimum requirement related to soil organic matter and soil structure. The most important instruments for the protection of soil biodiversity within the CAP are certainly the agri-environmental measures including organic production which have been shown to be very effective in preserving and enhancing biodiversity. Within this scheme, various

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<sup>11</sup> COM(2000)547.

<sup>12</sup> COM(2003)572 final.

<sup>13</sup> COM(2004)60.

measures have a direct or indirect influence on soil biodiversity such as restrictions on pesticides and fertilisers beyond good farming practice, restrictions for pastures and meadows or rotational cropping measures. However, the efficiency of the instruments mentioned above depends largely on the implementation by the Member States and the control. Further information is needed for assessing the contribution of these instruments to maintain and enhance soil biodiversity throughout Europe.

### 3.2.9 Salinisation

Salinisation is a specific problem of the Southern countries and related to agricultural land. Salinisation might be a result of an incorrect water policy. At the European level, the existing policies do not directly address the issue of salinisation, but some of them regulate the irrigation of agricultural land, which might cause over-exploitation of water resources and ensuing salinisation. Therefore, the agricultural and water policies are the most relevant policies for addressing salinisation. For example, the Water Framework Directive propose, inter alia, promotion of water-saving irrigation techniques as a supplementary measure which may be chosen by Member States within each river basin district as part of the programme of measures. In addition, one of the objectives and measures of the agri-environmental programmes under the Common Agricultural Policy is to promote ways of using agricultural land which are compatible with protection and improvement of, inter alia, the soil. Examples might be the measures to reduce use of water for irrigation. For example, in Greece, irrigation systems which lessen leaching and erosion are promoted; in Spain, the agri-environmental programmes aims to reduce the application of intensive irrigation; and in Italy, extensive crop production with reduced irrigation are supported.<sup>14</sup> Although these measures seek to reduce irrigated water amounts and might thus help to prevent salinisation, the strategies to combat soil salinisation are lacking in many countries.

### 3.2.10 Floods and landslides

Flooding is a cross-cutting issue related to land and water management. Thus, in addition to the Soil Thematic Strategy and the European Spatial Development Perspective (ESDP), flooding issues are also discussed in the water policy. One of the aims of the Water Framework Directive is "to mitigate the effects of floods and droughts" and offers Member States an opportunity to manage water in a way that protect inter alia the environment from the damaging effects of flooding. A comprehensive river basin planning approach should include land use planning and agricultural policies, not only to achieve a 'good ecological status' of waters, but also to prevent floods. However, although the guidance documents to assist the implementation process contain a reference to flood prevention and requires to take flooding into account when implementing the WFD, it is not legally required to do so.<sup>15</sup>

The Communication on Flood Risk Management, Flood Prevention, Protection and Mitigation (COM(2004)427 final) is the first document explicitly addressing the issue of floods. The Communication proposes a number of actions, including flood risk management plans for affected river basins and coastal zones, flood risk maps showing the areas at risk of flooding,

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<sup>14</sup> DG VI Commission 2003.

<sup>15</sup> Dworak 2003.

co-ordination of information exchange, ensuring the contribution of all relevant EU policies and increasing public awareness.

Due to floods and landslides the soil is threatened in different ways and scales. This threat is not reversal and therefore prevention measures have a particular importance. Since floods and landslides might be caused by soil compaction, soil sealing and deforestation, it is important to consider this issue in other policy fields, such as urban management and transportation.<sup>16</sup>

### **3.3 Qualitative Objectives of Soil Protection and Land-Use**

In the previous chapters, the relation to soil and possible side-effects of the different pieces of European environmental legislation and other relevant policies have been outlined. It can be concluded that the existing policy instruments and measures address mainly qualitative soil protection issues, which aim at preventing or minimising the loss of soil quality caused by chemical, biological or physical pressures. Qualitative soil protection issues are integrated within the European waste, water, chemicals and air policies as well as in other policies, such as the Common Agricultural Policy. The focus of the measures is to reduce emissions and immissions and the discharges of contaminants, e.g. by setting limits for the use of pesticides or sewage sludge, or to minimise soil compaction, e.g. by regulating the use of heavy agricultural machinery on certain soils. Thus, the measures aim at maintaining, improving or recovering the quality of soils by promoting the sustainable use of soils and its various functions.

On the other hand, there are very few instruments at European level to reduce soil sealing and to promote sustainable land use planning and environmental management. The focus of these instruments is to reduce the consumption of land for purposes of urban development and transport by promoting sustainable land use planning, e.g. with the integration of environmental concerns into spatial planning, by regulating the further expansion of built-up areas on greenfield sites or by promoting the reuse of underdeveloped or derelict urban areas (brownfields). The most important instruments for this purpose at European level are the Environmental Impact Assessment (EIA) Directive and the Strategic Environmental Assessment (SEA) Directive, which should generally cover soil protection issues. For example, for larger construction projects, the outcome of an impact assessment could be to use a soil covering that is less damaging than e.g. asphalt and thus contributes to the maintenance of soil functions. However, EIAs and SEAs often do not take the effects of irreplaceable soil losses into account adequately, partly due to a lack of available data and evaluation methods, but also because of a lack of commonly agreed definitions and indicators for soil degradation. Land use and management of land have been also addressed by various strategies such as the strategy on the sustainable use of natural resources and on urban environment as well as by the European Spatial Development Perspective (ESDP) or the Community Initiative Urban II.

One reason why the existing EU policies address mainly qualitative soil protection is that the classical research of soil science as well as other scientific areas related to water, waste, chemicals and agriculture has concentrated on the quality aspects of soils in the past. In turn, the decisions of the policy-makers have been based on results provided by science. Land

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<sup>16</sup> Dworak 2003.

use aspects, such as soil sealing, were reflected neither by science nor by policy-makers in the same intensity than quality soil protection issues.

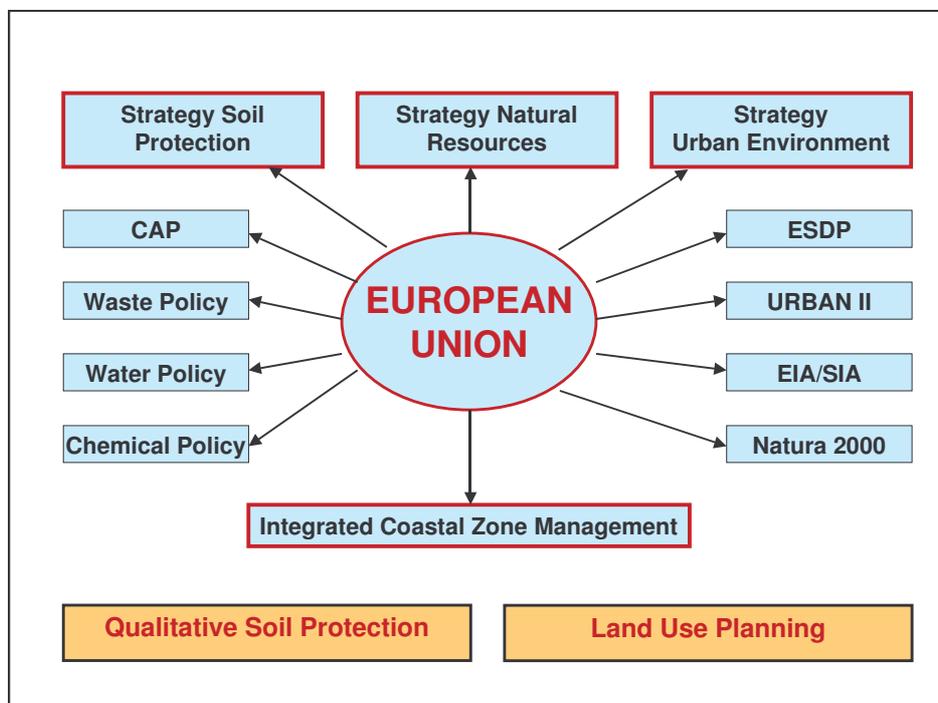
Another reason is that land use planning traditionally falls under the responsibility of the Member States, or more specifically, that of the regions or municipalities. Therefore any European initiative to regulate land use planning or to promote the sustainable development of land is much more difficult to establish. Measures affecting land use as well as town and country planning are still one of the few areas where unanimity is required in the Council of Ministers. This underlines the importance that Member States assign to this area and the willingness to keep the power of decision within the Member States.<sup>17</sup>

Today, the European Union is one of the most densely populated regions in the world with an increase of sealed land by two percent every ten years. Therefore, the increase of sealed areas has been placed high on the political agenda, not only at the European level, but also at the national, regional and municipal levels and was included as one of the main threats to soil in Europe within the proposal of the Thematic Strategy for Soil Protection.

However, it should be noted, that qualitative aspects of soil protection should be integrated in a coherent manner in measures addressing land use or soil sealing.

The following Chart 2 gives examples of European policies related to the qualitative soil protection and land use policies. However, it has to be noted, that the examples highlighted in the Chart for land use planning might have as well an influence on qualitative soil protection issues, e.g. by promoting types of sealing which have a less negative impact on the soil.

**Chart 2: Soil protection policies at European level**



<sup>17</sup> The unanimity requirement of the EC Treaty will also be maintained in the future Constitutional Treaty, see the European Convention. Draft Treaty establishing a Constitution for Europe. CONV 850/03

### 3.4 Level of Policy Making

Summarising the previous chapter, it can be noted that the existing policy instruments and measures at European level address mainly qualitative soil protection issues, while land use is targeted to a lesser degree. Considering the different threats to soils, such as erosion, decline of organic matter, soil contamination or soil sealing, different approaches are needed to integrate these issues in European policy making.

In this chapter, various approaches will be outlined how soil policy on the European level can be brought forward, starting from the legally binding instruments at European level up to non-legally binding instruments, such as the transnational forum.

At the European level, the following levels of policy making exist:

1. Community Method;
2. Open Method of Co-ordination (OMC);
3. Intergovernmental forum;
4. Transnational activities, and
5. Concerted (joint) actions.

These options, and their relation to soil policy, will be briefly discussed in the following.

#### 3.4.1 The Community Method

The first option, the Community Method, aims for legislative measures and is legally binding. As explained above, there are currently no Community legislation measures, e.g. directives or regulations, on soil protection. However, the European Commission intends to develop various legislative proposals related to soil issues (including a directive on soil monitoring), based on the findings of the technical working groups and the multi-stakeholder consultations.

#### 3.4.2 The Open Method of Co-ordination (OMC)

Legislative measures are best suited to areas where a relatively high degree of harmonisation and the mutual recognition of the various national procedures and standards is required, such as measures affecting the EU Internal Market (e.g. pesticides, fertilisers, and building materials). By contrast, in cases where harmonisation is either not desirable or politically not possible to achieve, the Open Method of Co-ordination (OMC) may offer a politically more viable "second best" option. Rather than a reliance on binding legislation, this method emphasises flexibility, "voluntary" compliance, incentives, information, co-ordination (rather than harmonisation), and the participation of societal, regional, and local stakeholders and actors, taking into account national and regional differences.

The Open Method of Co-ordination is a new and innovative method introduced by the Lisbon European Council in 2003.<sup>18</sup> It is defined as "the means of spreading best practice and achieving greater convergence towards the main EU goals". This method is designed to help Member States to progressively develop their own policies, and involves:

<sup>18</sup> Commission of the European Communities 2003.

- fixing **guidelines** for the Union combined with specific timetables for achieving the goals which they set in the **short, medium and long** terms;
- establishing, where appropriate, **quantitative and qualitative indicators** and benchmarks against the best in the world and tailored to the needs of different Member States and sectors as a means of **comparing best practice**;
- translating these European guidelines into national and regional policies by setting specific targets and adopting measures, taking into account **national and regional differences**; and
- organising periodic monitoring, evaluations and peer reviews as mutual **learning processes**.

OMC-type arrangements have been found necessary and useful components of the environment policy regime, improving its effectiveness.<sup>19</sup> The OMC initiates a trans-national co-operation which is both a precondition and a consequence of political integration.<sup>20</sup> The method is based on a learning process and recognises the role of the European Community. It is an example of intergovernmental-transnational structures that are useful in areas where European Commission competence is questionable (referring to EC Treaty and unanimity), the European dimension of solution is unclear, or where the time has not yet come for Community legislation. Such structures can be seen as precursors to "Community Method" measures; they can provide policy-relevant input from Member States (and stakeholders) and provide legitimacy for (later) EC action. The outcome depends on political will and the ambition and drive of opinion leaders in the relevant policy community.

### **3.4.3 Intergovernmental Forum**

The third option is the intergovernmental forum which is a broad consensus-building mechanism among national governments. The purpose is to develop and promote strategies in a co-ordinated and integrated manner, to foster understanding of issues and to build partnerships. It functions as an accountability mechanism for its participants and provides countries the opportunity to place issues on the agenda while emphasising their special needs and concerns. Its an alliance of governments and respectively the ministries concerned operating on the basis of full and open participation of all partners. The European Commission can be a member of such a transnational co-operation.

### **3.4.4 Transnational Co-operation**

The focus of the transnational activities is placed upon the co-operation between national, regional or local administrations in order to enhance the exchange of information, to develop and promote strategies and to built-up partnerships. The European Commission can be a member of such a transnational co-operation.

### **3.4.5 Concerted Actions**

The focus of the concerted action is placed upon the co-operation and built-up of partnerships within the European research community. In doing this, they can contribute to

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<sup>19</sup> von Homeyer, Klasing and Kraemer 2003.

<sup>20</sup> Kraemer, Klasing and von Homeyer 2003.

the development of the European Framework Programme for Research and Technological Development and thus play a role for the agenda setting within these research programmes. Conversely the European Commission influences the European research community due to its research programmes.

#### 3.4.6 Options for a European Soil Policy

Taking into account the various threats to soil and the various possibilities to take actions at the European level, discussion is needed in order to identify the appropriate level of European action and the most appropriate instruments for each of the different threats to soil. Thus there are two components to be considered within the discussion process: on the one hand the type of threat to the soil and the different level of policy making at the European level.

In discussing the different policy options, it should also be kept in mind that the different policy options can be regarded as sequential, rather than offering clear-cut alternatives. Thus, the OMC and the last three options are not legally binding and informal in nature, but they could be used as supporting activities for future developments.

### 3.5 Coherence of EC Legislation

In general, the issue of soil protection is becoming more recognised at the European level and is gaining in importance in the recent and forthcoming Community legislation. For example, the fourth air daughter Directive<sup>21</sup> takes into consideration the deposition and accumulation of heavy metals and polycyclic aromatic hydrocarbons in soils. Part of this may be related to the ongoing development of a European Soil Strategy. However, despite these laudable initiatives, the integration of the explicit provisions for soil protection, management or sustainable use into environmental or other policies is impeded by the lack of a clear definition and indicators for the different types of soil degradation. In addition, the failure to adequately incorporate soil protection requirements is also due to the limited data availability and the lack of methods to evaluate potential impacts on soil. In order to enhance the contribution of other policies and guarantee the coherence of all environmental legislation and related policy initiatives, it is necessary to agree on a common **definition of soil protection** as an explicit objective of EC policies, as well as the use of **soil indicators**. For example, this would allow to assess the soil-related impacts of measures funded through regional policy instruments in a more coherent and complete way, and to introduce subsequently environmental agreements or environmental safeguards to limit or mitigate those impacts.

Moreover, the integration of soil issues into other environmental and other policies has an additional value, since it supports not only the protection, management and sustainable use of soil, but also contributes to the achievement of other Community targets (environmental or otherwise). Thus, synergies can be expected for the objectives of achieving good ecological status in all water bodies by 2015; halt the decline of biodiversity by 2010, help to reduce the concentrations of greenhouse gases 2008-2012 in the atmosphere, and stop the emissions of hazardous substances into the marine environment, by 2020.

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<sup>21</sup> Formally adopted on 15 November 2004.

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# **ANNEX**

## **Integration of Soil Protection Issues into other Policy Areas at EU Level**

## A. Environmental Policy at EU Level

The following chapters will review seven environmental policy areas such as waste, water, air, chemicals, biodiversity conservation, climate change and horizontal legislation on impact assessment. This background document aims to give a picture of the current situation how the existing environmental policies consider soil protection and management issues and the list does not deem to be complete.

### I Waste

Waste treatment in general and waste disposal in particular have a direct impact on soil and soil degradation. Certain pollutant substances from non hazardous to hazardous waste can potentially cause contamination of soils. Among others, these include chemicals (e.g. paint, herbicides, insecticides), waste oil (e.g. hydrocarbons), batteries (e.g. acids, heavy metals) as well as several organic compounds (e.g. dioxins).

At EU level, there is a wide range of measures on waste management (treatment and disposal) which have an effect on soil protection. Waste related directives constitute a cross-media approach covering air, water and soil. One of the main aims of waste treatment facilities, like landfill sites, incinerators, mechanical-biological treatment facilities etc., is the reduction of waste volume and weight as well as its impact on the environment and nature, that thus contribute to the protection of soil.

The most soil relevant legislation and initiatives will be described in the chapter below.

#### 1 Waste Framework Directive (75/442/EEC as amended by 91/156/EEC)

The Waste Framework Directive<sup>22</sup> was adopted in 1975 to harmonise waste management standards among Member States. It provides a clear definition of waste and waste-related terms and a framework for waste management. The Directive aims to ensure that waste management activities (recovery or disposal) do not pollute the environment, including soil (Art. 4). The Directive was entirely revised in 1991.<sup>23</sup>

In order to meet the goal of the Directive to make the Community self sufficient in waste disposal, Member States must establish an integrated and adequate network of disposal installations (Art. 5), taking into account the best available technologies not involving excessive costs. Moreover, Member States have to draw up waste management plans including the wastes to be recovered or disposed, technical requirements, special arrangements for particular wastes, and suitable disposal sites or installations. Permits to be issued must cover the types and quantities of waste, technical requirements, security precautions, the disposal site, and the treatment method.

*Addressing the following threats to soil:  
(indirect: Soil contamination)*

<sup>22</sup> Directive 75/442/EEC, OJ L 194, 25.7.1975.

<sup>23</sup> Directive 91/156/EEC, OJ L 78, 26.3.1991.

## 2 Sewage Sludge Directive (86/278/EEC)

Sewage sludge contains a high amount of nutrients, such as nitrogen and phosphorus, and contains valuable organic matter. Therefore, the sludge is regarded as a good fertiliser for agriculture. However, sludge can also show contamination with heavy metals, bacteria and viruses and a number of organic substances.<sup>24</sup>

Soil protection is one of the main goals of the Sewage Sludge Directive,<sup>25</sup> which seeks to protect the environment, and in particular soil, when sewage sludge is used in agriculture (Art. 1). Due to harmful effects of heavy metals to human beings and plants, maximum limit values for concentrations of heavy metals (cadmium, copper, nickel, lead, zinc and mercury) in the soil and in the sludge are established as well as maximum quantities of heavy metals which may be added to the soil (Art. 4). It is prohibited to use sewage sludge if the concentration of one or more heavy metals in the sludge exceeds the given limit values in the Directive. Furthermore, the Directive takes into account the nutrient needs of plants, the protection of surface and groundwater and the pH of the soil (Article 8), regulates the application of sewage sludge depending on the crops grown as well as the time of their harvest and sets limits for areas designated for grazing (Article 7). Sludge and the soil on which it is used must be analysed according to the procedures set out in the annexes of the Directive (Art. 9).

Addressing the following threats to soil:

*Decline of organic matter, Soil contamination, (very indirect: Decline of soil biodiversity)*

## 3 Directive on the Disposal of Waste Oils (75/439/EEC as amended by 87/101/EEC)

The Directive on the Disposal of Waste Oils<sup>26</sup> aims to create an effective and coherent system for the treatment, diversion, storage, collection and disposal of waste oils, which allows Member States to compensate companies for the unrecovered costs of collection and disposal of waste oils. The highest priority is given to the regeneration of waste oils, then to burning, and the lowest priority to their safe destruction or controlled storage. Member States must ensure the safe collection and disposal of waste oils. The discharge of waste oils to waters and drainage systems is prohibited as well as any deposit and/or discharge harmful to the soil (Art. 4). Furthermore, it is neither allowed to uncontrollably discharge residues from processing nor to process waste oils causing air pollution which exceeds the level prescribed by existing provisions.

Addressing the following threats to soil:

*(indirect: Soil contamination)*

## 4 Landfill Directive (1999/31/EC)

The Landfill Directive<sup>27</sup> prescribes the prevention, recycling, and recovery of waste by limiting the amount and controlling the quality of waste going to final disposal in landfills. The

<sup>24</sup> EEA 2001.

<sup>25</sup> Directive 86/278/EEC, OJ L 181, 4.7.1986.

<sup>26</sup> Directive 75/439/EEC, OJ L 194, 25.7.1975.

<sup>27</sup> Directive 1999/31/EC, OJ L 182, 16.7.1999.

objective is to prevent and control the landfilling of waste in order to establish a high level of environmental protection, in particular as regards the pollution of surface water, groundwater, soil and air, as well as the resulting risks to human health.

Landfills are subject to strict technical requirements, and all requirements set out by this Directive must be included in waste management plans required by the Waste Framework Directive. Annex I of the Directive sets out requirements for all classifications of landfills. This includes requirements for location; water control and leachate management; protection of water and soil; gas control; nuisances and hazards (like odours, fires, and noise); stability; and barriers. Annex II details waste acceptance criteria and procedures, and Annex III details control and monitoring procedures during operation and aftercare phases.

*Addressing the following threats to soil:*

*(indirect: Soil contamination)*

## II Water

The environmental systems of soil and water are inextricably linked, with water constituting one of the main components of the soil structure. Therefore negative impacts on the water environment (surface and groundwater) frequently have respective effects on soil quality and vice versa. As a consequence, legislation on water issues in most cases indirectly affects the protection of soils, which will be highlighted through the example of the most important EU directives in the area of water policy. It should be noted that conversely the quality of water bodies is also dependent on consistent and sustainable soil protection policies.

### 5 Water Framework Directive (2000/60/EC)

The Water Framework Directive (WFD)<sup>28</sup> constitutes a completely new approach for a more efficient and sustainable management of water resources throughout the EU. The Directive establishes the goal of a 'good status' for all waters (surface waters and groundwater) by the year 2015. For achieving this goal, the Directive suggests an integrative approach. Firstly, water bodies and no longer water uses form the centre of water policies. Secondly, good status is defined through three factors: biology, chemistry as well as morphology and thirdly, water bodies are no longer considered as autonomous environmental compartments, with the Directive taking on a river basin approach for the management of water resources. This explicitly extends the responsibility of water managers beyond the water body itself to the surrounding environmental systems including soil.

The implementation process for the WFD comprises the following steps: after a characterisation of the river basin districts, the review of the environmental impact of human activity therein and an economic analysis of water uses, Member States need to assess whether or not the respective water body will reach the environmental quality goals in the foreseen timeframe. Member States are required to devise a programme of measures in case a water body is at risk of not attaining the respective quality goals. For these programs of measures Member States are furthermore obliged to take a combined approach for addressing point sources, mostly originating from industrial sources as well as sewage treatment plants and diffuse sources, mostly caused by agricultural activities. Most measures

<sup>28</sup> Directive 2000/60/EC, OJ L 327, 22.12.2000.

suggested in this context are aimed at reducing the influx of nutrients, such as nitrogen, phosphorus as well as pesticides to the groundwater as well as surface waters. Measures introduced in this context may include the reduction of nutrient application, the modification of cultivation techniques, the proper handling of pesticides as well as the prevention of soil erosion through erosion-minimising soil cultivation. Thus these measures are conducive to reaching and to maintaining better soil quality as well.

Additionally, the WFD also advocates measures to protect and reinstate the good morphological quality of water bodies, which could also have a positive effect on soil structure, such as preventative flood protection as well as the restoration of wetlands.

The management of groundwater will be subject to more specific regulation under the Daughter Directive to the WFD on Groundwater, which is currently being discussed in a proposal stage. The most important aspects of the Groundwater Daughter Directive can be summarised as follows: delivering on Article 17 of the WFD (specifically pertaining to the protection of groundwater resources) includes suggesting criteria for defining good chemical status of groundwater as well as methods for identifying significant and sustained upward trends of groundwater pollution and trend reversals. Due to the strong interdependencies of groundwater and soil eco-systems, all methods and measures suggested in the context of the Groundwater Daughter Directive will have a direct impact on soil as well.

From a management perspective, the WFD fully integrates the requirements of the Aarhus Convention<sup>29</sup> and requires the participation and involvement of citizens and other affected stakeholders in planning procedures and decision-making in water resource management. This new approach could also contribute to create a better awareness for the linkages between soil and water resources and thus have beneficial effects on soil protection as well.

Addressing the following threats to soil:

*Soil contamination, Floods and landslides, (marginally: Erosion, Soil sealing [in certain river basins])*

## 6 Nitrates Directive (91/676/EEC)

The Nitrates Directive<sup>30</sup> on the protection of waters against pollution caused by nitrates from agricultural sources aims at mitigating the negative effects of fertilisation on drinking water sources and ecosystems by limiting the input of organic fertilisers and manure on farmland.

Based on a one-year monitoring programme, Member States have to identify vulnerable zones. For these vulnerable zones, action programmes have to be developed, implemented and revised every four years. Annex III of the Directive sets out measures that Actions Programmes must contain.<sup>31</sup> Member States are required to report on the designation of vulnerable zones, the results of the water quality monitoring, the action programmes and the codes of good agricultural practice to the Commission on a four year basis.

<sup>29</sup> Aarhus Convention 1998.

<sup>30</sup> Directive 91/676/EEC, OJ L 375, 31.12.1991.

<sup>31</sup> Setting up of periods when the application of certain fertilisers is prohibited and of limits on the quantities of fertilisers applied and on the application of livestock manure per hectare to an amount containing no more than 170 kg N or 210 kg N during the first four year basis of the action programme. Furthermore, conditions relating to the available storage capacity on farms for livestock manure and a code of 'good agricultural practice' have to be identified.

The measures established within the Action Programmes aim to control diffuse water pollution and contribute thus indirectly to soil protection. For instance, by limiting the annual application of nitrogen fertiliser and livestock manure, defining legally binding maximum concentrations of nitrates in drinking water and designating periods when the application is prohibited, the Directive clearly aims at establishing and maintaining the natural balance of fertilisers in soils. Through these measures a massive influx of nutrients to water bodies and thus potential eutrophication is prohibited, while the over-saturation of soils with these substances and a possible ensuing degradation is avoided at the same time.

*Addressing the following threats to soil:*

*Soil contamination, (very indirect: Decline in soil biodiversity)*

## **7 Urban Wastewater Treatment Directive (91/271/EEC)**

The Urban Wastewater Treatment Directive (UWWT)<sup>32</sup> aims at the reduction of the pollution of freshwater, estuarial and coastal water resources resulting from domestic sewage, industrial wastewater and urban surface run-off. The Directive establishes standards and compliance mechanisms pertaining to the collection as well as the treatment and discharge of the 'urban wastewater'. It also regulates the disposal of sewage sludge, encouraging its recycling.

The approach taken in the Directive is the classification of areas according to the sensitivity of the respective water sources (i.e. used as drinking water sources or high level of eutrophication). Standards of differing stringency apply to the various classes (sensitive, less sensitive and normal areas). According to these three categories of receiving waters, different minimum standards for sewage treatment are set. The Directive introduces mechanical-biological treatment as a minimum standard, and further treatment (i.e. tertiary treatment) in sensitive areas. Furthermore the Directive foresees that all agglomerations greater than 2000 p.e. are required to have collecting systems for wastewater by the end of either 2000 or 2005, depending on their size. Finally the disposal of sewage sludge is also regulated, while the dumping of these sludge at sea or other surface waters was mandated to be phased out by 1998 (Article 14).

Although the Directive regulate the disposal of sewage sludge and encourage its re-use (Art. 14), it sets no quality requirements for the sewage sludge to be re-used on the land. Though the agricultural use of sewage sludge is covered by the Directive on Sewage Sludge (86/278/EEC), it does not consider yet the application of sewage sludge on land used for other purposes. Thus, if regulated improperly, the implementation of the UWWT Directive might add to the (non-agricultural) soil contamination.

*Addressing the following threats to soil:*

*(very indirect: Soil contamination)*

<sup>32</sup> Directive 91/271/EEC, OJ L 135, 30.5.1991.

## 8 Bathing Water Directive (76/160/EEC)

The objective of the Bathing Water Directive<sup>33</sup> is to ensure the good quality of bathing water. This goal is not only motivated by public health considerations, but also for reasons of amenity. The main issue in achieving this goal is the prevention of the pollution of bathing waters by sewage effluents and other urban wastewater. The current Directive entered into force in 1976; in October 2002 the European Commission proposed a new directive in order to provide more modern and simple rules to ensure clean bathing waters across the EU (COM(2002)581), which is expected to enter into force soon.

While the Bathing Water Directive is mostly concerned with establishing quality standards as well as monitoring requirements for bathing waters, the new proposal takes an interesting approach, which might also be relevant from the perspective of soil protection: in order to allow for a more efficient attainment of quality goals, a prior assessment of likely contaminant sources at each bathing site as well as an extensive information and the active involvement of the public is mandated. This might contribute to a heightened awareness for soil-related problems as well.

*Addressing the following threats to soil:*

*(indirect: Soil contamination), (very indirect: Decline in soil biodiversity)*

## 9 Communication on Flood Risk Management, Flood Prevention, Protection and Mitigation (COM(2004) 427final)

In July 2004, the European Commission issued the Communication on Flood Risk Management, Flood Prevention, Protection and Mitigation (COM(2004)427 final). With the Communication, the European Commission for the first time proposed concerted EU action on flood risk management to improve protection against flooding. The Communication proposes a number of actions, including flood risk management plans for affected river basins and coastal zones, flood risk maps showing the areas at risk of flooding, co-ordination of information exchange, ensuring the contribution of all relevant EU policies and increasing public awareness.

Floods and landslides cause erosion and ensuing water pollution with sediments as well as loss of soil resources. On the other hand, floods and landslides might be caused by soil compaction, soil sealing and deforestation. In order to address these common issues, in particular soil erosion and soil sealing, the communication and co-ordination between the technical working groups under the Thematic Strategy for Soil Protection and the Task Force on Flooding should be enhanced.

*Addressing the following threats to soil:*

*Floods and landslides (indirect: Soil erosion, Soil sealing)*

## III Air

Deposition of atmospheric pollutants, generally due to emissions from industry, transport and household, causes mainly diffuse pollution of soil and consequently soil degradation.

<sup>33</sup> Directive 76/160/EEC, OJ L 31, 5.2.1976.

Contaminants from polluted air most likely to reach the soil directly or with precipitation are heavy metals (e.g. lead, cadmium, arsenic, mercury), materials contributing to soil acidification (e.g. SO<sub>2</sub>, NO<sub>x</sub>) and eutrophication (e.g. NO<sub>x</sub>) as well as several organic compounds (e.g. dioxins, PCBs,<sup>34</sup> PAHs<sup>35</sup>).

The air policy of the European Union, aiming to improve ambient air quality, applies various approaches such as emission limit values for stationary plants, ambient air quality standards and product standards (e.g. lead in petrol or vehicle exhaust emissions). Air quality management measures combating air pollution consequently reduce the amount of pollutants reaching the soil and in this way contribute to soil protection policy.

At the EU level, a number of core legal instruments aiming to improve ambient air quality and at the same time directly or indirectly contributing to soil protection could be distinguished as they are described below. Although there is numerous legislation limiting vehicles exhaust emissions (around 50 Directives and their amendments) and legislation on sulphur or lead content in fuel that also contribute to the reduction of acidification and air pollution by heavy metals, this legislation is not included in the text.

## 10 Air Quality Framework Directive (96/62/EC) and its Daughter Directives

The Air Quality Framework Directive<sup>36</sup> provides a framework for ambient air quality management in the European Community. The directive aims to set the basic principles of a common strategy to define and set standards and objectives for ambient air quality, the assessment of air quality, the provision of information to the public, and the development and implementation of programmes to maintain (where it is good) or improve ambient air quality. The measures taken in order to achieve these aims of the directive shall take into account an integrated approach to the protection of other environmental media (water and soil) (Art. 7). Implementing this directive, Member States have to draw up a list of zones and agglomerations in which the limit value(s) of pollutant(s) are exceeded. In these zones and agglomerations, Member States have to prepare and implemented a plan or programme for attaining the limit value(s) within the specific time limit (Art. 8). The directive itself does not create any precise air quality objectives, they have to be established through daughter directives.

Regarding to soil protection, the first and the fourth daughter directives are of particular importance. The first daughter Directive<sup>37</sup> sets air quality standards for sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>), particulate matter and lead. All these pollutants have an impact on soil degradation (i.e. soil acidification and eutrophication as well as pollution with heavy metals). The fourth daughter Directive<sup>38</sup> sets thresholds for heavy metals in ambient air, namely arsenic (As), cadmium (Cd), mercury (Hg), nickel (Ni) and a target value for benzo(a)pyrene.<sup>39</sup> The directive takes into consideration the deposition and accumulation of the named pollutants in soils and sets the provision to monitor the state of the environment also with a view to local and diffuse soil contamination as a relevant cause

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<sup>34</sup> Polychlorinated Biphenyls.

<sup>35</sup> Polycyclic Aromatic Hydrocarbons.

<sup>36</sup> Directive 96/62/EC, OJ L 296, 21.11.1996.

<sup>37</sup> Directive 1999/30/EC, OJ L 163, 29.6.1999.

<sup>38</sup> Formally adopted on 15 November 2004.

<sup>39</sup> Benzo(a)pyrene is used as a proxy for polycyclic aromatic hydrocarbons (PAH).

for soil degradation. Both directives are likely to have some impact on soil through reducing the air born pollution that might be discharged into the soil.

*Addressing the following threats to soil:*

*(indirect: Soil contamination), (very indirect: Decline in soil biodiversity)*

## 11 Directive on National Emissions Ceilings (2001/81/EC)

The Directive on National Emission Ceilings for Certain Atmospheric Pollutants (NECs)<sup>40</sup> is part of the follow-up to the 1997 Commissions Communication on a Community Strategy to Combat Acidification.<sup>41</sup> The Directive establish national emission ceilings to limit emissions of acidifying and eutrophying pollutants and ozone precursors, namely SO<sub>2</sub>, NO<sub>x</sub>, VOCs and ammonia (NH<sub>3</sub>), to be attained by 2010 and 2020.<sup>42</sup> The Directive applies to emissions from all man-made sources across all sectors.<sup>43</sup> One of the aims of this Directive is to limit emissions of the mentioned pollutants in order to improve the protection of the environment against risks of adverse effects of acidification and eutrophication (water and soil) in the Community. Reducing emissions of the acidifying and eutrophying pollutants, the NECs Directive has an impact on soil and thus contribute to soil protection.

Member States are obliged to draw up national programmes by 2002<sup>44</sup> in order to demonstrate how they are going to meet the national emission ceilings by 2010, including information on adopted and envisaged policies and measures and the effects of these emissions in 2010, but are left free to decide which measures and polices to take. In addition, Member States have to prepare and annually update national emission inventories and emission projections for 2010. As regards acidification, the areas where critical loads are exceeded shall be reduced by at least 50 % (in each grid cell<sup>45</sup>) compared with the 1990 situation. Meeting those objectives, it is also expected to reduce soil eutrophication by about 30 per cent compared with the situation in 1990 (Annex I).

*Addressing the following threats to soil:*

*(indirect: Soil contamination), (very indirect: Decline in soil biodiversity)*

## 12 Directive on Large Combustion Plants (LCPD) (2001/80/EC)

The national emission limits approach, though less extensive, applies also to the Large Combustion Plants Directive (88/609/EEC).<sup>46</sup> In 2002, Directive 88/609/EEC was repealed by a new Directive 2001/80/EC,<sup>47</sup> which derives from the Commission's 1997 Acidification Strategy as well. The new Directive contributes to the long-term goals of the National Emissions Ceiling Directive and takes into account recent developments in combustion and

<sup>40</sup> Directive 2001/81/EC, OJ L 309, 27.11.2001.

<sup>41</sup> COM(97) 88 final.

<sup>42</sup> Parallel to the development of the EU NEC Directive, the European Community in 2003 has ratified the "multi-pollutant" protocol under the Convention on Long-Range Transboundary Air Pollution (the so-called Gothenburg protocol). The emission ceilings in the protocol are less ambitious than those decided in the NECs Directive.

<sup>43</sup> Except for emissions from maritime traffic and aircraft emissions beyond the take-off and landing cycle.

<sup>44</sup> And to revise them as necessary by 2006.

<sup>45</sup> According to Article 3, "grid cell" means a square 150 km x 150 km.

<sup>46</sup> Directive 88/609/EEC, OJ L 336, 7.12.1988.

<sup>47</sup> Directive 2001/80/EC, OJ L 309, 27.11.2001.

abatement technologies and establishes stricter requirements for air pollution from combustion plants. This Directive applies to all existing<sup>48</sup> and new<sup>49</sup> combustion plants for the production of energy with a thermal input of 50 Megawatts (MW) or more, irrespective of the type of fuel used. The Directive, aiming to reduce the emissions of acidifying pollutants and ozone precursors, sets emission limit values for SO<sub>2</sub>, NO<sub>x</sub> and dust and requires Member States to take all appropriate measures to ensure that all licences for the operation of plants contain conditions relating to compliance with the emission limit values. The Directive sets stricter emission limit values for new plants. From 2004, Member States shall establish an inventory of the related pollutants emissions from all large combustion plants.

The emission of SO<sub>2</sub>, NO<sub>x</sub> and dust are carried over long distances and damage human health and the environment as a whole, leading to deposits in the form of "acid rain". Large Combustion Plants Directive plays a decisive role in the Community's efforts to combat acidification and eutrophication as part of the overall strategy to reduce air pollution. This Directive is likely to affect soils and thus contributing to soil protection due to reduced emissions of acidifying and eutrophying pollutants (SO<sub>2</sub> and NO<sub>x</sub>).

*Addressing the following threats to soil:*

*(indirect: Soil contamination), (very indirect: Decline in soil biodiversity)*

### **13 Directive on Integrated Pollution Prevention and Control (96/61/EC)**

Differently than the other European legislation considering exceptionally emissions to air or water, the Directive on Integrated Pollution Prevention and Control<sup>50</sup> introduces an integrated cross-media approach, aiming to prevent or minimise emissions to air, water and land, as well as to avoid waste production with a view to achieve a high level of environmental protection as a whole. The IPPC Directive concerns highly polluting industries, e.g. energy, production and processing of metals, minerals, chemicals, waste management and others, including also intensive agricultural activities such as intensive livestock farms.

The IPPC Directive sets up an integrated system of permitting for industrial installations within the EU that considers all emissions from a single installation. A single permit must include all arrangements made, including emission limit values for pollutants, for water, air and land, and may, if necessary, contain requirements for the protection of the soil and the groundwater as well as measures for waste management (Art. 9(3)). The permit must be based on the concept of Best Available Techniques (BAT) in order to continuously prevent and reduce pollution. Limit values in permits are set according to BAT. The BAT for different industrial sectors are described in the "BAT Reference" documents (BREF). BREFs provide ranges of emission limit values for different pollutants pursuant to the IPPC Directive, but they are legally not binding. In the absence of emission limit values defined according to BAT, the relevant emission limit values specified in various existing EC instruments (as listed in Annex II) and in other Community legislation shall be applied as minimum emission limit values. Although there is no comparable Community legislation aimed at preventing or minimising emissions into soil, this media is though indirectly protected through other

<sup>48</sup> According to Article 2(10), "existing plant" means any combustion plant for which the construction or operating licence was granted before 1 July 1987.

<sup>49</sup> According to Article 2(9), "new plant" means any combustion plant for which the construction or operating licence was granted on or after 1 July 1987.

<sup>50</sup> Council Directive 96/61/EC, OJ L 257, 10.10.1996.

Community legislation in particular from the waste sector. In this way the IPPC Directive adds to the soil quality improvement and is likely to impact soil protection policy.

*Addressing the following threats to soil:*

*Soil contamination, (very indirect: Decline in soil biodiversity)*

## IV Chemicals

In October 2003, the European Commission presented a proposal for a new EU regulatory framework for chemicals called REACH (Registration, Evaluation and Authorisation of Chemicals)<sup>51</sup>. The proposed Regulation would replace over 40 existing Directives and Regulations in order to establish a single, integrated system at European level. The objectives of REACH are to improve the protection of human health and the environment while maintaining the competitiveness and enhancing the innovative capability of the EU chemicals industry.

According to the proposal, chemicals that were manufactured or imported in quantities of more than one tonne per year and per manufacturer/importer would be registered in a central database with some exceptions. Approximately 30,000 substances are believed to fall within this category. The registration would include information on properties, uses and safe ways of handling the chemicals.<sup>52</sup> The information will then be passed down the chain of production. Within the new framework, the current distinction<sup>53</sup> between "existing" and "new" chemicals<sup>54</sup> will be abolished, meaning that all chemicals will then receive the same treatment. A new European Chemicals Agency will be established to manage the database and provide non-confidential information to the public.

REACH will oblige downstream user as well as producers and manufacturers to undertake chemicals testing encompassing as well their impacts on soils. This would reverse the burden of proof from public authorities to industry. As REACH will impose the requirement to assess the environmental properties of substances and preparations included in products and focus the attention on their impact on soil, it could significantly contribute to a more efficient and controllable consideration of issues related to soil protection. However, this will depend largely on the further development of REACH before it is finally adopted as well as the implementation and control in the Member States.

As mentioned above, the European Chemical Policy encompasses more than 40 pieces of legislation. As regards soil protection issues, legislation and strategies described in the following chapters can be regarded as the most important.

### 14 Legislation and Directives related to Plant Protection Products

Pesticides are toxic compounds deliberately released into the environment to fight plant pests and diseases. They can accumulate in the soil, leach to the groundwater and

<sup>51</sup> COM(2003) 644 final.

<sup>52</sup> The information required would be proportional to production volumes and the risks that a substance poses.

<sup>53</sup> Directive 67/548/EEC, OJ 196, 16.8.1967.

<sup>54</sup> New chemicals have to be notified and tested in production volumes as low as 10kg per year, while there are no such provisions for existing chemicals. This has encouraged the continued use of "existing", untested substances and inhibited research and development and innovation.

evaporate into the air from which further deposition onto soil can take place. Moreover, the inappropriate use of pesticides can have very negative effects on soil biodiversity because of their poor selectivity. Some studies suggest that some herbicides considerably suppress soil bacteria and fungi activity.<sup>55</sup>

Within the European Union, the consumption of pesticides by weight is decreasing. A main reason seems to be the application of more efficient pesticide substances which are applied in smaller quantities. However, it has to be taken into account that it is the toxicity of an individual pesticide and the extent to which pesticide residues or metabolites accumulate in soil, not necessarily the amount used, which determines its potential for environmental damage.<sup>56</sup>

At European level, the most important proposals and directives on pesticides addressing directly or indirectly soil issues are: the thematic strategy on the sustainable use of pesticides, the Directive on the authorisation and marketing of pesticides and the Directive on the use restrictions of pesticides. As regards the various legislation on pesticide residues, it can be noted that their main purpose is to protect the consumers by setting limits on the amount of pesticides on food and not to protect the environment.

## **15 Proposal on a thematic strategy on the sustainable use of pesticides**

In June 2002, the European Commission issued a proposal on a thematic strategy on the sustainable use of pesticides.<sup>57</sup>

The aim of the strategy is to reduce the impact of pesticides on human health and the environment (including soils), whilst ensuring crop protection. The proposal aims to further reverse EC pesticides legislation from a "negative" system which places restrictions on the use of certain named pesticides to a "positive" authorisation system. Member States would be required to establish national plans to reduce hazards, risks and dependence on pesticides in order to abate risks of water and soil pollution; to reduce pesticide-use in environmentally sensitive areas and to ban aerial spraying. Producers and distributors would have to report to national authorities on the quantities of plant protection products containing pesticides that are produced and imported/exported. Furthermore, compulsory training for users and measures to promote low-input or pesticide free crop farming and an EU-wide levy on plant protection products are proposed. These measures can contribute significantly to the reduction of the above mentioned negative impacts of pesticides on soils.

*Addressing the following threats to soil:*

*Soil contamination, (very indirect: Decline in soil biodiversity)*

## **16 Directive on the Authorisation and Marketing of Pesticides (91/414/EEC)**

With the Directive on the Authorisation and Marketing of Pesticides<sup>58</sup>, the European Community has developed a comprehensive regulatory framework defining strict rules for the authorisation and the placing on the market of plant protection products (PPPs). The

<sup>55</sup> COM(2002) 179 final.

<sup>56</sup> EEA 2004.

<sup>57</sup> COM (2002) 349 final.

<sup>58</sup> Directive 91/414/EEC, OJ L 230, 19.8.1991.

Directive deals with the composition, marketing, usage and control of PPPs and requires extensive risk assessments for effects on health and environment, including soil, to be carried out, before a PPP can be placed on the market. With the Directive, a 'positive' Community list of active ingredients was introduced. In order to apply for the integration of a new active ingredient, the applicant has to submit to the Commission two detailed dossiers (Annex II and III). Within the Annex II and III soil issues are specifically addressed by requirements on the rules on testing procedures, e.g. the rate of degradation in soils, mobility in soils, adsorption and desorption in soils as well as the estimation on expected concentration in soils.<sup>59</sup>

However, the current authorisation process of pesticides requires the assessment of the environmental risks of individual pesticides in the soil whereas information on the combined effects and the persistence of pesticides in soil remains limited.<sup>60</sup> As mainly the impacts of PPPs on plants and groundwater have been monitored in the past, more focus should be placed to monitor their impacts on soils.<sup>61</sup>

*Addressing the following threats to soil:*

*Soil contamination, (very indirect: Decline in soil biodiversity)*

## **17 Directive on the Use Restrictions of Pesticides (79/117/EEC)**

The purpose of this Directive is to ban or restrict plant productions products containing certain active ingredients. Those that are on the market are to be appropriately classified, packaged and labelled. The environment, defined as relations between, inter alia, water, air, soil/ground and human beings (Art. 2), should not be negatively affected. Therefore, Member States are to ensure that pesticides containing substances listed in the Annex are not being marketed or used. This Annex has been amended several times encompassing now five mercury compounds and nine persistent organochlorine compounds. In its most recent form the Annex prohibits the use of eight further substances. In addition, there are substances which are prohibited unless they meet specified quality standards.

*Addressing the following threats to soil:*

*(indirect: Soil contamination), (very indirect: Decline in soil biodiversity)*

## **18 Directive on Biocidal Products (98/8/EC)<sup>62</sup>**

Biocidal products are defined as active substances and preparations containing one or more active substances, intended to destroy, deter, render harmless, prevent the action of, or otherwise exert a controlling effect on any harmful organism by chemical or biological means. Harmful organisms are defined as having an unwanted presence or detrimental effects for humans, their activities or the products they use or produce, for animals or the environment.

The aims and requirements of this Directive follows closely the common framework of the Directive on the authorisation of pesticides (see chapter 3.1.4.3). The Directive on Biocidals aims to harmonise the European market for biocidal products and their active substances as

<sup>59</sup> Annex II, Part A, Chapter 7.1 and Annex III, Part A, Chapter 9.1.

<sup>60</sup> EEA 2004.

<sup>61</sup> Römken Paul et. al 2004.

<sup>62</sup> Directive 98/8/EC, OJ L 123, 24.4.1998.

well as to provide a high level of protection for humans, animals and the environment. The scope of the Directive is very wide, covering 23 different product types including disinfectants used in different areas or chemicals used for preservation of products and materials.

According to the Directive, biocidal products shall not be placed on the market or used unless they have been authorised, classified, packaged, and labelled in accordance with the Directive. Applicants for a new biocidal product have to deliver two detailed dossiers to the competent authorities. For this purpose, they have to carry out a risk assessment encompassing various requirements which address soil protection issues, e.g. ecotoxicological studies on effects, fate and behaviour in soils; studies on the rate and route of degradation as well as on absorption and desorption in at least three soil types under appropriate conditions. In addition, spread, mobility, multiplication and persistence in air, soil and water have to be analysed as well as distribution and dissipation in the soil and the effects on earthworms and other soil non-target macro-organisms and micro-organisms.

According to the Directive, Member States shall not authorise a biocidal product where unacceptable contamination of soil is likely to occur, if active substance persists in soil for more than one year during tests in the fields or have unacceptable consequences or effects on non-target organisms, unless it is scientifically demonstrated that under field conditions there is no unacceptable accumulation in soil.

*Addressing the following threats to soil:*

*Soil contamination, (very indirect: Decline in soil biodiversity)*

## 19 POPs - Persistent Organic Pollutants (EC No 850/2004)

Persistent organic pollutants (POPs) are chemical substances that persist in the environment, bioaccumulate through the food chain, and pose a risk of causing adverse effects to human health and the environment. POPs consist of pesticides (such as DDT), industrial chemicals (such as polychlorinated biphenyls, PCBs) and unintentional by-products of industrial processes (such as dioxins and furans).

In April 2004, the European Community ratified the Protocol to the regional UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP) on POPs. In addition, the proposal of the Commission for a Council decision on ratification of the Stockholm Convention is under final adoption procedure in the Council. In May 2004, a regulation on persistent organic pollutants<sup>63</sup> entered into force based on a proposal by the Commission<sup>64</sup>. The regulation aims to eliminate the production and use of internationally recognised POPs. Soil protection issues are directly addressed in the context of the management of stockpiles of persistent organic pollutants if they seriously endanger the environment and human health through, for instance, contamination of soil. According to the regulation, stockpiles of prohibited substances should be treated as waste, while stockpiles of substances the production or use of which is still allowed should be notified to the authorities and properly supervised. In particular, existing stockpiles which consist of or contain banned persistent organic pollutants should be managed as waste as soon as possible.

*Addressing the following threats to soil:*

<sup>63</sup> Regulation (EC) No 850/2004.

<sup>64</sup> COM(2003) 333 final.

*(indirect: Soil contamination)*

## V Biodiversity

Soil protection is an integral part of biodiversity protection. This is due to several inter-linkages: soil provides different kinds of habitats and both flora and fauna are dependent on the soil quality. Therefore, legislation aiming to protect biodiversity has influence on soil and soil conservation.

The core legal instruments for the protection and the conservation of biodiversity in the EU and the implementation of the Convention on Biological Diversity (CBD) conservation objectives are the Habitats Directive,<sup>65</sup> in force since 1992, and the Birds Directive,<sup>66</sup> in force since 1979.

### 20 Birds Directive (79/409/EEC)

The Bird Directive aims to ensure a long-term conservation of all bird species naturally living in the wild within the European territory of Member States. It covers the protection, management and control of these species. The most suitable territories, including land and sea, are to be designated as protected areas for the conservation of birds species. Special attention is to be given to the protection of wetlands. Sites that are in accordance with the Birds Directive are known as "Special Protected Areas" (SPAs).

Member States are to take all necessary measures to ensure the conservation of all species of birds listed in Annex I at levels corresponding with ecological, cultural and scientific requirements, while taking into account economic requirements. Measures to preserve, maintain and re-establish biotopes and habitats (and thereby indirectly the soils) shall include e.g. the creation of protected areas, the management of habitats both inside and outside protected areas and the reestablishment of destroyed habitats.

Addressing the following threats to soil:

*(indirect: Soil contamination, Decline in soil biodiversity), (marginally: Soil sealing [in the protected areas])*

### 21 Habitats Directive (92/43/EEC)

The main purpose of this Directive is to ensure biological diversity through the conservation of natural habitats and of wild flora and fauna within the European territory, while taking into account economic, social, cultural and regional requirements. The Directive aims to establish a "favourable conservation status" (Art. 1(e) and 1(i)) for natural habitats and wild species of Community interest.<sup>67</sup> It aims to establish a coherent European ecological network of sites of Community interest known as "Natura 2000".

<sup>65</sup> Directive 92/43/EEC, OJ L 206, 22.7.92.

<sup>66</sup> Directive 79/409/EEC, OJ L 103, 25.4.1979.

<sup>67</sup> A habitat type is defined as being of Community interest if it is in danger of disappearance within its natural range or has a small natural range or represents an outstanding example of one or more of six biogeographic regions (Alpine, Atlantic, Boreal, Continental, Macronesian and Mediterranean).

The Natura 2000 network comprises "Special Areas of Conservation" (SAC) designated by Member States in accordance with the provisions of the Directive, and Special Protection Areas (SPAs) classified pursuant to the Birds Directive.

Although the implementation of both Directives still possesses significant challenges, considerable progress has been made as most of the Member States have now submitted a comprehensive list of SACs and SPAs. This includes as well the ten new Member States which had to transpose all of the legal requirements of the two Directives into national law<sup>68</sup> by the accession date 1 May 2004. Their immense richness in nature and wildlife will make a significant contribution to the EU's biodiversity objectives and to the Natura 2000 network in particular. The Natura 2000 network is due to be completed in 2004.<sup>69</sup>

Although neither the Habitats Directive nor the Birds Directive do address soil protection directly, the Habitats Directive is of particular relevance since it defines a number of protected terrestrial habitats that depend on specific soil characteristics, such as dunes, peat lands, calcareous grasslands and wet meadows.

According to Article 6 of the Directive, Member States have to establish the necessary conservation measures for the respective site including the development of a management plan which corresponds to the ecological requirements of the habitats types. Within this management plan, specific issues related to soils can be included depending on the kind of habitat, e.g. dunes or peat lands.

Furthermore, the Directive requires an impact assessment for plans or projects which are likely to have negative effects on the protected habitats. As such, plans or projects that are judged likely to have a negative effect upon habitats and species - even if not projected on the Natura 2000 site itself but with a possible significant effect thereon - can only be approved if no alternative solution exists. If, in spite of a negative assessment and in the absence of alternative solutions, a plan or project must be carried out for imperative reasons<sup>70</sup>, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. Member States should ensure, that soil-related issues will be considered in this procedure in the same way as e.g. biotopes.

Last but not least, farmers who have agricultural land in Natura 2000 sites and face restrictions due to the requirements of the Habitat-Directive will be eligible to receive payments for the management of these sites by the Rural Development Regulation.<sup>71</sup> This financial support might help to promote environmental-friendly farming. Depending on the specific conditions of a certain area, these measures could include measures to reduce the use of pesticides and fertilisers, measures to mitigate the effects of soil compaction, e.g. limitations on the use of machinery or the setting of stocking limits, or measures aiming to regulate the irrigation of agricultural land.

Addressing the following threats to soil:

*(indirect: Soil contamination, Decline in soil biodiversity), (marginally: Soil sealing [in the protected areas], Soil compaction)*

<sup>68</sup> No transition periods have been agreed for the transposition of the Directives.

<sup>69</sup> [http://europa.eu.int/comm/environment/nature\\_biodiversity/index\\_en.htm](http://europa.eu.int/comm/environment/nature_biodiversity/index_en.htm)

<sup>70</sup> As described in Article 6 (4) of the Council Directive 92/43/EEC.

<sup>71</sup> Council Regulation (EC) No. 1783/2003.

## 22 Convention on Biological Diversity: European Community Biodiversity Strategy and Biodiversity Action Plans

The global scale of biodiversity reduction or losses and the interdependence of different species and eco-systems across national borders demands concerted international action. The framework for this action is the Convention on Biological Diversity (CBD) agreed during the Rio World Summit in 1992. The European Community ratified the CBD on 21 December 1993.

In February 1998 the Commission adopted a Communication on a European Community Biodiversity Strategy.<sup>72</sup> The Strategy focuses specifically on the integration of biodiversity concerns into relevant policies, in particular: conservation of natural resources, agriculture, fisheries, regional policies and spatial planning, forests, energy and transport, tourism, development and economic co-operation.

With the adoption of the Biodiversity Strategy, the Commission took the first step towards the implementation of the CBD. The second step, foreseen in the Strategy, is the development and implementation of Action Plans and of other measures affecting the policy areas concerned.

In March 2001, the European Commission adopted four specific "sectoral" Biodiversity Action Plans.<sup>73</sup> The sectoral Action Plans are aimed at supporting integration of biodiversity protection into EU policies, contain an overview of the many actions and steps needed, define concrete actions and measures to meet the objectives defined in the strategy and specify measurable targets.

The Biodiversity Action Plan for the Conservation of Natural Resources is most relevant to soil protection as it defines concrete actions that focus on soil, e.g.:

- Establishing an information base with respect to soil erosion, organic matter and heavy metals;
- Ensuring that the products resulting from the treatment of sludge and biodegradable waste and intended for application on soils are of sufficient quality as not to endanger the inherent quality of soils and their biodiversity; and
- In the longer term, raising overall awareness about the need to protect European soils for preserving biodiversity.

*Addressing the following threats to soil:*

*(indirect: Soil contamination, Decline in soil biodiversity), (marginally: Erosion, Decline in organic matter)*

## VI Climate Change

Climate change presents an overarching but as yet uncertain factor linked to soil degradation processes. There is no conclusive evidence on the effects of climate change on soil yet, however it appears likely that it will worsen the threats to soil. The link between the climate change and soil protection can be interpreted from two sides. On the one hand, in the last

<sup>72</sup> COM(1998) 42.

<sup>73</sup> COM(2001) 162.

decade, due to the temperature rise caused by climate change, the frequency of strong wind and precipitation has increased. It consequently has accelerated erosion of soil and added to the frequency of floods. Moreover, the increased temperature might have an impact on ecosystems and biodiversity in particular. However, in these cases, it is very difficult to estimate the real impact of climate change on soil distortion. On the other hand, the main link between the climate change and soil currently discussed under the climate policy is a characteristic of soil (and forest) to sequester carbon from the atmosphere.

Agricultural soils can be used as a sink (carbon store). Carbon is a major component of soil organic matter, at the same time it plays a major role in the global carbon cycle.<sup>74</sup> Carbon from the atmosphere can be sequestered by soil organic matter (humus) - underlining the importance of soil organic matter in relation to climate change. In addition to contributing to climate change mitigation, soil carbon (soil organic matter) plays a crucial role in soil protection. Soil organic matter plays a central role in maintaining key soil functions and is an essential determinant of erosion resistance and soil fertility.

Climate change policy of the European Union takes different actions to reduce greenhouse gas emissions including the characteristic of soil as a sink. At international level, the European Union addresses the issue through the United Nations Framework Convention on Climate Change and its Kyoto Protocol. At European level it is considered in the European Climate Change Programme (ECCP).

### 23 Framework Convention on Climate Change

The 1992 Framework Convention on Climate Change,<sup>75</sup> seeking to stabilise the greenhouse gas concentrations in the atmosphere, recognises the role and importance of terrestrial ecosystems as sinks of greenhouse gases and that land degradation problems and changes in land use can exacerbate the emission of gases to the atmosphere. The Convention calls for the sustainable management, conservation and enhancement of sinks, including biomass, forests and other terrestrial ecosystems (Art. 4d).

In 1997, the Kyoto Protocol<sup>76</sup> to the Convention was adopted setting quantified emission limits for greenhouse gases. The European Community has signed it in 1998 and ratified in 2002. European Union Member States jointly (Art. 4) fulfil their obligations by applying the "bubble" approach.<sup>77</sup> Considering soil protection, the Protocol promotes sustainable development and calls on each Annex I Party achieving its commitments to reduce greenhouse gases to implement policies and measures to protect and enhance sinks and reservoirs of greenhouse gases (Art. 2(a)). The Marrakech Accord agreed at COP7 in November 2001 set legally binding guidelines for reporting and accounting for agricultural sinks as set in Article 3.4 of the Kyoto Protocol.

*Addressing the following threats to soil:*

*(indirect: Decline of organic matter)*

<sup>74</sup> The carbon contained in soils is the third largest global carbon pool, following the oceanic pool and the fossil pool. The soil carbon pool is about four times larger than the atmospheric pool and about six times the size of the biotic carbon pool (Lal 1999).

<sup>75</sup> United Nations 1992.

<sup>76</sup> United Nations 1998.

<sup>77</sup> IEEP 2004, 6.2-2.

## 24 European Climate Change Programme (ECCP)

In order to implement the Kyoto Protocol, the European Commission has launched European Climate Change Programme<sup>78</sup> in 2000. The ECCP was designated to identify and develop all instruments necessary for the EU to implement its commitments under the Kyoto Protocol. The ECCP activity covers several areas including now soils as sinks. The measures developed under the ECCP to enhance carbon sequestration in agricultural soils are potential tools for mitigating global warming and add to soil protection.

Under the European Climate Change Programme the Working Group on Sinks - Sub-group on Agricultural Soils was established to consider the mitigation potential of improved use and management of agricultural soils. The Working Group on Sinks recognises that measures for carbon sequestration have to be viewed not alone from the perspective of climate change mitigation, but also from the viewpoint of their contribution to a European policy of soil protection.<sup>79</sup> Some technical measures to help combat global warming, identified by the Working Group on Sinks,<sup>80</sup> appear to be suitable tools for the European agricultural sector and Soil Protection Strategy. These measures, e.g. organic farming or conservation tillage, aim at an increase of soil carbon as well as at a reduction of its loss. The measures are to some extent already used in different Member States and are eligible for inclusion in national Rural Development Programmes, where they can be financially supported under the Agri-Environment Scheme. The CAP Reform provides for increased opportunities to support environmentally friendly agricultural production, including measures in favour of carbon sequestration (see Chapter I.VIII).

*Addressing the following threats to soil:  
(indirect: Decline of organic matter)*

## VII Impact Assessment

The horizontal legislation on impact assessment concerns various matters which cuts across different environmental areas including soil issues. Rather than to regulate a specific area, e.g. water or air, these items of legislation are more procedural. They provide for methods and mechanisms aimed at improving decision-making, legislative development and implementation while taking into account economic, social and environmental issues. As regards soil protection policy, the most relevant horizontal legislation covers the Environmental Impact Assessment Directive (EIA)<sup>81</sup> and the Strategic Environmental Assessment Directive (SEA).<sup>82</sup>

## 25 Environmental Impact Assessment Directive (85/337/EEC as amended by 97/11/EEC and 2003/35/EC)

This Environmental Impact Assessment Directive (EIA) sets out requirements for undertaking environmental impact assessments before an authorisation is given for a public and private

<sup>78</sup> COM(2000) 88 final.

<sup>79</sup> European Community 2004.

<sup>80</sup> European Community 2004.

<sup>81</sup> Directive 85/337/EEC, OJ L 175, 5.7.1985.

<sup>82</sup> Directive 2001/42/EC, OJ L 197, 21.7.2001.

project which is likely to have a significant impact on the environment. The aim of the EIA Directive is therefore to ensure that environmental consequences of projects are identified and assessed before authorisation is given.

The EIA Directive requires to identify, describe and assess the direct and indirect effects of a project on humans, fauna and flora, soil, water, air, climate and the landscape, material assets and cultural heritage as well as the interactions between these factors (Art. 3).

Annex II lists the projects concerned, including those directly related to soil e.g.:

- Projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes;
- Water management projects for agriculture, including irrigation and land drainage projects;
- Initial afforestation and deforestation for the purposes of conversion to another type of land use;
- Quarries, open-cast mining and peat extraction (projects not included in Annex I); and
- Underground mining.

It has to be stressed that soil is explicitly mentioned as a protected good in Article 3. Although the directive creates procedural rather than substantive requirements, the procedure of EIA requires that soil issues has to be taken into account to the same degree as issues related to water and air while carrying out the environmental impact assessment. However, as regards the application of EIA, soil issues have been rather neglected in the past. In fact, the focus of EIA were set mostly on issues related to biodiversity. The negligence of soil protection is partly due to a lack of available data and methods for evaluation.<sup>83</sup>

*Addressing the following threats to soil:*

*Soil contamination, Soil sealing, Floods and Landslides*

## **26 Strategic Environmental Assessment Directive (SEA) (2001/42/EC)**

The SEA-Directive provides a framework for a formalised, systematic and comprehensive procedure in order to ensure that environmental consequences of certain proposed policies, plans and programmes are identified and assessed during their preparation and before their adoption. The SEA-Directive requires an environmental assessment to be carried out for plans and programmes which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use. The Directive sets the framework for future development consent of projects subject to the EIA, which are likely to have significant environmental effects (Art. 3(1)). Member States shall determine which plans and programmes will be subject to an SEA based on Article 3 of the directive.

Where an environmental assessment is required, an environmental report shall be prepared in which the likely significant effects on the environment and reasonable alternatives are identified, described and evaluated (Annex I, Art. 5(1)). The strategic environmental

<sup>83</sup> Billwitz, K. 2003.

assessment shall include e.g. biodiversity, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors (Art. 5).

Strategic environmental assessment, by its nature, covers a wider range of activities, a wider area and often over a longer time span than the environmental impact assessment for projects. Strategic environmental assessment might be applied to an entire sector (such as a national policy on energy for example) or to a geographical area, (for example, in the context of a regional development scheme). Strategic environmental assessment does not replace or reduce the need for project-level environmental impact assessment, but it can help to streamline the incorporation of environmental concerns (including soil) into the decision-making process, often making project-level environmental impact assessment a more effective process. This might enhance as well the consideration of soil protection issues, especially as regards soil sealing, as these issues can be evaluated already at the land use planning stage evaluating thus the best option for land use for certain purposes independently from an already planned project.

*Addressing the following threats to soil:*

*Soil contamination, Soil sealing, Floods and Landslides*

## **B. Other Policies at EU Level**

The following chapters will review how soil protection and management issues are considered in selected policies,<sup>84</sup> such as the Common Agricultural Policy, Internal market Regulations on product quality, as well as will review how the EU financial instruments and Research and Development programmes support soil protection and management issues.

### **VIII The Common Agricultural Policy**

Agriculture and forestry cover over three-quarters of the territory of the EU having therefore a great influence on nature and environment, and thus also on soils, with negative as well as positive impacts. In the last forty years, intensification, concentration, abandonment and greater specialisation of agricultural production has occurred in the EU caused by a variety of driving forces, including technical change, international market developments and policies.

As a result, the pressures on the environment has increased significantly. In many parts of the EU agricultural land is under severe threat through soil degradation caused e.g. by the use of heavy machinery, inappropriate farming practices on sloping land, improper use of fertiliser and pesticides, unprotected agricultural land during rainy periods, removal of field and river boundary features, overabstraction of groundwater for irrigation or the use of intensive monoculture practices.

However, certain farming systems, such as high nature value farming systems, play also an important role in the maintenance of cultural landscapes and semi-natural habitats and contribute significantly to the maintenance of soil quality, e.g. extensive farming systems

<sup>84</sup> The integration of environmental protection requirements into the definition and implementation of all Community policies and activities is required by the EC Treaty (Article 6). This implies an appropriate balance between environmental, economic and social objectives and promotes sustainable development.

(extensive grasslands), traditional rotation patterns or the presence of hedges and trees on agricultural land.

The Common Agricultural Policy (CAP), established in 1962, is one of the European Union's most important policy areas as it represents one of the highest developed forms of EU supranational decision-making and accounts for nearly 50% of the total European Union's budget. The CAP can be regarded as one crucial driving force influencing the agricultural development in the European Union and thus, through land use changes, has influenced environment and nature.

In the past, the CAP encouraged intensive agricultural production, e.g. by providing subsidies per tonne of wheat or per head of livestock produced. Increasing internal and external pressures, such as numerous crises in food chain security, the increased awareness about environmental protection and nature conservation and growing expectations regarding food quality and safety, has led to several reform processes of the CAP. In the following sections, the main instruments introduced in order to integrate environmental concerns into the CAP will be outlined highlighting the aspects which address directly or indirectly soil protection issues.

## **27 Agri-Environmental Programmes (2003/1783/EC)**

Agri-environmental programmes<sup>85</sup> were introduced in 1992, and integrated as an obligatory measure within the Rural Development Regulation<sup>86</sup> in 1999 and strengthened in 2003<sup>87</sup>. The key objectives of these programmes are to reduce the negative pressures of farming on the environment, in particular on water quality, soil and biodiversity and to promote farm practices necessary for the maintenance of biodiversity and landscape. For this purpose, the Member States are required to develop agri-environment measures throughout their territories, according to their environmental needs and potential. The measures are voluntary for the farmers. Farmers who are taking part in an agri-environmental scheme have to deliver environmental services going beyond the application of good agricultural practice. For doing this, they receive payments covering the income foregone, costs incurred and necessary incentive.

Agri-environmental measures offer significant opportunities for favouring the build-up of soil organic matter, the enhancement of soil biodiversity, the reduction of soil erosion, contamination and compaction. In the past, various agri-environment measures throughout the European Union have been established directly or indirectly addressing soil protection issues e.g. measures to reduce the use of pesticides and fertilisers; measures addressing soil compaction, e.g. limitations on the use of machinery or the setting of stocking limits, or measures in order to minimise soil erosion, e.g. specific crop rotations, mulch seeding, ploughing restrictions, retaining stubble after harvest or the maintenance of terraces. Furthermore, measures aiming to maintain abandoned farmland or to promote organic farming also contribute to the maintenance of soil quality and to the protection of soils.<sup>88</sup>

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<sup>85</sup> Council Regulation (EEC) No 2078/92, OJ L 215, 30.7.1992.

<sup>86</sup> Council Regulation (EC) No 1257/1999, OJ L 160, 26.6.1999.

<sup>87</sup> Council Regulation 2003/1783/EC, OJ L 270, 21.10.2003.

<sup>88</sup> European Commission 1999.

At present, the agri-environment measures cover over 20% of the farmland of the EU. Data shows that measures lead to quantified reductions in use of inputs, conservation of valuable farmed habitats, and changes in use of land for environmental purposes. These identified positive impacts contribute to biodiversity, landscape, water and soil resources.

*Addressing the following threats to soil:*

*(indirect: Erosion, Decline of organic matter, Soil contamination, Soil compaction, Decline in soil biodiversity, Salinisation)*

## **28 Cross-Compliance (2003/1782/EC)**

The Cross-Compliance Scheme was firstly introduced as a voluntary scheme in 1999 as part of the Agenda 2000 CAP reform ('Horizontal' Regulation)<sup>89</sup>. However only few Member States implemented the voluntary cross-compliance scheme (e.g. France, Ireland, UK and Denmark) mainly addressing over- and undergrazing, indirectly contributing to soil protection by preventing further soil erosion and compaction.

In 2004, as part of the mid-term review of the CAP, a compulsory cross-compliance scheme for all direct payments (2003/1782/EC)<sup>90</sup> was introduced.

From 2005 onwards, all direct payments will be conditional upon 19 statutory requirements<sup>91</sup> in the field of environment, food safety, animal and plant health, and animal welfare as well as requirements to keep the land in good agricultural and environmental condition (GAEC)<sup>92</sup>. This means that in future all farmers receiving direct payments have to comply with these requirements, as in the case of non compliance, the total amount of direct payments will be reduced or cancelled. The focus of the scheme is:

- To support the implementation of statutory management requirements established by Community legislation in the fields mentioned above;
- To enforce the definition of good agricultural and environmental conditions (GAEC) by the Member States;
- To avoid land abandonment by introducing land management obligations.

From the 19 statutory requirements listed in Annex III of the Regulation 03/1782/EC, only one directly addresses soil protection issues –the Sewage Sludge Directive. However, soil protection is a key issue as regards the good agricultural and environmental conditions (GAEC). According to the Regulation 03/1782/EC, all agricultural land is to be maintained in GAEC. For this purpose, Member States have to define, at national or regional level, minimum requirements for GAEC taking into consideration the specific characteristics of the areas concerned, including soil and climatic condition, farming systems and farming practices. The GAEC of the Member States have to be in accordance with the framework set out in Annex IV of the Regulation 03/1782/EC. As Table 2 shows, mainly soil protection issues are addressed in this European framework.

<sup>89</sup> Council Regulation (EC) No 1259/1999, OJ L 160, 26.6.1999.

<sup>90</sup> Council Regulation 2003/1782/EC, OJ L 270, 21.10.2003.

<sup>91</sup> According to Article 5, Annex III, of the Regulation (2003/1782/EC), farmers have to comply with 19 Legislation until 2007.

<sup>92</sup> According to Article 5, Annex IV, of the Regulation (2003/1782/EC).

**Table 2 Good Agricultural and Environmental Condition**

Issues	Standards
<b>Soil erosion:</b> Protect soil through appropriate measures	<ul style="list-style-type: none"> <li>• Minimum soil cover</li> <li>• Minimum land management reflecting site-specific conditions</li> <li>• Retain terraces</li> </ul>
<b>Soil organic matter:</b> Maintain soil organic matter levels through appropriate practices	<ul style="list-style-type: none"> <li>• Standards for crop rotations where applicable</li> <li>• Arable stubble management</li> </ul>
<b>Soil structure:</b> Maintain soil structure through appropriate measures	<ul style="list-style-type: none"> <li>• Appropriate machinery use</li> </ul>
<b>Minimum level of maintenance:</b> Ensure a minimum level of maintenance and avoid the deterioration of habitats	<ul style="list-style-type: none"> <li>• Minimum livestock stocking rates or/and appropriate regimes</li> <li>• Protection of permanent pasture</li> <li>• Retention of landscape features</li> <li>• Avoiding the encroachment of unwanted vegetation on agricultural land</li> </ul>

A further requirement of cross-compliance scheme addresses indirectly soil protection issues. According to the Regulation, Member States shall ensure that land which was under permanent pasture (at the date for the area aid applications 2003) is to be maintained under permanent pasture. With this requirement a further conversion from grassland into arable land shall be prevented, thus possible negative impacts on soils resulting from arable crop production could be avoided such as soil erosion or impacts through the use of pesticides.

*Addressing the following threats to soil:*

*Erosion, Decline of organic matter, Soil contamination, Soil compaction, Decline in soil biodiversity, Salinisation*

## **29 Organic Farming (Regulation 2092/91, Regulation 1804/99 and European Action Plan for Organic Food and Farming**

Increased consumer awareness of food safety issues and environmental concerns has contributed to the growth in organic farming over the last few years. Although it only represented around 3 % of the total EU utilised agricultural area (UAA) in 2000, organic farming has in fact developed into one of the most dynamic agricultural sectors in the European Union.

The first regulation on organic production at the European level was established in 1991<sup>93</sup>. The regulation sets rules for defining the method of agricultural production for crops, regulates labelling, processing, inspection and marketing of organic products within the Community and the import of organic products from non-member countries. A supplement was introduced in 1999 to cover livestock.<sup>94</sup> In June 2004, the European Commission adopted the "European Action Plan for Organic Food and Farming" aiming to facilitate the ongoing development of organic farming in the EU and encompassing 21 concrete policy measures. Organic farming can contribute significantly to the protection and maintenance of

<sup>93</sup> Regulation 2082/91.

<sup>94</sup> Regulation 1804/99.

soils. According to the guide to Community rules for organic farming<sup>95</sup>, the concept of organic farming requires inter alia to increase soil biological activity, maintain long-term soil fertility, recycle wastes of plant and animal origin in order to return nutrients to the land, thus minimising the use of non-renewable resources. Moreover organic farming should promote the healthy use of soil, water and air as well as minimise all forms of pollution thereto that may result from agricultural practices. Organic farming is financially supported by the agri-environmental programmes (see chapter 9.2.1.1)

As farmers have to follow these guidelines, organic production can contribute to the maintenance of high quality soils from an environmental perspective.

Addressing the following threats to soil:

*(indirect: Erosion, Decline of organic matter, Soil contamination, Soil compaction, Decline in soil biodiversity, Salinisation)*

## IX Internal Market Regulations on Product Quality

The internal market - one of the essential cornerstones of the European Union - had principally been set up within the Community in 1993 and is based on the free movement of goods, persons, services and capital. The key factor when it comes to integrating environmental concerns into the EU's internal market policy is the need to find a balanced approach between the free movement of goods and environmental protection. On the one hand, the increasing openness of the market is sometimes perceived as a threat to the quality of Europe's environment. On the other hand, environmental standards are often seen as barriers to market access. Finding a way to integrate these two policy areas is the main challenge facing Europe's policy-makers.

The EU has developed a number of policies aimed at delivering environmental and social protection without causing distortions in internal trade. A number of internal market regulations have a particular impact on soil protection policies. These interdependencies between soil protection and internal market issues are of particular interest, as they provide a motivation for a harmonised European approach. Among the most important interdependencies are the trade of pesticides and fertilisers, the trade of building materials, and the trade in decontamination and remediation services.

- Both pesticides, fertilisers and building materials are used in or near the soil and may give rise to contamination of soil and groundwater. Thus, harmonised product standards are called for in order to ensure that all traded goods meet soil protection requirements, and that all European producers of the three goods compete on a level playing field.
- In the case of building materials themselves, interlinkages with soil protection stem from the fact that the production of building materials (including clay, gravel and sands), as well as the disposal of demolished buildings, has an immediate impact on soils. This impact can be diminished e.g. by increasing the share of recycled building materials. At the same time, the share of building materials that is traded across borders can be

<sup>95</sup> European Commission 2001a.

expected to be small, as the bulk of building materials is produced in the environs of the building site.<sup>96</sup>

- Finally, a third linkage between internal market regulations and soil protection arises where the decontamination and remediation of soils is traded as a service. To ensure market access for foreign service providers in this area, a harmonised approach to defining and measuring soil contamination and remediation will be helpful.

*Addressing the following threats to soil:*

*(indirect: Soil contamination)*

## X Research and Development

In various Community research initiatives, a number of soil protection problems are addressed. However, one of the most important is the European Research Framework Programme. Soil-related research was introduced within the **5th Research Framework** with a number of research activities with a focus to assess and minimise pollution originating from industrial activities, from contaminated land, waste disposal sites and sediments or diffuse pollution originating from land-use practices. The interactions between soil and water are also being studied in the context of integrated water management.

The current **6th Research Framework** supports soil-related research mostly in the priority theme "Sustainable Development, Global Change and Ecosystems" with a total budget of Euro 2.329 million. In the topic "Global Change and ecosystems", the most important themes addressing directly or indirectly soil issues are: water cycles, biodiversity and ecosystems, land management as well as complementary and cross-cutting research (e.g. risk assessment and tools for integrated sustainability assessment). As regards the topic of "sustainable surface transport" the theme on environmentally friendly and competitive transport systems will have an important indirect impact on soil issues.

Under the 6<sup>th</sup> EU Research Framework Programme, the European Commission introduced the Scientific Support to Policies initiative (SSP) - recognising that scientific are often needed for the decision-making process. Through focused research answering precise needs identified by policy-makers, SSP aims to improve the quality of policy decisions and speed up the decision-making process. The SSP includes various topics which will be relevant for soil policies, such as environmental assessment (soil, water, air, noise etc) and the forecasting of innovative policies for sustainability.

Currently, the preparations to define the priority research areas for the 7th Research Framework Programme (2006-2010)<sup>97</sup> have started. In June 2004 the European Commission published the Communication on "Science and technology, the key to Europe's future - Guidelines for future European Union policy to support research" outlining the six major objectives for the future EU research.

<sup>96</sup> The bulk, in this context, can be understood in terms of the mass rather than the economic value. Higher-value building materials such as window panes, doors, tubes as well as marble slabs, will often be transported over longer distances, whereas sands and gravel are typically mined locally.

<sup>97</sup> COM(2004) 353 final.

At European level there are various institutes carrying research on soil issues. As regards the activities of the Joint Research Centre's (JRC)<sup>98</sup>, most of the research related to the environmental is carried out by the JRC Institute for Environment and Sustainability. Soil-related topics are e.g. soil and waste management, land resources and biodiversity, the integration of sustainability into other policy areas, monitoring and assessing ecosystem sustainability as well as sustainable and safe transport systems. In addition, the European Soil Bureau, a specific project of the Commission's Joint Research Centre (JRC), is a network of soil science institutions. It is carrying out scientific and technical work programmes in order to collect, harmonise and distribute soil information from countries all over Europe relevant to Community and national policies.

Further soil related research is carried out by the Global Monitoring for Environment and Security (GMES).<sup>99</sup> Under the topic "environmental stress in Europe" two projects have a direct focus on soils. This is "Land Degradation Assessment in Mediterranean Europe" which will identify hot spot areas subject to a high desertification/degradation risk and "Coastal Erosion in Europe" aiming to visualise the existing information on coastal erosion in Europe in order to develop guidelines for information systems at a local scale and policy measures.

Soil issues are also covered by the Information Society Technologies Programme<sup>100</sup>, especially as regards the topic to improve risk management which aims to develop open platforms, integrated systems and components for improved risk management and environmental management.

## **XI EU Financial Instruments with an Impact on Soil Protection**

The European Union offers a wide scope of funding instruments that have an impact on soil protection. The funding instruments most relevant to the state of soils in Europe are the regional policy instruments, i.e. the Cohesion Fund and the Structural Funds. These funds provide finance for the least favoured regions of the European Union. In relation to soil protection, they support waste management and pollution control measures, measures targeted at the regeneration of contaminated industrial sites as well as land use planning in coastal areas. At the same time, the impact of regional policy on soils has not been exclusively benign. Thus, a large share of the regional policy funding flows into the development of transport infrastructure, and here mainly into road transport, thus adding to soil sealing and contamination along roads and railways. Indeed, both the Structural Funds and the Cohesion Fund have been criticised repeatedly by NGOs and the European Parliament for their environmental insensitivity.

Regarding soil protection, it has been argued that, with the adoption of a Thematic Strategy on Soil Protection, soil protection could also become more of a priority for the allocation of Community funding.<sup>101</sup> This includes soil protection as an explicit objective, as well as the use of soil indicators to allocate funding, or the introduction of environmental covenants and safeguards to evaluate the impact of supported projects on the soil.

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<sup>98</sup> JRC is a research-based policy support organisation working for the EU policy-maker.

<sup>99</sup> <http://www.gmes.info/projects/index.html>

<sup>100</sup> <http://www.cordis.lu/ist/so/risk-management/home.html>

<sup>101</sup> European Parliament 2003.

Against this background, the Committee on the Environment, Public Health and Consumer Policy of the European Parliament considered it necessary to better integrate soil protection issues into other Community policies in general, and the regional policy instruments in particular.<sup>102</sup> The Committee also called for an evaluation of Structural Fund programmes with regard to their impact on soil protection policies, as well as the introduction of specific soil protection standards for future programmes. Finally, it supported the incorporation of soil as a component of Community policy, particularly regarding the imposition of soil protection conditions for infrastructure projects that are co-financed through the Structural Funds and the Cohesion Fund.

Likewise, the EU Commission in its 2003 Environment Policy Review advocated an integrated approach to soil protection and regional development, including "appropriate co-financing through Cohesion policy to adequately cover the territorial dimension", a process that could be supported through the development of a fully fledged soil strategy.<sup>103</sup>

In addition to the regional policy funds, which include environmental objectives among others, there are also some funding instruments and regulations that are explicitly targeted at improving the environment. This concerns the LIFE-environment fund, as well as the guidelines on State aids for environmental protection. These are, however, much smaller in size than the Structural and Cohesion Funds.

### **30 Cohesion Fund**

The Cohesion Fund was first established in 1994, and has currently been extended until 2006. The beneficiaries of the Cohesion fund are those Member States with a gross national product (GNP) per capita of less than 90 per cent of the EU average. Before EU enlargement, Spain, Greece, Portugal and Ireland were eligible for funding from the Cohesion Fund. Following the enlargement, the overriding objective of the Cohesion Fund will be to support the economic development of the new Member States.

Measures that are eligible for support from the fund include environmental projects directed at preserving, protecting and improving the quality of the environment, but also transport infrastructure projects. While the transport and environment objectives were supposed to be balanced, the Cohesion Fund was heavily skewed towards road transport infrastructure in its practical implementation, a fact that was repeatedly criticised both by NGOs and by the European Parliament.

Cohesion Policy is one of the most decentralised policies of the EU. The local implementation of EU legal requirements therefore varies widely in terms of environmental integration, both between and even within Member States. In addition, compared to the Structural Funds, the Cohesion Fund incorporates fewer environmental safeguards, so that the relative balance between the funds in the new Member States will be of crucial importance for the overall environmental performance of the regional policy instruments following the enlargement.

In the Cohesion Fund, there is generally little explicit reference to soil protection, but many of the supported measures have a direct or indirect impact on soils. This applies e.g. to the

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<sup>102</sup> European Parliament 2003.

<sup>103</sup> COM(2003) 745 final, 3 December 2003.

purchase of fire-fighting equipment and to soil protection and reforestation measures carried out with support from the Cohesion Fund, following forest fires in Greece, Spain and Portugal.

Also, the Cohesion Fund may cover up to 75% of the costs of waste treatment projects, which amounts to more than Euro 200 million per annum. In terms of benefits, these investments are expected to substantially reduce landfill waste disposal and to create up to 46,000 new jobs for managing the programmes (4,000 in Ireland, 9,000 in Portugal, 10,000 in Greece and 23,000 in Spain). Similar developments are expected in the new Member States, where EU waste legislation is expected to create 50,000 jobs by the time the acquis is fully implemented.<sup>104</sup>

### 31 Structural funds

The EU Structural Funds comprise the European Regional Development Fund (ERDF), the European Social Fund (ESF), the European Agricultural Guidance and Guarantee Fund (EAGGF) and the Financial Instrument for Fisheries Guidance (FIFG).

In total, the resources made available through the Structural Funds account for over one-third of the Community's annual budget. Its principal purpose is to promote the economic and social development of disadvantaged regions, sectors and social groups within the EU. Each of the four structural funds may support environment-related projects where these contribute to economic development. Of the four funds, the ERDF and the EAGGF (guidance section) are most relevant to soil protection policies. In the past, projects with relevance to soil protection policies have been carried out in the following areas:<sup>105</sup>

- protection and exploitation of natural resources;
- prevention of erosion and fires;
- farming practices which help to protect the environment;
- management of household, industrial and toxic wastes.

Activities funded through the Structural Funds also comprise the treatment and rehabilitation of industrial sites (particularly in Objective 2 areas)<sup>106</sup> as well as the upgrading of deprived urban areas. Many areas that experienced the decline of traditional industries were also left with high levels of dereliction and environmental damage, making them unattractive locations for new business development. Cleaning up of former industrial sites thus received considerable emphasis in many of the 1994-99 Objective 2 programmes.<sup>107</sup>

In Luxembourg, for example, interventions to clean up former industrial sites and related environmental measures aimed at 'enhancing the attractiveness of the zone', accounted for

<sup>104</sup> European Commission 2001b.

<sup>105</sup> IEEP 2004, 12.4-2.

<sup>106</sup> The Structural Fund regulations for 2000-06 provide for three priority objectives: Objective 1: to promote the development and structural adjustment of regions whose development is lagging behind; Objective 2: to support the economic and social conversion of areas experiencing structural difficulties; and Objective 3: to support the adaptation and modernisation of education, training and employment policies and systems in regions not eligible under Objective 1. (Council Regulation (EC) No 1260/99 of 21 June 1999 laying down general provisions on the Structural Funds. OJ L 161 of 26.6.1999).

<sup>107</sup> The following examples identified from Centre for Strategy and Evaluation Studies, CSES (2003): Ex-post evaluation of 1994-99 Objective 2 programmes. Synthesis Report. Study commissioned by the European Commission, DG Regional Policy.

almost two-thirds (65%) of overall expenditure. Cleaning up of contaminated industrial sites was also a priority in Objective 2 areas in Wallonia and in Belgian Limburg. In Spain, the regeneration of industrial sites accounted for 4% of funding in Objective 2 areas in 1994-96 and 12% in 1997-99. Further examples include the German North Rhine - Westphalia, where a new business park was developed on a previously polluted industrial site in the city of Herne, leading to spin-off effects for local qualification and employment generation.

The scale of the task of cleaning up former industrial sites is also illustrated by the French Nord-Pas de Calais region. During the 1994-96 programmes, 1,200 hectares of former industrial sites out of an estimated stock of 4,000 hectares were identified for environmental rehabilitation. In the French Rhône-Alpes region, 89 projects were established to clean up former industrial sites through innovative public-private-partnership schemes.

The administration of the Structural Funds is very decentralised in practice, so that the manner in which funds are deployed varies considerably between Member States. Indeed, Wilkinson (1994)<sup>108</sup> criticises the fact that the clearance of derelict land is often regarded as an 'environmental' measure, irrespective of whether the land is used for the construction of new industrial installations.

There is also a 'negative' linkage between the Structural Funds and soil protection: in response to the failure to implement the habitats and birds directives, the Commission has threatened to withhold payments under Structural Fund programmes. Even though the supported projects were not related to either of the directives, the Structural Funds were thus used to exert leverage on the Member States.

### **32 LIFE Programme**

One of the main source of funding for environment-related measures is the LIFE-environment funds.

LIFE (the Financial Instrument for the Environment)<sup>109</sup> co-finances environmental initiatives in the European Union and certain non-Community countries and aims to contribute to the development, implementation and updating of Community environment policy and environmental legislation. It supports innovative solutions for some of the soil threats as well as for sustainable use of soil.

Launched in 1992, LIFE has been implemented in 3 phases. The current phase "LIFE III" (2000-2004) has a budget of Euro 640 million.

It contributes towards financing in three areas: "LIFE-Nature", "LIFE-Environment" and "LIFE-Third countries". With regard to soil protection issues LIFE-Nature is the most relevant category. The specific objective of LIFE-nature is to contribute to the implementation of the Habitats and the Birds Directive and the establishment of the Natura 2000 network. Both Directives are based upon the protection of habitats which are again partly depending on specific soil characteristics.

Under the LIFE-environment fund, up to Euro 300 million have been made available in the period 2000 – 2004. Project categories that can be expected to have an impact on soil contamination include demonstration projects integrating environment and sustainable

<sup>108</sup> IEEP 2004, 12.4-6.

<sup>109</sup> Regulation (EC) No 1655/2000, OJ L 192, 28.7.2000.

development objectives in land-use planning, as well as projects aimed at the prevention, reuse, recovery and recycling of waste streams.

### **33 Guidelines on State Aids for Environmental Protection**

In addition to the Community funding instruments, the EU has also set Guidelines for national funding and support instruments. The Guidelines on State aids for environmental protection were agreed in December 1999. They set maximum rates and periods for support, calculated as a maximum percentage of gross eligible costs. For the rehabilitation of polluted sites, 100 per cent of the eligible costs can be covered from state aid if the person responsible cannot be identified. Eligible costs in this context are the costs of rehabilitation work less the increase in the value of the land.