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The consequences of the European Soil Framework Directive for Dutch policy

L.G. Wesselink, J. Notenboom en A. Tiktak

In cooperation with:
- Alterra, Soil Science Centre (P.F.A.M. Römkens en O. Oenema)
- Centre for Environmental Law and Policy, Utrecht University (M. van Rijswick en B.A. Beijen)

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Contact:
L.G. Wesselink
Milieu- en Natuurplanbureau
Bart.Wesselink@mnp.nl

Netherlands Environmental Assessment Agency

Netherlands Environmental Assessment Agency (MNP),
P.O. Box 303, 3720 AH Bilthoven, the Netherlands
Telephone: +31-30-274 274 5; Fax: +31-30-274 44 79; www.mnp.nl/en

Summary

The European Soil Framework Directive obligates Member States of the EU to draw up and implement policy that protects the soil against seven threats. The protection level can depend on the function of the soil and can be established by the local authorities. This is compatible with the basic principles of Dutch policy. The Directive describes, among other things, how the approach to soil contamination in Member States must be organized. This description links up to a great extent with the practice of soil remediation in the Netherlands and provides opportunities to export relevant Dutch expertise.

The Directive contains a number of points of attention for the Netherlands for which clarification can be requested from the Commission. For example, the effect of the Directive is broader and potentially more mandatory than Dutch soil policy. This applies, for instance, to the limitation of soil sealing by buildings and pavements, the reduction in the loss of organic matter in peat soils and, in the future, the reduction of salinization due to sea level rise. In addition, the Directive contains many general principles. These provide a great deal of policy flexibility, but they can also be interpreted differently by local authorities. It is conceivable that third parties can appeal to the courts for an unequivocal interpretation of the obligations from the Directive. This could lead to more uniform policy and a limitation of policy flexibility.

In this document we will evaluate the consequences for the Netherlands of the European Commission's proposal for a European Soil Framework Directive, hereafter to be called the SFD (EC, 2006a). The SFD is the statutory elaboration of the thematic strategy for soil protection that the Commission published recently (EC, 2006b). The European decision-making about the SFD is expected to begin during the first half of 2007. The present evaluation aims to inform the Dutch Parliament, special interest groups and other EU countries about three primary questions:

1. What are the soil problems in the Netherlands?
2. What is existing Dutch soil policy doing about these problems?
3. How does the proposed SFD link up with that existing policy?

The present evaluation will not address the administrative costs of converting the European policy into Dutch legislation, the legitimization of European soil policy (its trans-border character, level playing field) or the choice of the European Commission to use the directive instrument (taking account of the principles of subsidiarity and proportionality).

1. The Soil Framework Directive

The 6th EU Environmental Action Programme describes the environmental policy for the period 2001-2011 (EC, 2000). An important part of the Action Programme is the establishment of seven thematic strategies, including strategies for European air quality, the marine environment, pesticides and the soil. Many of these themes have a European policy tradition. This does not apply to the soil, although existing EU policy does intervene in various aspects of soil protection (*Table 1*). In the thematic strategy for soil protection (EC, 2006b), the European Commission refers to four pillars of European soil policy:

1. increasing public awareness of the need to protect soil;
2. intensifying research;
3. integrating soil protection in the formulation and implementation of national and Community policies in agriculture, regional development, transport and research;
4. enacting framework legislation with its principal aim being the protection and sustainable use of soil.

The Commission believes that a framework directive is the most suitable instrument for insuring coherent European soil policy while taking the subsidiarity principle into account (EC, 2006a,b). The SFD does not propose any community norms for soil.

Table 1 Main aspects of existing EU policy that affect soil remediation and protection

	loss of organic matter	local soil contamination	diffuse soil contamination	soil sealing	soil compaction	soil biodiversity	salinization	floods	landslides	erosion	desertification
Common agricultural policy: agricultural-environmental measures, rural development	√		√		√	(√)				√	
Water Framework Directive: plans for river basin management, groundwater			√				√				
Legislation for nitrate, pesticides and air pollution	√		√								
Directive on the assessment and management of floods			(√)	(√)				√			
Legislation on wastes: useful application, landfill disposal reduction, biodegradable waste	√		√								

The SFD establishes a framework for the protection of the soil with the aim of maintaining its capacity to fulfil ecological, economic, social and cultural functions. Member States must begin to take measures to reduce seven large-scale threats to European soils: contamination, erosion, loss of organic matter, compaction, salinization, soil sealing and landslides. In addition, the SFD requires the Member States to include soil protection as part of their policy in many other sectors. As a result, the SFD has a very broad scope and fills gaps in policy not foreseen in existing European legislation (*Table 1*).

The background to a Soil Framework Directive

In the White Paper on European Governance (2000), the European Commission described a new mode of operation that could lead to better recognition and acknowledgement of new policy by actors and a smoother policy implementation (EC, 2001). The mode of operation of the Thematic Strategy for soil protection is compatible with this new method of policy making. The process of establishing the Thematic Strategy began with drawing up the initial document 'Towards a thematic strategy for soil protection' (EC, 2002). In their response to this document, the European Council of Ministers (2002) and the European Parliament (2003) supported the initiative of the Commission to establish European draft legislation for soil monitoring. During the preparation process for the soil protection strategy in Europe, the stakeholders were involved in various ways, for example, by means of workshops and Internet consultations. The final proposal of the Commission (EC, 2006a,b) is accompanied by an Impact Assessment (EC, 2006c). This assessment is qualitative in nature because i) the Directive allows a great deal of flexibility to the Member States to choose suitable measures themselves and ii) the costs and benefits of soil protection are often difficult to quantify.

2. The soils in the Netherlands and the existing policy

Man-made-soil

In the Netherlands, most of the soils have been created by human intervention: land reclamation, peat harvesting, enrichment with animal manure, deforestation and reforestation, draining, cultivation, equalization, etc. (*Figure 1*). There is hardly a single square meter of land in the Netherlands that has been left untouched by such interventions. Moreover, the intensive land use in the Netherlands, certainly in the past, has not always been very sustainable. There is currently a more policy-based approach for sustainable soil management (see *Table 2*).

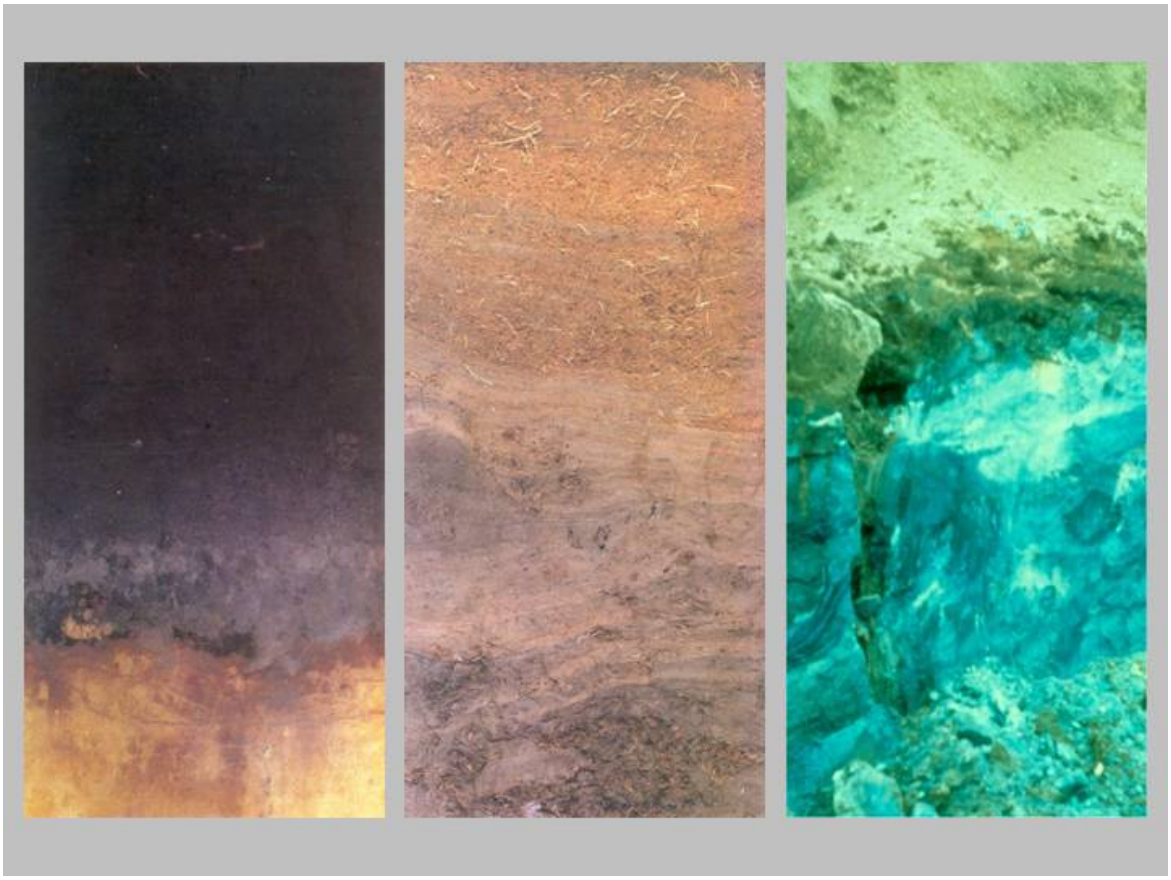

Figure 1 On the left a typical man-made soil (high organic matter soil resulting from years of enrichment with animal manure and sods), in the middle a peat soil and on the right a soil contaminated with cyanide (photos: left and middle from De Bakker and Edelman-Vlam (1976), right: M.G. Keizer, Wageningen University).

Soil policy in the Netherlands

Soil policy in the Netherlands has a tradition going back 25 years. The Netherlands is one of nine EU countries with a soil protection policy that is based on legislation (EC, 2006b). The Soil Protection Act makes a distinction between a severely contaminated soil, lightly contaminated soil and clean soil:

- severely contaminated soil must theoretically be remediated. The statutory soil remediation regulations in the Netherlands include: intervention values (norms) above

which remediation must take place, financing agreements and regulations about monitoring the national situation concerning sites with severe soil contamination (see also *textbox*);

- slightly contaminated soil must be continuously managed. For example, there is legislation on moving and reusing soil and dredgings and using or reusing stony building materials;
- clean soil must remain clean. The statutory prevention regulations in the Netherlands concern the following: storage of liquids in underground tanks, discharging liquids on or in the soil, disposing of wastes and usage rules for animal manure, sewage sludge and compost. In addition, soil protection measures can be imposed on companies via the Environmental Management Act.

For severely contaminated soil, the competent authorities are provinces and the large cities. For diffusely contaminated soil, there is no explicit competent authority. The enforcement of legislation in the area of fertilizers/manure and pesticides lies with the General Inspectorate of the Ministry of Agriculture, Nature Management and Food Quality, the enforcement of the soil care obligation is the responsibility of the municipalities, the provinces, the national government or the water boards.

Facts and figures about soil remediation in the Netherlands

- The aim for soil remediation is that all cases of serious soil contamination must be remediated or controlled in 2030 (VROM, 2006a). Before 2015, urgent cases must be solved or brought temporarily under control (VROM budget, 2005 and 2006).
- Since 2005, the Netherlands has maintained a national inventory of soil contamination sites (including potential cases). The competent authorities update this inventory regularly. There are 400,000 registered sites that are contaminated or potentially contaminated. It is estimated that about 55,000 sites must be remediated, of which approximately 11,000 sites are classified as urgent because the soil quality is inadequate for current use
- The national inventory of soil contamination is digitally available to all citizens in accordance with the obligations of the Aarhus Convention (see www.bodemloket.nl).
- The national progress in soil decontamination is reported annually to the Dutch Parliament (VROM/RIVM, 2005). This report and the information that is supplied for the purposes of the report by competent authorities are legal obligations.
- At the present time, 50% of the remediation costs are financed by market parties and the other 50% by the government. Every year, approximately €270 million (the average for 2000-2005) for soil remediation is included in the national budget, which is 10% of the entire national budget for environmental policies. The share of financing by market parties is increasing steadily.
- Together with the UK, Belgium and Denmark, the Netherlands spends the highest amount per resident on soil remediation: €20 (EEA, 2005).

Developments in soil policy in the Netherlands

During the period from 1980 to the present, soil policy in the Netherlands has repeatedly sought a new balance between soil protection – to benefit people, plants and animals – and providing space for societal activities (*Figure 2*).

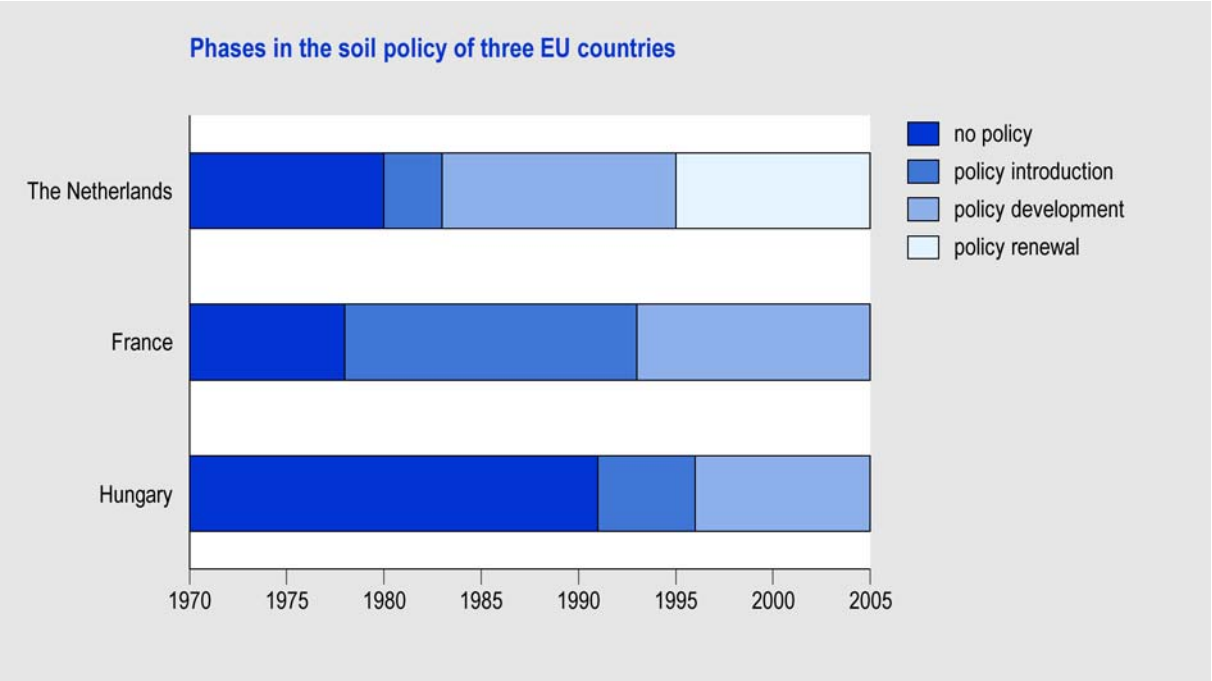

Figure 2 Soil policy over time in three EU countries (Veenman, 2006).

1980-1995: introduction and policy development

The soil remediation policy in the Netherlands began 25 years ago with the discovery of a large-scale soil contamination problem while a housing project was being built in the town of Lekkerkerk. In 1983, soil remediation was given legal status as part of the Interim Soil Remediation Act. In 1987, the Soil Protection Act went into force; soil remediation was legally anchored in this Act in 1994. During the period until 1995, the principle of the 'polluter pays' was introduced and applied by means of legal procedures. After initial success, this approach stagnated and the first steps were taken to stimulate the private funding of soil remediation. In addition, legal norms were scientifically established (intervention values), above which remediation was mandatory. During this period, the point of departure was to make contaminated soils completely clean, and in this way to once again make every form of land use possible (multifunctional remediation).

1995-2003:1st phase of policy renewal

Due to growing understanding of the magnitude of the soil remediation problem and the high costs of multifunctional remediation, during this period there was a transition to a function-oriented remediation approach. This meant that the remediation requirements became dependent on the specific use of the soil (for example, a playground requires a cleaner soil than an industrial area). The remediation norms (criteria) for the new approach were established by the national government and were applied by competent authorities, provinces and large cities.

2003-present: 2nd phase of policy renewal

The most recent policy development, which began in 2003, focuses on i) a simplification of administrative procedures to accelerate the process of dealing with contamination in

standard situations, ii) more flexibility for local authorities in regulating the 'movement' of diffusely contaminated soil and iii) the integration of soil protection with other policy areas (VROM, 2003). The Soil Quality Decree (not yet formally enacted) contains regulations for municipalities on how they can responsibly 'move' soil and dredgings. To this end, within frameworks established by the national government, they are allowed to establish their own norms for moving soil and dredgings to be processed elsewhere. Such norms must be approved by means of local participation and democratic decision making. The national government supervises this policy renewal process (see www.bodemambities.nl, www.biells.nl and Zijp, 2005).

Integration

The following list contains a number of aspects of the integration of soil protection with other policy areas in the Netherlands. This summary is not exhaustive:

- The Soil Policy Letter establishes sustainable soil management as a central priority and refers to the early involvement of soil policy in regional planning and decisions as an important policy theme (VROM, 2003). The operational unit Soil+ supports a range of pilot projects. On behalf of the Ministry of Housing, Spatial Planning and the Environment (VROM) the Association of Netherlands Municipalities is implementing the Routeplanner BodemAmbities (Soil Ambitions) project that describes the process by which local authorities can achieve a regionally oriented, sustainable soil policy.
- A number of provinces have published a 'soil vision' that expands soil policy to include themes such as archaeology, agriculture and underground energy storage. In the multiyear programme of the Agenda Vitaal Platteland (Agenda for a Vital Countryside), all provinces are requested to publish a similar soil vision (LNV, 2006).
- The new Spatial Planning Act explicitly stipulates that the subsoil must be included in zoning plans.
- There is a strong interaction between soil, surface water and ground water in the Netherlands. Soil policies will therefore play an important role in implementing the Water Framework Directive.
- Cross compliance is an EU instrument that can be used by Member States to link soil use to a precondition for income support to farmers.
- The Water Assessment (2003) requires water to be included in regional planning and decisions from the very beginning (including zoning plans). Soil as a water storage compartment plays an important role in this assessment. However, the 'water paragraph' is part of the explanation of any such plan and as such is not legally binding.
- The national government offers aid to local authorities so that they can improve how they take account of the various functions and qualities of the soil during regional development (VROM, 2006b). Examples include the so-called layer approach (see: www.ruimtexmilieu.nl) and the stimulation programme for regional planning and the subsoil.

Existing policies and new requirements from the SFD

Table 2 provides a summary of soil problems in the Netherlands. The table and the following text explain which existing policies already provide soil protection and where possible new policy will be required under the SFD.

Table 2: Summary of soil trends and soil policy in the Netherlands and the global effect of the Soil Framework Directive

Problems	*Trend*	*Policy in the Netherlands*	*SFD*
Local historical chemical contamination: In the Netherlands, many sites were contaminated by a wide range of activities in the past. According to estimates, there are 45,000 sites with severe soil contamination (MNP, 2006c).	The remediation task in the Netherlands is known and the progress in remediation is being monitored. During the period 2000-2004, 5,188 remediations were completed.	The Dutch policy is set down in the Soil Protection Act and in subsequent elaborations of this Act in decrees and regulations. The aim is to complete the national remediation operation in 2030. The current rate of completion appears to be insufficient to achieve this aim.	Establish strategy, aims and remediation programme.
Decline in organic matter: The Netherlands has nearly 300,000 hectares of soils with a high (> 10%) organic matter content; these are primarily peat soils and bog soils (see *Figure 3*). These soils are susceptible to oxidation, causing the organic matter content to decline, which in turn results in soil subsidence and CO_2 emission.	In most regions of the Netherlands, the organic matter content appears to have stabilized since 1972, but hard data is lacking In peat soils the supply of organic matter has declined due to drainage. In the peat meadow areas in the West of the Netherlands, the ground level subsides an average of 1 cm per year.	There is no specific policy to retain organic matter in soils. In peat meadow areas, soil subsidence due to the oxidation of peat is an acknowledged problem for which long-term solution strategies are being formulated in policy memorandums of various authorities. A crucial instrument is the so-called water table decree of the water boards, which stipulates the level of the water table in an area for a period of about ten years.	Identify risk areas, draw up and implement action plans.
Wind erosion: Areas that are susceptible to wind erosion are the sandy soils in the eastern part of the province of North Brabant and the reclaimed peat lands in the provinces of Groningen and Drenthe. Wind erosion is a small-scale phenomenon in the Netherlands; in the reclaimed peat lands, wind erosion only occurs a few days per year during dry spring or autumn weather.	Unknown. Small-scale phenomenon.	Since 2003, legislation concerning wind erosion has been withdrawn (HPA, 2003b). Soil coverage in the winter with crops, crop residues, straw or manure has become a general practice in the areas suceptible to wind erosion (flower bulb regions and the reclaimed peat lands).	Idem.
Water erosion: Water erosion is a problem in the southern, hilly part of the Netherlands. Based on long-term measurements, De Roo (1991) estimates the rate of erosion in the South Limburg region at 0.8-1 cm per year.	Unknown. Water erosion is not measured on a structural basis.	In the province of Limburg, agricultural and horticultural decrees are used to control erosion (HPA, 2003b; PT, 2004). In order for farms to qualify for income support as part of the Common Agricultural Policy, they must meet the requirements of these decrees (cross compliance).	Idem.
Compaction: Fine sandy soils and light loam soils are suceptible to compaction. Current quantitative information about the problem of soil compaction is lacking.	Unknown. Compaction is not monitored.	There is no policy on the theme of soil compaction. Compaction receives attention in agricultural practice because agricultural machinery is becoming increasingly heavier. The soil-compacting effect of this machinery is, for example, reduced by lowering tire pressure.	Idem.
Salinization: Salinization caused by irrigation is not present in the Netherlands. However, in the polders in the West of the Netherlands, there is upwelling of brackish groundwater. At the present time there is sufficient freshwater available to stabilize the interface between brackish water and freshwater. The current loss of production caused by excessively saline conditions is low (Riza, 2005).	Upwelling of brackish water can increase in the future due to rising sea levels, soil subsidence, groundwater extraction for agriculture and periods with a reduced precipitation surplus.	The water boards, which are responsible for regional water quality and quantity, have developed detailed procedures to keep the salt content of polder water as low as possible.	Idem.

Table 2 Continued

Soil sealing: Soil sealing takes place due to the construction of housing, offices, industry and roads. In the Netherlands, approximately 14% of the land area is built up or partially built up (CBS, 2003). Within the EU, only Belgium has a higher percentage.	Soil sealing is increasing due to the continual increase of the built-up area in the Netherlands. See also *Table 3*.	There is little or no policy that focuses explicitly on limiting soil sealing. However, in Dutch spatial planning and water policy, there are various policy themes that contribute to a sparing and deliberate management of the soil and subsoil. In a more indirect fashion, this contributes to mitigating the increase in soil sealing. *See main text.*	Take suitable measure to limit soil sealing or to mitigate its effects.
Diffuse contamination *Heavy metals*: In agricultural soils, there is a net accumulation of heavy metals due to the use of fertilizers. At present, this has not led to functional limitations for agriculture or to problems with food quality. Exceptions are the river forelands and areas where there has been a long period of diffuse contamination (such as the De Kempen district and the western peat meadow region; this is approximately 8% of the total agricultural area). Agriculture is the primary source of registered emissions of heavy metals to the soil (Dutch Emission Register, 2005). *Crop protection agents:* Weighted accorded to daily intake, 1.7-3.5% of the agricultural products grown in the Netherlands contain residues of crop protection agents that exceed the residue norm. At approximately half of the measurement sites in 2003-2004, one or more crop protection agents were found in concentrations greater than the maximum allowable risk level (MNP, 2006a).	In 2003, the loading of agricultural soils with heavy metals declined by 40% (zinc), 50% (copper) and 80% (cadmium) with respect to 1990 (Dutch Emission Register, 2005). Nevertheless, heavy metals are continuing to accumulate, but the time periods during which this can lead to norm exceedances are relatively long. The environmental load of the soil ecosystem due to crop protection agents declined by 78% between 1998 and 2005 (MNP, 2006a).	Since 2001, legislation has limited the input of zinc and copper to soils by setting a maximum on the content of heavy metals in animal feeds. The input of cadmium has declined by reducing artificial phosphate fertilizers (by means of the generic fertilization policy) and by using fertilizer from cleaner phosphate ore. Due to the requirements of the Water Framework Directive, specific aims (yet to be established) for high priority substances in water could result in policy that requires further reductions of diffuse soil contamination. The policy on crop protection agents comprises, among other things, regulations for approval, limitation of emissions, norms for residues on or in crops and stimuli for integrated crop protection.	Avoid accumulation of substances that harm soil functions or lead to significant risks for human health and the environment.
Over-fertilization with nutrients: Due to over-fertilization with artificial fertilizer and animal manure, between 1960 and 2000 there was an annual accumulation of 60-100 kg P_2O_5 per hectare of agricultural soil. Consequently, approximately 55% of the agricultural soils in the Netherlands are saturated with phosphate (Schoumans, 2004).	In 2010, the surpluses of nitrates and phosphates on agricultural soils are expected to be 50% and 70% lower, respectively, than in 1990 (MNP, 2006d). As a result, phosphate will accumulate at a slower rate.	The implementation of the European Nitrate Directive in the Netherlands limits nitrate fertilization from animal manure to 170 kg/ha (or 250 kg/ha for dairy farms with a threshold provision) and a norm for total nitrogen. These norms aim to satisfy on average the nitrate norm of 50 mg/l in groundwater (European Nitrate Directive). The Netherlands is aiming for a balanced phosphate fertilization in 2015 (Tweede Kamer, 2005). By setting aims for surface water quality (not yet established), the Framework Directive can also steer policy towards reducing the soil load with phosphate and nitrogen.	Avoid accumulation of substances that harm soil functions or lead to significant risks for human health and the environment.

Table 2 clearly shows that existing policy is successfully steering towards the remediation of contaminated soils and the reduction of diffuse soil contamination. The problem of salinization is manageable for the time being, erosion takes place only on a small scale and compaction is in fact still a subject for research. The exact linkage of the SFD with existing policy will be discussed later on in this evaluation. There are two soil problems referred to in the SFD that Dutch soil policy does not address directly: the loss of organic matter and the increase in soil sealing. A further explanation of these problems in the Netherlands is provided below.

Loss of organic matter

Approximately 290,000 hectares of peat soils are present in the Netherlands, which is approximately 7% of the total land area of the country. A large percentage of these soils are located in reclaimed areas (polders) below sea level and are being used as pastures. These 'peat meadow areas' are internationally important cultured landscapes (VROM 2006b). To make modern and economically viable agriculture possible, the water table is maintained at approximately 60 cm below ground level. The peat soil that is drained in this way oxidizes and disappears as CO2 into the atmosphere, which results in local soil subsidence of more than 1 cm per year. The CO2 emission amounts to more than 4 Mton CO2 equivalents per year, approximately 2% of the total annual greenhouse gas emissions of the Netherlands (Brandes et al., 2006). The TNO Institute expects that in some areas this will lead to a subsidence of 50 cm in 2050 compared to the present (TNO, 2003; *Figure 3*).

In the Northeast of the Netherlands, the disappearance of organic matter is not as apparent in terms of soil subsidence, but instead from the fact that soils that were previously classified as peat soils or bog soils have been classified otherwise on recent soil maps. For example, in the Schoonebeek area approximately 46% of the soils that were classified as peat soils in 1980 were no longer classified as such in 2003 (Pleijter, 2004). For bog soils, there has been an even greater decline of 73%. A similar study was also conducted by the provinces of Groningen, Drenthe and Overijssel (De Vries, 2003), which indicated that 48% of the peat soils on the soil map could no longer be classified as such.

The problem of peat soils sketched out above is unique for the Netherlands and parts of northern Germany. The problem is acknowledged in various policy memorandums of the national government, provinces and water boards, and the conservation of peat meadows by reducing soil subsidence has been established as an aim. Concrete measures to counteract soil subsidence are being currently applied to only about 5% of the total peat meadow area (MNP, 2006b; *Figure 3*). The most important measure is raising the water table. This discrepancy between the amount of attention in the policy memorandums and the implementation of concrete measures illustrates the complex weighing of interests that takes place in these areas and the social costs – which are often high in the short term – that result from changes in the water table.

Soil sealing

In the Netherlands, approximately 14% of the total land area is built up, partially or completely (CBS, 2003); some 77% of this built-up area is covered by residential areas, industrial areas or greenhouses. Due to the influence of Dutch regional planning policy, the Netherlands has a relatively open and non-built-up landscape, despite high pressure on land use. This has been achieved by bundling economic activities, infrastructure and urbanization (*Figure 4*). This bundling of activities and the great demand for housing have led to high land prices and compact housing construction. In industrial areas, there is much less

attention to compact construction. This is because the land is sold at a much lower price to stimulate local economic development.

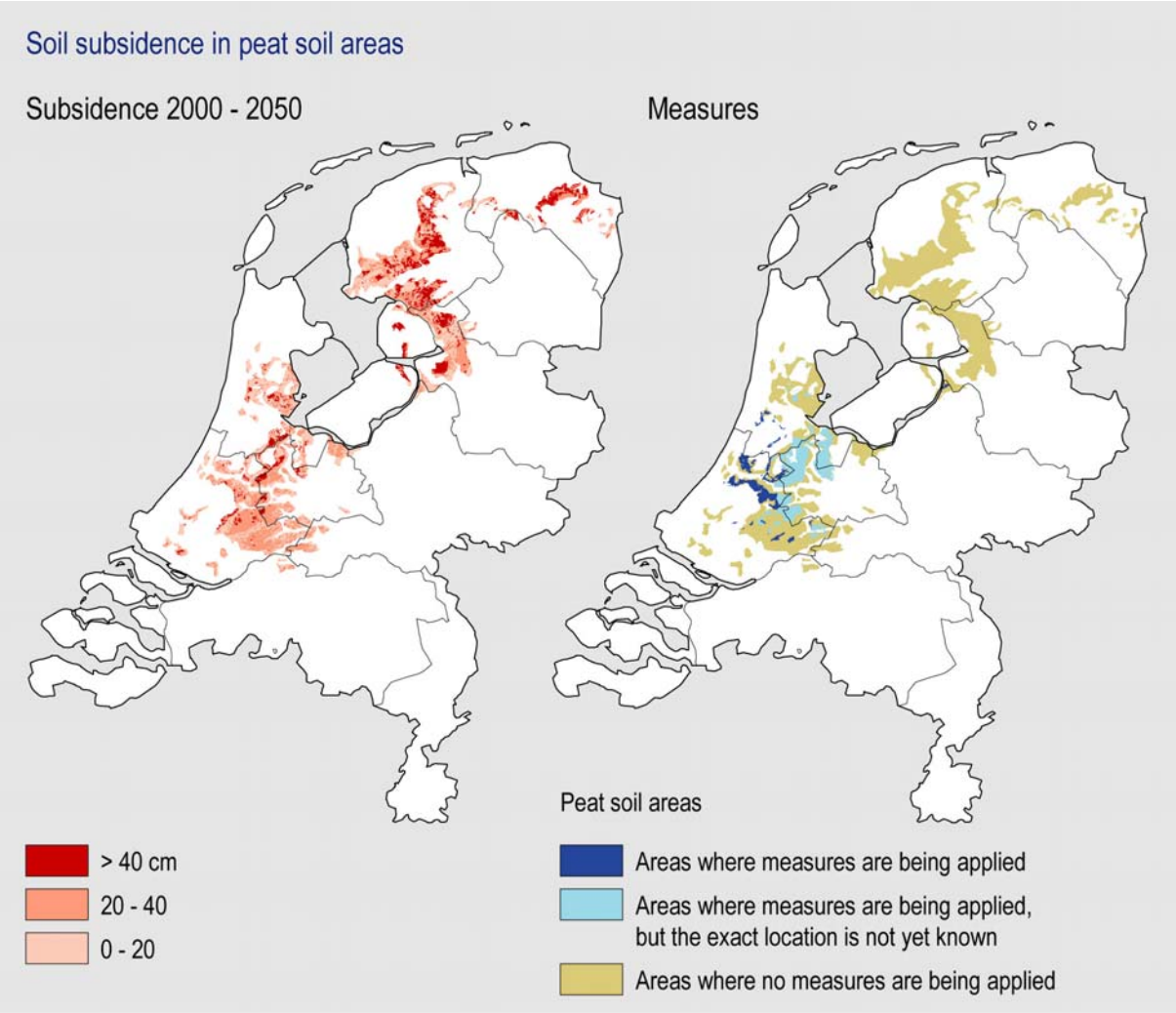

Figure 3 Expected soil subsidence in peat soil areas until 2050 (left) and areas where there are measures to counteract soil subsidence (right) (Source: MNP, 2006b).

Due to the increase in the population, the number of households and the number of employed individuals, both the built-up area and the level of soil sealing in the Netherlands have increased (*Table 3*). The use of space by housing and employment in the Netherlands increased somewhat less during the period 1981-2000 than the increase in the number of residents and working individuals, and much less than the number of households.

Dutch cities have a somewhat higher population density than the European average, certainly if the relatively large area of harbour and airport area is taken into account in the two largest urban agglomerations. In the United States, the urban densities are only 20-30 % of those in Europe; in contrast, Japan has densities around 130 % higher than those in Europe (Demographia, 2006).

Table 3 Developments in demographics and spatial use in the Netherlands (MNP, 2006c)

Demographic developments (in millions)	**1981**	**2000**	**Percentage change**
Population	14.2	15.9	12%
Households	5.1	6.8	33%
Employed individuals	4.8	6.9	44%
Space occupied (km2)			
Residential areas	1,997	2,211	11%
Highways and railroads	1239	1204	*
Industrial areas	594	820	38%
Greenhouses	139	150	8%

** discontinuity due to new measurement method; the spatial use actually increased during this time period*

Measures to mitigate soil sealing

The Netherlands does not have any consistent policies or mandatory measures that focus explicitly on preventing or mitigating soil sealing. The 'de-linkage' of paved area, where rainwater no longer enters the wastewater system but infiltrates locally into the surface water, is one of the few concrete measures that is being applied on a large scale in new construction (TNO, 2006).

However, there are consistent policy themes in Dutch regional planning and water policy that contribute to a sparing and careful approach to the soil and subsoil. This policy contributes in a more indirect fashion to the mitigation of soil sealing (TNO, 2006):

- conservation of open space, so-called national buffer zones and areas with restrictive policy (see also MNP, 2006d);
- the interimwet stad-en milieubenadering (Interim Act on Urban Environmental Policy) (Staatsblad, 2006) provides municipalities with the possibility of deviating from statutory norms in areas such as soil policy and noise pollution, if this leads to sparing and efficient use of space and an optimal environmental quality;
- sparing and efficient use of space by restructuring areas such as former harbour, industrial and military terrains ('brown fields') as part of urban renewal;
- taking account of water in spatial plans and decisions by means of the mandatory Water Assessment;
- by means of the Land Use Act, future users will be obligated to contribute to the costs of facilities such as water storage capacity and natural habitats.

These initiatives affect provincial and municipal policy memoranda and zoning plans in various ways and various degrees.

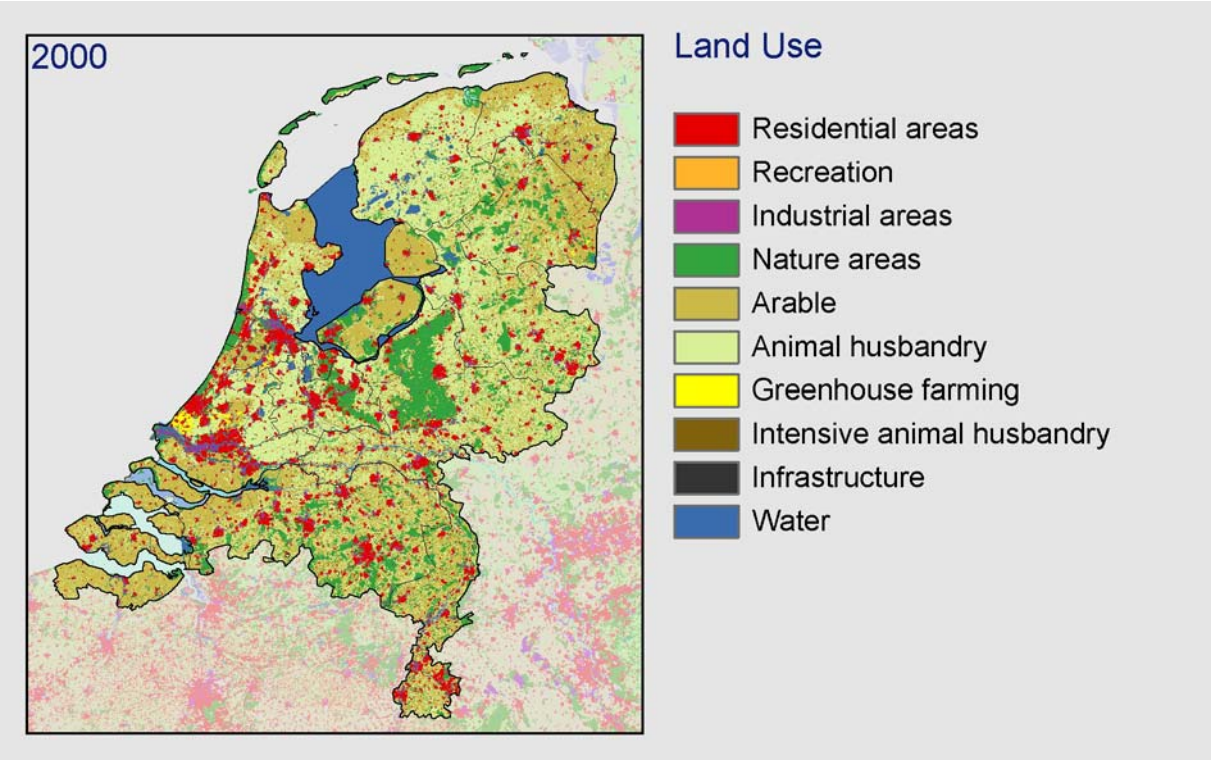

Figure 4 Land use in the Netherlands and adjacent regions of Germany and Belgium in 2000 (source: MNP).

3. The linkage of the Soil Framework Directive with Dutch policy

The comparison of Dutch policy results in a list of findings that are summarized in this section. These findings can be used by the Netherlands to propose clarifications or changes to the SFD or to conduct more in-depth research about the linkage of the SFD with Dutch policy. *Appendix 1* specifies these findings for each article of the SFD.

General principles

1. Many basic principles of the SFD are comparable with those in Dutch soil policy. This concerns the principles that soil contamination must be prevented, that past contaminations must be remediated, that the approach to soil problems must take place at the most suitable geographical and administrative level for a Member State, that specific function (ecological and social) of the soil can be taken into account and that there must be a sustained effort to integrate soil protection with other areas of policy.
2. The SFD does not establish soil norms and is primarily a guideline that prompts the Member States to make plans in this area. The SFD potentially provides a great deal of flexibility because the aims, and the time periods in which the aims must be accomplished, can be determined by the Member States themselves.
3. The Directive comprises many general points of departure. These provide a great deal of policy flexibility, but they can also be interpreted differently by local authorities. Conceivably, third parties can appeal to the courts for an unequivocal interpretation of SFD obligations. This could lead to more uniform policy and a limitation of policy flexibility.
4. In principle, the SFD has a broad scope; aspects not explicitly excluded by the Directive could still fall under the Directive. For example, a large group of dangerous substances and risk areas are potentially subject to the SFD, as well as diffuse contamination in the rural area and its prevention.
5. The SFD does not establish any soil norms, but does refer to a possible future harmonization by the Commission in dialogue with representatives of Member States (comitology, see *Appendix 1*, article 19 (2,3)) of methods for the evaluation of risks for soil contamination and the adaptation of the very general elements (characteristics) that must be taken into account when identifying risk areas (see *Textbox*). While the SFD assumes that the Commission can interpret this authority broadly, the elements do not provide the possibility to include limit values, for example. Adaptations that take place via 'comitology' are reviewed by the European Parliament and the Council, considering aspects such as subsidiarity and proportionality ('regulatory procedure with scrutiny').
6. The Directive defines soil as everything between the earth's surface and bedrock, where groundwater is explicitly excluded (art. 1). The affect of the SFD therefore concerns the solid phase of matter between the surface and the bedrock, which in the Netherlands lies at a great depth. The water in the saturated zone of the soil falls under the effect of the Water Framework Directive (WFD). The SFD and the WFD therefore exclude each other. Nevertheless, there appears to be a great deal of uncertainty among actors concerning the extent to which water-saturated soils, lake and river bottoms, and deep salt layers fall under the SFD.

European standards for evaluating soil contamination: the current situation

Soil contamination became part of the European research agenda relatively recently. The EU project CARACAS (1995-1998) mapped out the European state-of-the-art concerning the evaluation of soil contamination. The CLARINET project (1998-2001) established a shared philosophy on Risk-based Land Management, which was adapted to dealing with contaminated soils. More recently, the HERACLES research framework (Human Health and Ecological Risk Assessment for Contaminated Land in EU Member States) was initiated by the European Commission Joint Research Centre (JRC). The project aims to survey which evaluation methodologies (models, norms) are currently being used by Member States as part of their soil contamination policy. It will then determine the elements in these methods that are evidently suitable for standardization in Europe with the aim of policy harmonization, such as lists with substance properties and allowable exposure to non-carcinogenic substances. The HERACLES framework does not aim for an identical evaluation of soil contamination everywhere in Europe or to establish and enforce a single list with soil norms for all of Europe. The scientists who participate in HERACLES believe that the geographical and cultural differences in Europe are too large to achieve such standardization.

7. The SFD obligates the Member States to require potential polluters to take precautionary measures. Dutch environmental law addresses this issue by prescribing measures in permits and general regulations. In addition, there is the principle of 'due care', a broad concept under which precautionary measures can be defined. The due care obligation is included in Dutch legislation such as the Soil Protection Act, the Environmental Protection Act and the Pesticide Act. In the legislation concerning agricultural fertilization, this due care principle appears to be given shape by means of good agricultural practices. It is unclear whether or not these 'due care obligations' are suitable to serve as a form of implementation of the precautionary measures provision in the SFD.
8. The SFD obligates Member States to take measures to prevent the accumulation of dangerous substances in the soil (art. 9). This obligation is possibly addressed insufficiently by Dutch legislation. This applies, for example, to the accumulation of heavy metals from manure in the soil (Table 2). Phosphate and nitrate from manure are not classified as dangerous substances. Here only the precautionary principle applies (Art 4, see also *finding 7*)

Soil contamination and remediation

9. The remediation policy referred to in the SFD comprises establishing a national remediation strategy, setting a remediation aim, establishing implementation programmes and a financing structure for these programmes as well as reporting progress on remediation. All these steps are in accordance with current Dutch policy.
10. The SFD (art. 13 (2)) requires remediation while 'taking account of its current use and approved future use'. This is in accordance with the function-oriented remediation aim of the Dutch Soil Protection Act (art. 38).
11. Dutch soil quality policy maintains a list of about 120 chemical substances. This list comprises environmentally hazardous substances that can be encountered in soil (and groundwater) contamination. Consequently, this list is much shorter than the list of dangerous substances to which the SFD refers.
12. Dutch policy focuses on flexible implementation of soil remediation and the reuse of lightly contaminated soil in regional-urban development. In this way, the Soil Quality Decree makes it possible to use diffusely contaminated soil on clean or cleaner soil, as long as improvement takes place elsewhere in the region (standstill at the regional level). In special cases and under specific conditions, severely contaminated soil can also be re-

used within a region. This flexible approach could be in conflict with the SFD, which states that the deliberate or non-deliberate introduction of dangerous substances must be prevented (art. 9, see also *finding 8*).

13. The Netherlands has largely complied with the obligation to administer sites where potentially contaminating activities take place as part of the 'national inventory' (www.bodemloket.nl) or other EU reporting obligations (the Integrated Pollution Prevention and Control Directive and the European Pollution Release and Transfer Register Directive).
14. The SFD (art. 13(2)) requires remediation so that 'the contaminated site … no longer poses any significant risk to human health or the environment'. This could be a more stringent formulation than used by the Netherlands in the Soil Protection Act, which states that 'Soil remediation must be implemented in such a way that … the risk for people, plants and animals … is limited as much as possible.'
15. During transactions involving suspected locations, the SFD requires a soil status report to be drawn up (art. 12). The Netherlands does not have this obligation as such. However, there are a number of activities that touch on this obligation. The preamble (art. 25) to the SFD states that the intended aim of the status report is to 'assist the rapid identification of contaminated sites'. The Netherlands has largely completed this inventory. The soil status report from the SFD therefore appears to have little added value for the Netherlands.

Risk areas

16. The SFD introduces a new concept in soil policy: 'risk area' (art. 6). The Directive does not make any distinction between large or small areas, and if there are demonstrable risks of soil degradation, then the Member States are obligated to identify such areas (see also *finding 9*).
17. Of the soil degradation processes referred to in the Directive for which risk areas must be identified, only the loss of organic matter in peat soil regions in the Netherlands is a large-scale phenomenon. Although the SFD does not explicitly refer to peat soil areas, there are indications that they potentially fall under this Directive (see *Annex 1*, art. 6(1)).
18. The identification of risk areas is an objective obligation. If the Dutch peat meadow areas are important for retaining CO2 and if there is a loss of organic matter in these areas, then they must be identified as risk areas, and plans must be formulated and implemented to reduce the risks.
19. Such a planning process is taking place in the Netherlands (national government, provinces, water boards), but implementing these plans in concrete terms to raise water tables to prevent soil subsidence and loss of organic matter is administratively complex; consequently it is a slow process which is difficult to plan.

Soil sealing

20. The SFD requires Member States to take 'appropriate measures' to limit and mitigate the effects of soil sealing. There is little or no policy in the Netherlands that explicitly addresses this issue.

21. It is difficult to specify suitable measures to limit soil sealing in a European context, which is characterized by extremely large differences in soil types and land use (see *finding 3*).

Integration of soil protection in sectoral policy

22. The SFD requires soil protection to be included in the development of sectoral policy (art. 3). This 'policy integration' provision is included in various aspects of Dutch environmental law and offers the possibility to take account of soil protection. This concerns, for example, i) the process of weighing out pros and cons that takes place as part of 'good urban and regional planning', 'good agricultural practice', 'the interest of protecting the environment' and ii) instruments such as environmental effect reporting, the Water Assessment and the policy implementation guide for 'planning with the subsoil in mind'. However, the SFD also refers to a number of sectors (such as transport and tourism) for which it is unclear if they have been included in soil policy in the Netherlands. In summary, it is unclear whether the existing policy in the Netherlands fully complies with the integration obligation from the SFD.

Reporting to the Commission

23. The reporting obligation of Member States to the Commission consists of making a summary of initiatives taken, applied risk evaluation methods and inventoried sites (or potential sites) with soil contamination. This appears to lead to little additional administrative burden. It is unclear whether the required reporting about the effectiveness of the measures and risk areas will require a monitoring effort.

Public information

24. The SFB refers to the necessity to 'make public' the information about the importance of the soil and to ensure public participation in the decision making about the national soil remediation strategy and programmes of measures for risk areas. In this regard, the SFD refers to the existing European obligations under the Aarhus convention to provide access to environmental information, public participation and access to the courts. Concerning regional plans, which include the identification of risk areas, the Netherlands has a public participation procedure. It is unclear, however, what public participation in the Dutch soil remediation programme (or strategy) implies.

Does the SFD have consequences for present and future spatial planning in the Netherlands?

During the course of the present evaluation, a number of practical questions were asked, see *Table 4*. These questions are wide-ranging and focus on both the present and the future. To take climate change as an example, in a scenario involving rising sea levels caused by climate change, in the near future the Netherlands will have to deal with increasing upwelling of brackish water (salinization) and will have to make more space for water. The SFD touches on these issues. To protect soil functions, it now requires limiting salinization, and over the long term, it will require raising the water tables in reclaimed areas (polders). The SFD allows a Member State to change the function of an area, whereby the soil protection regime also changes. Tentatively speaking, the SFD therefore appears to offer the Netherlands sufficient flexibility to adapt Dutch spatial planning schemes to rising water (including the rising sea levels).

Tabel 4 illustratie van praktijkvragen over de KRB

Question:	Tentative answer:	Explanation in Appendix 1:
Is 'space for water' – even if slightly contaminated – allowed?	Yes, it appears to be allowed	Art 3 and 5
Will the water table in peat meadow areas have to be raised?	Yes, over the long term	Art 3 and 5
Will salinization that threatens agriculture have to be limited?	Yes, if the soil function is agriculture	Art 1 (1)
Will the effect of soil sealing caused by a new road have to be limited?	Yes, possibly	Art 4 and 6
Will the Netherlands be obligated to build compactly in the future?	No, probably not	Art 4
Will windblown sand in nature reserves have to be prevented in the future?	No, probably not	Art 1, 3 and 4
Does the SFD require additional fertilizer/manure policy for phosphate and nitrogen?	No, probably not	Art 8 (1, 2, 3)

The evaluation answers the questions from *Table 4* in general terms. This is because the SFD provides a great deal of policy flexibility and it is not always clear how SFD texts must be interpreted. As a result, the meaning of the SFD in concrete situations is not immediately obvious. For the Netherlands, it is important during the decision making phase of the SFD at the European Commission to acquire understanding of the national flexibility in these types of concrete situations. At the same time, it is important to investigate how the SFD can be implemented optimally in the Netherlands, while taking account of its potential effect in policy areas such as regional planning, agriculture and water policy. Indeed, the implementation of the European Air Quality Directive in the Netherlands has demonstrated that a Member State can determine itself to a large extent how much policy flexibility remains following implementation in national legislation (Koelemeijer et al., 2005).

4. Conclusions

This evaluation focused on three questions:

1. What are the soil problems in the Netherlands?
2. What is the existing soil policy in the Netherlands doing about these problems?
3. How does the proposed SFD link up with that existing policy?

Answer 1

The soils in the Netherlands can be classified as 'man made soils'. The intensive land use in the Netherlands, certainly in the past, has not always been sustainable. Stubborn soil problems in the Netherlands are local soil contamination caused in the past, the current diffuse contaminations with substances such as heavy metals and phosphates and the soil subsidence in the peat meadow areas. Salinization due to climate change and sea level rise can become a large-scale problem in the future.

Answer 2

Soil protection was placed on the Dutch policy agenda relatively early, which led to the enactment of the Soil Protection Act in 1987. In the meantime, a great deal of Dutch policy has been established that focuses upon sustainable soil management, which has led, among other things, to progress in remediating soil contamination, a decline in the contamination load on the soil (including diffuse contamination) and the regulation of local erosion and salinization problems. Dutch policy also pays attention to soil subsidence in peat soil areas, but the legal pressure to take measures is limited.

Answer 3

In principle, the SFD has the same structure as the recently renewed soil policy in the Netherlands. This applies to linking the level of soil protection to the changing functions of the soil and the possibility to delegate the enactment of policy aims and measures to local authorities. Because the SFD is a legal instrument, it can make the implementation of a number of aspects of Dutch soil policy more mandatory. In this regard, we have drawn the following conclusions, listed thematically:

- Together with several other countries within the EU, the Netherlands is a leader in the area of soil remediation. Consequently, the SFD does not eliminate a policy deficiency in the Netherlands. Many other Member States do have such a policy deficiency, however. This situation creates opportunities to export Dutch expertise in this area.
- Preventing organic matter loss in peat soil areas (from the viewpoint of reducing soil subsidence and CO2 emissions), mitigating soil sealing and reducing diffuse soil contamination in the rural area are topics that are already on the Dutch policy agenda. Due to the SFD, the process of making and implementing plans on these themes and integrating these plans in other policy areas will acquire a more mandatory character.
- The SFD refers to a number of themes that are important in EU countries, but have not been addressed by Dutch policy. Some themes are not relevant in the Netherlands (landslides), are local and small scale (erosion), or are still in the policy exploration phase (such as soil biodiversity and compaction). The SFD can strengthen the research and increased awareness on the latter themes and appears to allow sufficient flexibility to the Netherlands to determine its own policy if necessary.

- In the Netherlands, salinization is largely a groundwater problem (often at deep layers), which therefore appears to fall outside the effect of the SFD. When salinization begins to threaten soil functions, for example agricultural production, then it falls under the effect of the SFD.

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Appendix: article-by-article explanation of the linkage of the SFD with Dutch policy

Note: Articles 17,18(3) and 20-26 are not included in this table. For the full text of the Directive, refer to: http://ec.europa.eu/environment/soil/index.htm

Article	**Linkage with Dutch policy**
Art (1) subject, matter, scope: This Directive establishes a framework for the protection of soil and the preservation of the capacity of soil to perform any of the following environmental, economic, social and cultural functions: (a) biomass production, including in agriculture and forestry; (b) storing, filtering and transforming nutrients, substances and water; (c) biodiversity pool, such as habitats, species and genes; (d) physical and cultural environment for humans and human activities; (e) source of raw materials; (f) acting as carbon pool; (g) archive of geological and archeological heritage. To that end, it lays down measures for the prevention of soil degradation processes, both occurring naturally and caused by a wide range of human activities, which undermine the capacity of a soil to perform those functions. Such measures include the mitigation of the effects of those processes, and the restoration and remediation of degraded soils to a level of functionality consistent at least with the current and approved future use.	*On the one hand,* the text of the SFD links up with the basic principles of Dutch soil policy. It explicitly refers to ecological and economic functions (agricultural, forestry, housing and – less clearly – industry) and also states that measures must be consistent with the current and approved future use of the soils. This is in accordance with Dutch policy; finding a balance between social activities and soil protection to benefit people, plants and animals is the point of departure of the renewed soil policy (VROM, 2003). The Soil Quality Decree (still in the process of decision making) explicitly refers to the relationship between the function of the soil (nature/agriculture, housing, industry) and the desired soil quality. *On the other hand,* the functions referred to above are very broad and go somewhat further than those referred to in Dutch policy. They are also described in fairly general terms, which leave room for interpretation. This room for interpretation is regularly referred to in the supplement to the legal text (Art. 4, 5, 8 and 9). The risk approach concerns risks with an eye to significant effects on these functions, but it also refers to risks for human health and the environment (Art. 13 on remediation aims).
Art (1) subject, matter, scope: This Directive shall apply to soil forming the top layer of the earth's crust situated between the bedrock and the surface, excluding groundwater as defined in Article 2(2) of Directive 2000/60/EC of the European Parliament and of the Council.	Article 1 of the Directive can be interpreted as defining soil as the entire solid phase between the surface and bedrock. This definition does not interfere with the Soil Protection Act in the Netherlands, which defines soil in Article 1 as: "The solid portion of the earth containing liquid and gas components as well as organisms." The water in the saturated zone of the soil (the groundwater) is explicitly excluded. In COM 2000/60 EC (the Water Framework Directive) groundwater is defined as "all water which is below the surface of the ground in the saturated zone in direct contact with the ground or subsoil." Nevertheless, there is still a great lack of clarity about the extent to which saturated soils, lake or river bottoms and deep salt layers in the subsoil fall under the SFD.
Art 2 (1) definitions: 'sealing' means the permanent covering of the soil surface with an impermeable material;	In the Netherlands defined as 'hardened surface', for construction, paving, etc.
Art2 (2) definitions: 'dangerous substances' means substances or preparations within the meaning of Council Directive 67/548/EC and Directive 1999/45/EC of the European Parliament and of the Council	'Dangerous substances' are defined in the Netherlands according to the criteria of Annex VI of Directive 67/548/EEC as CMR substances, meaning Carcinogenic (causes cancer) and/or Mutagenic (induces changes in inherited properties) and/or Reprotoxic (toxic for future generations). CMR substances are listed in Annex I of Directive 67/548/EEC. Annex I lists approximately 8,000 such substances. The Working Conditions Act in the Netherlands requires protective measures for employees against exposure to CMR substances. The CMR evaluation will be given an important place in the new European risk management system for chemical substances: REACH. The list of substances used in Dutch soil policy is contained in the Regulations accompanying the Soil Quality Decree (version 15.09.06). The list used in the Netherlands (approximately 120 substances) is much shorter than the CMR list because the Dutch list is adapted to substances that are present in actual soil remediation situations. However, research into historical contamination in conformance with NVN 5725 does focus on all potentially dangerous substances.

Art 3 (3) integration. In the development of sectoral policies likely to exacerbate or reduce soil degradation processes, Member States shall identify, describe and assess the impacts of such policies on these processes, in particular in the areas of regional and urban spatial planning, transport, energy, agriculture, rural development, forestry, raw material extraction, trade and industry, product policy, tourism, climate change, environment, nature and landscape. Member States shall make public those findings.	The provision in Article 3 (3) refers explicitly to the obligation to take external integration seriously. As such, other sub-areas of Dutch environmental law also offer the possibility and/or impose the obligation to take account of the interests of soil (see the main text) such as the Water Assessment, the Environmental Effect Report, the considerations that are made as part of 'good regional planning', the considerations as part of 'the interest of protecting the environment', the broad weighing of interests that takes place as part of earth removal processes ('all interests involved with earth removal') and the codes for good agricultural practices that apply both to the use of pesticides and fertilizers (one part of the legislation on fertilizers also describes soil protection, the same applies to the review criteria for the admission of pesticides). However, Article 3 also refers to a number of sectors that are hardly referred to in Dutch policy regarding harmonization with soil policy. Via Article 3, the SFD may possibly lay a claim on regional planning, which is a sensitive point in the Netherlands. Whether or not the above-named integration of soil protection in other policy areas is sufficient to satisfy the requirements of the SFD must still be investigated.
Art 4 precautionary measures: Member States shall ensure that any land user whose actions affect the soil in a way that can reasonably be expected to hamper significantly the soil functions referred to in Article 1(1) is *obliged to take precautions* to prevent or minimise such adverse effects.	The SFD obligates the Member States to take precautionary measures regarding potential soil pollution. Dutch environmental law fulfils these obligations by prescribing measures in permits and general regulations. In addition, there is a 'due care obligation', a broad concept under which precautionary measures can be defined. The due care obligation is included in legislation such as the Soil Protection Act, the Environmental Management Act and the Pesticide Act. In the legislation on fertilizers, this due care obligation is given shape by means of good agricultural practice. It is unclear whether or not these due care obligations can serve to implement the precautionary obligation in the SFD.
Art 5: sealing For the purposes of preserving the soil functions referred to in Article 1(1), Member States shall take appropriate measures to limit sealing or, where sealing is to be carried out, to mitigate its effects in particular by the use of construction techniques and products which will allow as many of those functions as possible to be maintained.	The SFD requires Member States to take 'appropriate measures' to limit soil sealing or its effects. There is little or no policy in the Netherlands that explicitly focuses on preventing or mitigating soil sealing, and there is little or no attention for structures, construction methods, products and technologies that promote the conservation and protection of soil functions (TNO, 2006). However, there are various policy lines in Dutch regional planning and water policy that contribute to dealing with the soil and subsoil in a sparing and mindful fashion. The freedom of Member States to determine what is 'appropriate' is not unlimited. If the Commission believes that a Member State is not taking appropriate measures, then it can initiate an infringement procedure with the Court of Justice, which will then make a ruling. When complying with the concept of 'appropriate' at the local level, there is a greater risk of serious differences in local implementation and legal procedures initiated by citizens who believe that suitable measures are not being taken correctly. On the other hand, it does offer optimal possibilities to take account of local circumstances. This choice is left to the Member State.
Art 6 (1) Risk areas: Within five years from [transposition date], Member States shall identify the areas in their national territory, at the appropriate level, where there is decisive evidence, or legitimate grounds for suspicion, that one or more of the following soil degradation processes has occurred or is likely to occur in the near future, hereinafter "the risk areas": (a) erosion…. (b) organic matter decline brought about by a steady downward trend in the organic fraction of the soil, excluding undecayed plant and animal residues, their partial decomposition products, and the soil biomass (c) compaction…, (d) salinization…, (e) landslides…;	Article 6 obligates the Member States to identify the risk areas for soil degradation. Because the Directive does not refer to identifying the 'most appropriate areas', or similar formulation, we believe the Member States are obligated to identify all risk areas, large and small. The Court of Justice can review this aspect as part of infringement procedures. Of the risk areas that are referred to in the Directive (erosion, compaction, salinization, landslides and loss of organic matter), the latter risk is the most large-scale one in the Netherlands: - The document 'Common criteria for Risk Area Identification according to Soil Threats' on the website of the Commission does not give any formal status to the SFD. However, in the chapter 'organic matter decline', it does refer to soil with a histic topsoil horizon (arable grasslands >40% organic matter, which would include peat soils) as an area with an increased risk of loss of organic matter (… even when the proportional loss is relatively small…).

	- The impact assessment of the Commission (Chapter 2.2) does refer to soils with low organic matter content as a risk, but not to soils with higher organic matter content. However, it does focus attention on organic matter as a source of CO_2 and major store of carbon. Although not explicitly named, in this case it would be peat soils – at least in the Netherlands – which would be most relevant. - The identification of risk areas is an objective obligation. If the peat soil regions are important for CO_2 sequestration, and if breakdown of organic matter is occurring there, these regions must therefore be identified as a risk area.
Art 6 (1) Risk areas (continued) For the purpose of that identification, Member States shall, in respect of each of those soil degradation processes , use at least the elements listed in Annex 1 and shall take into account the effects of those processes in exacerbating greenhouse gas emissions.	The wording of the Commission is somewhat confusing: the final version of the soil strategy COM (2006)231 refers in a figure to the term Common *Criteria*, but in the explanatory text refers to 'common *elements*'. The preamble to the SFD (15) refers to a *common methodology*, but in the actual articles of the Directive this appears to concern the very general term *elements* (land use, organic matter percentage, soil type, etc.). In principle, the Commission can steer the Member States towards a more uniform identification of risk areas. However, the elements from Appendix 1 are so general and non-quantified that they appear too vague to be used to draw hard conclusions about which areas should or should not be identified. As they are now formulated, Member States only have to 'take account' of such elements (see also Art. 18 (1) and Art. 19 (3)).
Art 7: methodology: Member States may base the identification of risk areas on empirical evidence or on modelling. If modelling is used, the models must be validated by comparing the results on the basis of empirical data which have not been used for the development of the model itself.	This article has not been investigated further. For peat soils, there is unequivocal empirical evidence of subsidence and oxidation of peat (see main text).
Art 8 (1): Programmes of measures. Member States shall in respect of the risk areas identified in accordance with Article 6, draw up, at the appropriate level, a programme of measures including at least risk reduction targets, the appropriate measures for reaching those targets, a timetable for the implementation of those measures and an estimate of the allocation of private or public means for the funding of those measures.	Subsidence of peat, due to the loss of organic matter, is the on the political and policy agenda, especially in the peat meadow areas. However, in the Netherlands there has not been a quantitative conversion into policy measures, financing and a time schedule to achieve established aims, as proposed in Article 8 of the SFD. Note that the text of Article 8, in contrast to the Water Framework Directive, allows Member States to establish their own time period for achieving aims.
Art 8 (2). When drawing up and revising the programmes of measures pursuant to paragraph 1, Member States shall give due consideration to the social and economic impacts of the measures envisaged. Member States shall ensure that measures are cost-effective, technically feasible and shall carry out impact assessments, including cost-benefit analyses, prior to the introduction of the programmes of measures. Member States shall indicate in their programmes of measures how the measures are to be implemented and how they will contribute to achievement of the environmental targets established.	Cost-benefit analyses, which take account of the social-economic impact of measures, are becoming more and more common as part of the major investments that are required to realize changes in the water table in the peat meadow areas. In the Impact Assessment of the Commission (which describes the costs and benefits of proposed measures), the 'prescriptive' detail of the Article 8 (2) text is not present. It is only in Chapter 9 (Monitoring) that the monitoring of the 'extent, effects and efficiency of measures' is assumed to be relevant (without further explanation).
Art 8 (3). Where an area is at risk from different concurrent soil degradation processes, Member States may adopt a single programme in which appropriate risk reduction targets are to be set for all the risk identified together with the appropriate measures for reaching those targets.	The linkage of this article with Dutch policy has not been investigated any further.
Art 8 (4). The programme of measures shall be drawn up within seven years from [transposition date] and shall be in application no later than eight years after that date.	Note that the process of drawing up and applying measures still allows Member States the freedom to determine the time period in which to achieve the aims.
Art 9: prevention of soil contamination. Member States shall take appropriate and proportionate measures to limit the intentional or unintentional introduction of *dangerous substances* on or in the soil, excluding those due to air deposition	- General: Dutch soil policy also focuses on tackling possible sources of soil contamination, such as business activities, discharging into the soil, dumping waste, building activities, fertilization etc. This policy is set down in the Soil Protection Act and various decrees and administrative orders. When granting permits to

and those due to a natural phenomenon of exceptional, inevitable and irresistible character, in order to avoid accumulation that would hamper soil functions or give rise to significant risks to human health or the environment.	companies, soil-protecting measures can be prescribed via the Environmental Management Act. - Due to its general nature, Article 13 of the Soil Protection Act by itself appears to be insufficient to comply with Article 9 of the SFD. However, if the environmental permit or more specific legislation also contain more detailed soil protection measures, then we believe there is compliance with this article. - Under certain conditions, the SFD obligates Member States to prevent the accumulation of dangerous substances in the soil. It appears to be insufficient to regulate this aspect only in the Soil Protection Act, except for accumulation resulting, for example, from the use of pesticides and heavy metals from fertilizers or manure. See 'integration' in Article 3 (3). - The Soil Quality Decree – still in the decision making process – makes it possible to use diffusely contaminated soil on clean (or cleaner) soil as long as an improvement occurs elsewhere in the region (standstill at the regional level). In unusual cases, and under specific conditions, severely contaminated soil can also be reused within a region. This flexible approach could be in conflict with the SFD. If the Netherlands believes it is necessary to continue this practice, it is advisable to focus attention specifically on this point during the negotiations (consider the change in the draft Groundwater Directive, where the use of contaminated dredgings was permitted as part of river cleaning activities after the Netherlands indicated the necessity of this). - The use of 'or' makes the coverage of the text very broad. This is because prevention not only concerns preventing significant risks for human health or the environment, but also preventing the degradation of soil functions. Note that the English version of the Directive refers to risks for human health 'or' the environment, while the official Dutch translation refers to risks for human health 'and' the environment.
Art 10 Inventory of contaminated sites. Member States shall, in accordance with the procedure laid down in Article 11, identify the sites in their national territory where there is a confirmed presence, caused by man, of dangerous substances of such a level that Member States consider they pose a significant risk to human health or the environment, hereinafter "contaminated sites". That risk shall be evaluated taking into account current and approved future use of the land.	- The Netherlands has established a 'national inventory' of the location and magnitude of soil contamination. - When identifying risks, the Directive allows 'taking into account of … the use of the soil'. This is comparable to the Dutch function-oriented risk approach. - A contaminated site is a site where 'dangerous substances', due to human activity, are present at such a level that *Member States consider* they pose a significant risk to human health *and* the environment. - See also Article 18 (2) and Article 19 (3).
Art 10 (2): Member States shall establish a national inventory of contaminated sites, hereinafter "the inventory". The inventory shall be made public and reviewed at least every five years.	- The national inventory in the Netherlands is a working list that has been compiled over time from i) reports of soil remediation by competent authorities, ii) sectors that have been inventoried more recently such as dry cleaners, service stations etc., iii) the inventory conducted by the Chamber of Commerce of potentially contaminated sites, followed by close examination of environmental permits; a selection from the latter set has been included in the national inventory. In addition, provinces sometimes add their own inventories to the national one. For example, the province of Friesland has included all locations of filled-in canals and shipping channels. The national inventory also contains updated information about the status of a site (progress in the risk evaluation and remediation). The national inventory is a dynamic document; the magnitude of the remediation task is understood, but the list is not static. - In the 'Annual Report on Soil Remediation' (RIVM/VROM), the relevant authorities report on the progress in soil remediation. This annual report is offered to the Dutch Parliament. The website www.bodemloket.nl contains the national inventory and makes this information available to the public. A few municipalities such as Amsterdam have their own system for the time being, called the 'estate agent module'.
Art 11 (1) identification procedure: - Each Member State shall designate a competent authority to be responsible for the identification of contaminated sites. - Within five years from [transportation date], the competent authorities shall	- The Netherlands has 42 competent authorities (municipalities, provinces, large cities) which are responsible for the identification and remediation of contaminated sites. - See 'national inventory', Article 10 (2). The *location* of potentially polluting activities must be identified. The 'national inventory' in the Netherlands largely satisfies this requirement.

have identified the location of at least the sites where the potentially soil-polluting activities referred to in Appendix II are taking place or have taken place in the past.	
Art 11 (2): For those purposes, the activities referred to in point 2 of Annex II shall be considered independently of the thresholds specified in Annex I to Council Directive 96/61/EC, except for the activities carried out by micro-enterprises, as defined in point 3 of Article 2 in the Annex to Commission Recommendation 2003/361/EC and those relative to the rearing of livestock.	The inventory of sites requested in Appendix II has largely been completed in the Netherlands by means of: - The 'national inventory', see Article 10 (2). This national inventory currently includes, for example, 30,843 service stations and 3,394 dry cleaners. - 'Point 2 of Annex II' concerns the industrial activities referred to in Annex I of the International Protocol on Climate Change. However, the IPCC guideline refers to 'threshold values' for each of these activities, for example 'combustion installations with a rated thermal input exceeding 50 MW'. The SFD includes the list of IPCC activities, but without the threshold values. (The SFD text on this point is difficult to interpret). It is possible that the national inventory already complies with this requirement. - A number of locations from Annex II fall under the European E-PRTR directive (European Pollutant Release and Transfer Register), including industrial and urban wastewater purification installations and mining installations. Landfill locations for wastes are registered under 1999/31/EC (and therefore theoretically also fall under E-PRTR). It is unclear whether the following locations from Annex II are publicly registered: Seveso locations 96/82/EC and former military bases.
Art 11 (3): The competent authorities shall measure the concentration levels of dangerous substances in the sites identified in accordance with paragraph 2, and where the levels are such that there may be sufficient reasons to believe that they pose a significant risk to human health or the environment, an onsite risk assessment shall be carried out in relation to those sites: (a) within five years from [transposition date], for at least 10% of the sites; (b) within 15 years from [transposition date], for at least 60% of the sites; (c) within 25 years from [transposition date], for the remaining sites.	At the first reading, this appears to concern the obligation to measure the entire group of potentially contaminated sites. However, the phrase 'where the levels are such' in fact refers to the 'contaminated sites' from Article 10. The sequence of prioritization in the Dutch national survey is determined by the following: - the historical scan (based on its history, can contamination be expected at a specific site?). - an exploratory soil study: several soil samples are taken on site; - additional research: the exact contamination is mapped out and the risk of the contamination spreading is evaluated (the risk of contamination spreading to the groundwater and affecting human health and ecology); - the Uniform Remediation Decree and the criterion 'societal need' include procedures to accelerate the soil remediation process (since 2000). Statutory methods in the Netherlands that comply with Article 11 (3) are the following: - as a risk evaluation method, the Netherlands uses the 'remediation criterion', which determines whether a case must be approached urgently; - in addition, a 'risk toolbox' is used when moving contaminated soil and dredgings – below the intervention values – if local governments, deviating from the national norms, want to use soil and dredgings for various functions (agriculture, housing, nature, industry, etc.); Article 11 (3) obligates the 'competent authorities' to measure the concentration levels of dangerous substances. This does not appear to offer any policy flexibility to leave this measurement to the landowners. Consequently, the text requires modification. However, it is conceivable that approval of external research by the competent authority is sufficient, although the Directive is not explicitly clear about this.
Article 12 Soil status report: Where a site is to be sold on which a potentially polluting activity listed in Annex II is taking place, or for which the official records, such as national registers, show that it has taken place, Member States shall ensure that the owner of that site or the prospective buyer makes a soil	The Netherlands does not require this soil status report. However, there are a number of activities that appear to be similar: - The Lanmark company is currently aggregating all information about soil quality and making this available to agents when land is sold, as required by the Government Information Public Access Act. Possibly, a report

status report available to the competent authority referred to in Article 11 and to the other party in the transaction.	from Lanmark could be used to satisfy the report obligation, if this can indeed be considered to be a soil status report. After all, the Directive does not require that the report should be especially drawn up for this transaction, only that it is made available to the competent authority and the other party in the transaction. The aspect of soil contamination and change of ownership is addressed by the public law notary when land is sold, and sellers are required to provide information to buyers if they know that there has been soil contamination. However, the results of soil testing during land sales transactions are not reported to the competent authorities (the authority is not a party to the transaction). But the information about the soil (which is a kind of soil status report) is submitted to the competent authorities if there is a request for a building permit, an environmental permit or when soil is moved. - The report is intended to support the 'inventory of contaminated sites' (Article 10). In SEC(2006)1165, page 6 – the explanation to the thematic strategy – the Commission states that the soil report is 'meant to contribute to and speed up the set up of the inventory of the contaminated site'. The preamble to the SFD (25) includes the text 'to assist the rapid identification of contaminated sites .... etc.'. The Netherlands has in fact completed this inventory of contaminated sites, and this information is now only kept up to date. The Netherlands could argue that the measure from Article 12 (soil report) is not proportional for this country. If this article in its current from is enacted, it will probably be impossible to appeal based on the fact that the inventory of contaminated sites has been virtually completed.
Article 13: remediation. Member States shall ensure that the contaminated sites listed in their inventories are remediated.	See Article 10. The Netherlands has a legal procedure and legal aims to remediate contaminated sites that are above the intervention value.
Art 13 (2): Remediation shall consist of actions on the soil aimed at the removal, control, containment or reduction of contaminants so that the contaminated site, taking account of its current use and approved future use, no longer poses any significant risk to human health or the environment.	Soil remediation in the Netherlands must be implemented in such a way that the soil is at least made suitable for the function that it is given after remediation, where the risk to human health, plants or animals resulting from exposure to the contamination is limited as much as possible (source: Article 38, Soil Management Act, explained in the Soil Remediation Circular). However, due to the formulation 'no longer poses any significant risk', the SFD could pose a more far-reaching obligation than limiting the risk 'as much as possible'.
Art 13 (3): Member States shall set up appropriate mechanisms to fund the remediation of the contaminated sites for which, subject to the polluter pays principle, the person responsible for the pollution cannot be identified or cannot be held liable under Community or national legislation or may not be made to bear the costs of remediation.	This has been arranged in the Netherlands via the Policy Regulation on Cost Recovery, an elaboration of Article 75 of the Soil Protection Act.
Art 14 national remediation strategy: Member States shall, on the basis of the inventory and within seven years from [transposition date], draw up a National Remediation Strategy, including at least remediation targets, a prioritisation, starting with those sites which pose a significant risk to human health, a timetable for implementation, and the funds allocated by the authorities responsible for budgetary decisions in the Member states in accordance with their national procedures.	The Netherlands has a remediation strategy (NMP2, Future Environmental Agenda, VROM budget 2005, 2006) and mechanisms to prioritize remediations. At present, approximately 50% of the remediation costs are financed by market parties and 50% by the government. The share of financing by market parties is increasing steadily. The national government finances the 'system costs' of the local authorities (manpower for implementing government remediations and evaluating the quality of research and remediation) and partly finances certain categories of soil remediation. Every ministry, such as the Ministry of Defence and the Ministry of Agriculture, reserves funding for the remediation of state-owned properties (source: project plan MKBA soil remediation, NMP).
Art 14 (continued): Where containment or natural recovery are applied, the evolution of the risk to human health or the environment shall be monitored.	When serious cases of soil contamination in the Netherlands are not remediated but are contained, a 'containment, management and control' scenario is applied. This scenario is stipulated by law in the Soil Protection Act, Article 38 (3), referring to Decree Order LMV2002043105 (Staatsblad 2002, 192).The severity of these measures can vary, linked to the risk of the inadequate functioning of the facility and the consequences thereof. Especially in areas with a special protection level (soil and groundwater protection areas), strict demands are placed on the design. Control

	and monitoring is a step from the post-project management cycle. The monitoring of the environmental situation of a containment, management and control system is a part of this cycle (source: www.bodemrichtlijn.nl).
Art 14 (2): The National Remediation Strategy shall be in application and be made public no later than eight years after [transposition date]. It shall be reviewed at least every five years.	See Article 14.
Article 15 Awareness raising and public participation 1. Member States shall take appropriate measures to raise awareness about the importance of soil for human and ecosystem survival, and promote the transfer of knowledge and experience for a sustainable use of soil. 2. Article 2(1), (2), (3) and (5) of Directive 2003/35/EC shall apply to the preparation, modification and review of the programmes of measures on risk areas referred to in Article 8 and the National Remediation Strategies referred to in Article 14.	This theoretically does not involve a new obligation. This article refers to the obligations from the Aarhus Convention to provide access to environmental information, public participation and access to the courts. Via European directives, this convention has (since 14 February 2005) been largely anchored in the Environmental Management Act and the Government Information Public Access Act. COM 2003/35 is one of the three directives that provide the Aarhus Convention with effect. Article 2 COM 2003/35 states: for the purpose of this Article, 'the public shall mean one or more natural or legal persons and, in accordance with national legislation or practice, their associations, organizations or groups'. Although Article 15 theoretically is not a new obligation, the Netherlands does not automatically comply with this article. For example, the Dutch strategy for soil remediation is not established by means of public participation. Addressing the matter in the Parliament is theoretically not sufficient to comply with the criterion 'public'. The risk areas referred to in the SFD fall in the category of regional plans and river basin management plans, for which public participation has been arranged.
Article 16: reporting Member States shall make the following information available to the Commission within eight years from [transposition date], and every five years thereafter: (a) a summary of the initiatives taken pursuant to Article 5; (b) the risk areas established pursuant to Article 6(1); (c) the methodology used for risk identification pursuant to Article 7; (d) the programmes of measures adopted pursuant to Article 8 as well as an assessment of the efficiency of the measures to reduce the risk and occurrence of soil degradation processes; (e) the outcome of the identification pursuant to Article 11(2) and (3) and the inventory of contaminated sites established pursuant to Article 10(2); (f) the National Remediation Strategy adopted pursuant to Article 14; (g) a summary of the initiatives taken pursuant to Article 15 as regards awareness raising.	The Commission requires a summary of current initiatives. This concerns a summary that the relevant departments theoretically have already.
Art 18 Implementation and adaptation to technical progress: The commission may, in accordance with the regulatory procedure with scrutiny referred to in Article 19(3), adapt Annex I to technical and scientific progress.	The Commission has the authority to amend Annex I (Common elements that must play a role in identifying risk areas based on Article 6) according to current technological and scientific progress. As previously indicated with Article 6, there is a chance that this Annex will be specified in greater detail. This could limit the freedom of Member States to identify certain areas as risk areas. However, this article does not give the Commission the authority to suddenly include specifications, such as limit values, in the Annex. We believe that this authority of the

	Commission will not lead to totally unexpected results, but it must be assumed that the Commission could interpret this authority in the widest possible fashion. To the extent that this authority of the Commission would limit the authority of the Member States, it is advisable to obtain clarity about this before the Directive is enacted. See Article 19 (3).
Art 18 (2) Where, on the basis of the exchange of information referred to in Article 17, a need to harmonise the risk assessment methodologies for soil contamination is identified, the Commission shall adopt common criteria for soil contamination risk assessment in accordance with the regulatory procedure with scrutiny referred to in Article 19(3).	See Article 19 (3). See also the textbox in the main text ('European standards for evaluating soil contamination: the current situation').
Art 19 (1) The Commission shall be assisted by a committee, hereinafter "the Committee".	Reference that the implementation of the SFD by the EC takes place while assisted by a committee.
Art 19 (2) Where reference is made to this paragraph, Articles 5 and 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof. The period laid down in Article 5(6) of Decision 1999/468/EC shall be set at three months.	Article 5 in Decree 1999/468 refers to the 'regulatory procedure'. In general this article refers to the formerly most prevalent committee procedures, where no further review by the Council and the European Parliament takes place. However, in case no agreement is reached in the committee, then the European Parliament is informed, and the decision making is transferred to the Council. This is described in Article 5 (4-6) Dec. 1999/468. Article 7 of Decision 1999/468 refers to the operation of the committee. Among other things, this article states that the committee establishes its own procedural rules (and publishes them in the Official Journal).
Art 19 (3) Where reference is made to this paragraph, Article 5a, paragraphs 1 to 4 and Article 7 of Decision 1999/468/EC shall apply.	This clause probably refers to the 'regulatory procedure with scrutiny'. This is a new procedure that was established in a recent amendment to Decision 1999/468 on 21 October 2006 (Decision 2006/512 in Official Journal C255/4-8). What does this 'scrutiny' entail? In the implementation of the SFD, a committee comprising representatives of the 25 Member States aids the Commission. The Commission submits a draft version of measures to be taken to the committee. The committee votes on the proposal and if passed, presents the European Parliament and the Council with the measures intended by the Commission for review. The Parliament and the Council can object based on the consideration that the draft measures in question exceeds the implementation of the authority prescribed by the SFD, is not compatible with the aim or the content of the SFD or is in conflict with the subsidiarity or proportionality principles. If the European Parliament and the Council make an objection, the Commission can present an amended proposal to the committee or can submit a legislative proposal. If the Parliament or the Council make no objection, the measures can be enacted by the Commission.