



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 22.9.2006
SEC(2006)1165

COMMISSION STAFF WORKING DOCUMENT

Accompanying document to the

**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE
EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

Thematic Strategy for Soil Protection

SUMMARY OF THE IMPACT ASSESSMENT

{COM(2006)231 final}
{SEC(2006)620}

SUMMARY

1. POLICY BACKGROUND

The 6th Community Environment Action Programme¹ requires the development of a Thematic Strategy on soil protection (hereinafter ‘the strategy’) “addressing the prevention of, inter alia, pollution, erosion, desertification, land degradation, land-take and hydrological risks taking into account regional diversity, including specificities of mountain and arid areas”².

The Commission adopted a Communication “Towards a Thematic Strategy on soil protection” on 16 April 2002³. This was the subject of favourable conclusions by the other EU institutions. Since then, work has been undertaken on the preparation of the strategy. As a part of this process, an impact assessment has been carried out, a summary of which is presented in this document.

This impact assessment is based mainly but not exclusively on reports by the Joint Research Centre (JRC) of the Commission and the Working Groups set up to assist the Commission, and reports carried out for the Commission assessing the economic impacts of soil degradation and economic, environmental and social impacts of different measures to prevent soil degradation.

2. EXTENT OF THE PROBLEM AND COSTS OF SOIL DEGRADATION

Extent of the problem

Available information suggests that, over recent decades, there has been a significant increase in soil degradation processes, and there is evidence that these processes will further increase if no action is taken. Soil degradation processes are driven or exacerbated by human activity. Climate change, together with individual extreme weather events which are becoming more frequent, will also have negative effects on soil.

Soil degradation processes include⁴:

- Erosion: the EEA estimates that 115 million ha, or 12% of Europe’s total land area, are affected by water erosion, and that 42 million ha are affected by wind erosion, of which 2% severely affected.

¹ Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme (OJ L 242, 10.9.2002).

² Article 6(2)(c).

³ COM(2002) 179.

⁴ Full references are in the impact assessment. To be noted that, of the soil degradation processes mentioned in Article 6(2)(c) of the Decision referred to in footnote 1, hydrological risks have been addressed in a separate proposal for a Directive on the assessment and management of floods (COM(2006) 15), and desertification is a cross-cutting issue tackled by addressing the other soil threats (in particular, erosion, organic matter decline and salinisation).

- Organic matter decline: soil organic matter (SOM) plays a major role in the carbon cycle of the soil. Indeed, soil is at the same time an *emitter* of greenhouse gases and also a major *store* of carbon containing 1,500 gigatons of organic and inorganic carbon. Around 45% of soils in Europe have a low or very low organic matter content (meaning 0-2% organic carbon) and 45% have a medium content (meaning 2-6% organic carbon). The problem exists in particular in the Southern countries, but also in parts of France, the United Kingdom, Germany and Sweden.
- Compaction: estimates of areas at risk of soil compaction vary. Some authors classify around 36% of European subsoils as having high or very high susceptibility to compaction. Other sources speak of 32% of soils being highly vulnerable and 18% moderately affected.
- Salinisation is the accumulation in soils of soluble salts mainly of sodium, magnesium, and calcium. It affects around 3.8 million ha in Europe. Most affected are Campania in Italy, the Ebro Valley in Spain, and the Great Alföld in Hungary, but also areas in Greece, Portugal, France, Slovakia and Austria.
- Landslides often occur more frequently in areas with highly erodible soils, clayey sub-soil, steep slopes, intense and abundant precipitation and land abandonment, such as the Alpine and the Mediterranean regions. There is, to date, no data on the total area affected in the EU, but this problem can be due to population growth, summer and winter tourism, intensive land use and climate change.
- Contamination: due to more than two hundred years of industrialisation, Europe has a problem of contamination of soil due to the use and presence of dangerous substances in many production processes. It has been estimated that 3.5 million sites may be potentially contaminated, with 0.5 million sites being really contaminated and needing remediation.
- Sealing: on average the sealed area, the area of the soil surface covered with an impermeable material, is around 9% of the total area in Member States⁵. During 1990-2000 the sealed area in EU15 increased by 6%⁶, and the demand for both new construction due to increased urban sprawl and transport infrastructures continues to rise.
- Biodiversity decline: soil biodiversity means not only the diversity of genes, species, ecosystems and functions, but also the metabolic capacity of the ecosystem. Soil biodiversity is affected by all the degradation processes listed above, and all driving forces mentioned apply (equally) to the loss of soil biodiversity.

⁵ Soil degradation in: Environment in the European Union at the turn of the century, Environmental assessment report No 2, EEA, 1999.

⁶ Corine Land Cover.

Costs of soil degradation

Though difficult to estimate, several studies demonstrate significant *annual* costs of soil degradation to society in the ranges of:

- erosion: €0.7 – 14.0 billion⁷,
- organic matter decline: €3.4 – 5.6 billion,
- compaction: no estimate possible,
- salinisation: €158 – 321 million⁸,
- landslides: up to €1.2 billion per event,
- contamination: €2.4 – 17.3 billion⁹,
- sealing: no estimate possible,
- biodiversity decline: no estimate possible.

These costs do not include the damage to the ecological functions of soil as these were not possible to quantify. Therefore, the real costs for soil degradation are likely to exceed the estimates given above.

No assessments of costs of compaction, soil sealing and biodiversity decline are currently available. The total costs of soil degradation *that could be assessed* for erosion, organic matter decline, salinisation, landslides and contamination on the basis of available data, would be up to €38 billion¹⁰ annually for EU25. These estimates are necessarily wide ranging due to the lack of sufficient quantitative and qualitative data.

On the other hand it must be highlighted that these costs of soil degradation do not take into account the effect of standards adopted in January 2005 under cross-compliance, or the effect of other measures recently taken by Member States. Nevertheless, as changes in soil are very slow, it is likely that the current estimate of the extent of the problem is an appropriate reference.

Evidence shows that the majority of the costs are borne by society in the form of damage to infrastructures due to sediment run off, increased health-care needs for

⁷ This estimate covers only costs of erosion in 13 countries, including the major Member States where erosion occurs. Data is not available for the others.

⁸ This estimate covers only the costs of salinisation in three countries, data is not available for others.

⁹ An independent study estimated that the costs of soil contamination could amount annually to up to €208 billion. Nevertheless this estimate had a high degree of uncertainty, therefore the intermediate value of €17.3 billion per year was retained.

¹⁰ For this estimate the intermediate bound was taken for contamination, while the upper bound was taken for the other threats, see section 2.6.2 in the impact assessment.

people affected by contamination, treatment of water contaminated through the soil, disposal of sediments, depreciation of land surrounding contaminated sites, increased food safety controls, and also costs related to the ecosystem functions of soil.

3. POLICY OPTIONS CONSIDERED

The following options, from less to more prescriptive, have been considered in the impact assessment:

- (1) Member States are encouraged to take action under a general non-binding EU soil strategy.
- (2) A flexible legal instrument which would take the form of a Soil Framework Directive, ambitious in its scope but not overly prescriptive in its content.
- (3) Legislative proposals for the different soil threats, setting also all targets and means at EU level.

Achieving soil protection requires actions to protect soil on supranational, national, regional and indeed local levels in order to succeed. However, the extent of the problem, the significant transboundary effects and off-site costs borne by society demonstrate that the fragmented approach taken so far in the absence of a focused policy, has been insufficient to address and combat the identified threats. That is why a non-binding action at EU level would not be sufficient to address the identified problems.

At the same time, soil is very variable regarding its general characteristics, but also with regard to its use in the socio-economic context. This makes it very difficult to establish general EU-wide soil quality standards and measures to address soil threats. For this reason, setting all targets and means at EU level in legislative proposals addressing the different soil threats has not been considered compatible with the subsidiarity principle.

4. OPTION CHOSEN

The Commission is persuaded that a Soil Framework Directive is the best option for addressing existing soil threats. Such a Soil Framework Directive, ambitious in its scope but not overly prescriptive in its content, will set in motion a process leading to an increased protection of soil throughout the EU.

The proposed Directive contains general preventive provisions requiring Member States to avoid soil degradation. It requires Member States to identify areas at risk of erosion, organic matter decline, compaction, salinisation, and landslides, adopt risk reduction targets and establish programmes of measures to reach them. Member States are required to identify the contaminated sites in their national territory, supported by the introduction of a so-called soil status report, and establish a National Remediation Strategy.

5. ANALYSIS OF THE IMPACTS

In the proposed Directive, there are a series of specified obligations aimed at a shared objective which is the identification of the location and extent of the problem of soil degradation and a more general requirement to act upon it.

The costs and the benefits are mainly linked to two parts of the Directive:

- (1) the identification of the problem (identification of risk areas and contaminated sites), which relies on obligations specified in the Directive;
- (2) the subsequent measures to combat the problem to be taken by Member States and which will be decided by them.

Costs and benefits of the identification of the problem

Costs

For the identification of risk areas, three options were investigated. The option chosen is a targeted monitoring which allows data acquired through existing monitoring schemes to be used. The overall costs are likely to be less than the €2 million per year for EU25.

Establishing an inventory of contaminated sites requires a number of steps to be taken: a preliminary survey and subsequent site investigations to determine whether sites are contaminated or not. The preliminary survey, to be carried out within five years after transposition of the Soil Framework Directive, represents the very start of the inventory process. The costs for this first five-year stage are estimated at about €51 million per year for EU25. This first stage will be followed by a series of (on-site) investigations to finally conclude if there is indeed a significant risk to human health or the environment. If so, then the site will be classified as contaminated site and introduced in the inventory. As the number of potentially contaminated sites for EU25 is not known at this stage, it had to be estimated on the basis of a scenario approach. Using this scenario, the completion of the inventory of contaminated sites would cost *up to* €240 million yearly for the EU25 over 25 years.

This amount is to be regarded as an upper bound figure, as it is based on a very high number of potentially contaminated sites in the scenario envisaged and also because both the number of sites on which to carry out the on-site investigation and the site investigation cost itself will drop over time due to clustering of site investigations and the development of expert judgement and technological progress for the investigation (e.g. remote sensing).

The soil status report, to be established upon a land transaction of a site where a soil polluting activity is taking or has taken place, is meant to contribute and speed up the set up of the inventory of contaminated sites. Soil transactions falling within the scope of this provision will automatically yield part of the information needed by the competent authorities in Member States to complete the inventory. As any soil investigations carried out within the scope of the soil status report would otherwise

have had to be carried out within the scope of the inventory, a separate monetisation of the costs of the soil status report is unnecessary. These costs are already included in the costs of the inventory of contaminated sites. There will be no increase in the total cost for the management of contaminated sites as a result of the establishment of a mechanism for financing the remediation of orphan sites. Creating a special mechanism will however lead to a shift in the way budget for the management of contaminated sites is put together.

Benefits

The benefits deriving from the implementation of these provisions could not be *quantified*. However, from a *qualitative* point of view, the establishment of a system allowing Member States to identify the problems due to soil degradation will allow them to address soil protection and combat soil threats systematically, effectively and efficiently. They will be able to adopt more targeted and efficient measures; plan in the mid and long term their strategies, while stimulating sustainable use of soil. This system will also allow to take a preventive approach thus protecting ecosystems and for society to make savings far greater than the additional costs due to the Soil Framework Directive.

Costs and benefits of possible measures to be taken by Member States

The proposed Directive will require Member States to take specific measures to address soil threats, but it leaves to Member States a large degree of freedom in how to implement this requirement. This means that risk acceptability, the level of ambition regarding the targets to be set and the choice of measures to meet these targets are left to Member States, thus the impacts of the proposed Directive cannot be assessed to their full extent. While from a *qualitatively* viewpoint, the environmental, economical and social impacts of possible measures may be similar in all Member States, *quantitatively*, however, the impacts of possible measures will vary enormously depending on the (site) specific approach and the actual measures taken. Therefore it was not possible within the scope of the impact assessment to *quantify* all the particular impacts of such specific measures. Only the more general *qualitative* impact assessment of possible measures to combat soil degradation could be provided for.

Nevertheless, the Commission has attempted to quantify the environmental, economic and social impacts of possible measures by assessing different hypothetical scenarios that could be followed by Member States on the basis of limited available information. Thus, the costs of these scenarios, presented in Annex I, are illustrative and are under no circumstances to be looked at as real implementation costs of the Soil Framework Directive.

6. CONCLUSIONS

The analysis contained in the impact assessment shows that a flexible legal instrument in the form of a Soil Framework Directive, ambitious in its scope but not overly prescriptive in its content, will yield benefits far outweighing the costs.

Theoretically, the benefits of the full implementation of the Directive consist in avoiding the costs of soil degradation, hence the benefits should amount to €38 billion annually (see section II). Nevertheless, the benefits derived from any actions to protect soils will not match the total costs of soil degradation, mainly due to the fact that in reality it is technically and economically difficult, or even impossible to fully avoid *all* soil degradation processes or to fully mitigate their effects. Moreover, Member States will set levels of ambition to address soil degradation according to the extent of the problem, their perception of the acceptability of the risks involved and their political, social and economical situations.

The Directive does not establish who bears the costs of its implementation, as this will be decided by each Member State. Depending on the funding schemes Member States will adopt in their Programmes of Measures and in their National Remediation Strategies, costs will be borne in varying degrees by land users, economic sectors, national budgets or the EU budget.

It is important to note that:

- Costs will arise before all the benefits can be reaped.
- Benefits will be enjoyed partly by the land users and most significantly by society at large.
- Costs will decrease, as some threats will totally disappear in some areas. Benefits will increase with time, as soil fertility and soil functions are restored.
- Benefits will also accrue gradually as measures taken begin to have a positive impact across a range of areas where the current costs of degradation are felt.
- Not all costs will be incurred simultaneously and the distribution of costs will not be even among Member States. This is because some threats are more important in certain Member States than others and some Member States are more advanced than others in combating soil degradation.