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“Down to earth”:
Soil degradation and sustainable
development in Europe.
A challenge for the 21st century

The Storyline

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INTRODUCTION



This third joint message from UNEP and the EEA aims to focus attention on the status of European soils, and to promote discussion on the need for a pan-European (and global) policy on soil. At the same time, there is an urgent need to stimulate and enhance discussion on the role of soil related to the global ecological and economic issues of climate change, industrial development and trade.



Soil is a service provider

Soil provides a large number of basic functions and services which we depend on and which we often are unaware of until it is too late. Soil is a multi functional medium: soil is not only the basis for 90 % of all human food, livestock feed, fibre and fuel, but also provides services beyond productive functions.

Soil forms the spatial dimension for the development of human settlements: the building of houses and infrastructures, recreation facilities and waste disposal. It provides raw materials, including water, minerals and construction materials. It forms an essential part of the landscape, it conserves the remains of our past and is itself a relevant part of our cultural heritage.

Soil is a forgotten issue and soil degradation is a 'silent disaster', for many reasons:

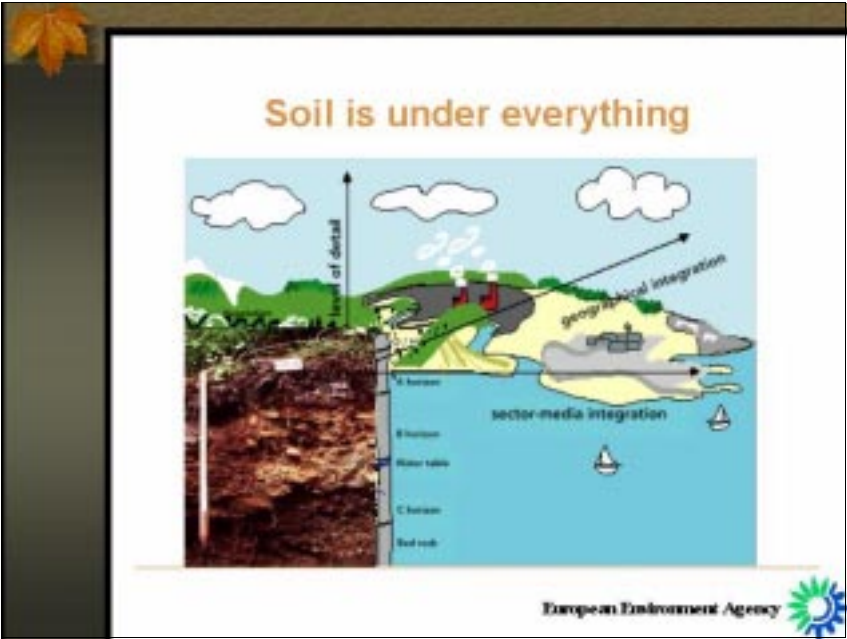
- the assessment is difficult since soil is a complex media;
- soil is a cross-cutting issue;
- soil is often taken for granted. Soil's buffering capacity, its resilience and its capability to filter and absorb contaminants mean that damage is not perceived until it is far advanced;
- many problems that starts in the soil become evident elsewhere;
- soil (and land) have owners.

Soil is a limited and non renewable resource and now, after many years of misuse, the signs and the impacts are showing more clearly and responses are required, both corrective (costly and sometimes not fully feasible) and preventive, so that the problem does not continue to be transferred to future generations.

In many parts of the world, as well as in Europe, we are now testing the limits of the resilience and multi-functional capacities of soil.

MAIN MESSAGES

Why are soil and territory relevant for Europe?



The diagram, titled "Soil is under everything", illustrates the interconnectedness of soil and various sectors. It shows a cross-section of the earth with a vertical axis labeled "level of detail" pointing upwards. The soil profile is divided into layers: O horizon, A horizon, B horizon, C horizon, and Bed rock. A water table is also indicated. The diagram shows a landscape with a house, a car, a boat, and a plane, all connected to the soil. Arrows point to "geographical integration" and "sector-media integration". The European Environment Agency logo is at the bottom right.

Soil is under everything

Soil is a cross-cutting issue - soil has many users and soil management involves many sectors.



There is competition between concurrent uses of land and soil (food production, living space, infrastructure and industrial production) due to concentration of activities in a small space. There are also conflicts between private and public use of soil resources. These competing demands, if not properly managed, will result in more degradation which ultimately will lead, in a vicious circle of decline, to a gradual reduction in the available resource. How these uses can be developed in a sustainable way without damage or depletion of the soil resource is a major challenge for the next decades.

Water erosion risk in agricultural areas due to climate change in 2050

Water erosion risk in agricultural areas, 2050

Low
Moderate
High
Very high

(Source EEA data elaboration from EC, 2000)

There is a clear link between climate change, sustainable development, environmental quality and soil degradation

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Soil and global issues

- Soil is affected by climate change and changes in climate could lead to further soil degradation. Under the EC baseline scenario, the water erosion risk is expected to increase by the year 2050 in about 80% of EU agricultural areas, as an effect of climate change. The increase will mainly interest the areas where soil erosion is currently severe (EEA, 1999)
- In developing countries, soil degradation reduces food supplies and contributes to an increase in the number of the so-called "environmental refugees", which may have an indirect effect on Europe.
- Protection of soil as the vital resource for agriculture is becoming an issue in negotiations of the WTO.

"Down to earth"

"Down to earth, down to basics" - solving soil problems will help solve other problems at the European and global levels.

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"Down to earth, down to basics"

Soil protection will have multiple benefits.

At the European level, as the diversity and multi-functionality of soil contribute to Europe's cultural and natural diversity, protecting soil will help to preserve Europe's resources, its identity and its ability to cope with change. At the global level, combating soil degradation will help offset greenhouse gas emissions, will provide a better environment, will guarantee more food to an increasing population and will contribute to the economic progress of future generations.

What is happening to the soil?

What is happening to the soil?

- consumption of the soil resource (erosion, sealing)
- local and diffuse contamination in urban and industrial areas
- acidification
- links with global issues (climate change)
- Mass movements

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Major soil problems in Europe

Overall, damage to Europe's soils from modern human activities is increasing and leads to irreversible losses due to sealing of soil surfaces, local and diffuse contamination and soil erosion. Globally, nearly 2 billion hectares of land are affected by human-induced degradation of soils (UN, 2000).

Soil degradation is not only occurring in the Mediterranean countries. One third of Europe's soil (EEA 1999) may be affected (with over 150 M ha suffering high erosion risk (EEA 1998)).

Deterioration is critical in the Mediterranean (e.g. Spain: 18% of land affected; loss of 28 t/ha/y peak average for 1990-95 in agricultural land) and around the Black Sea (e.g. Ukraine 41% of agricultural land affected by erosion risk in 1996).

Soil degradation also seriously affects Central Europe (Germany was losing due to sealing 120 ha/day in 1997; the rate of soil erosion in Austria's agricultural land reaches 9 t/ha/y (EEA 1999)) and northern countries like Ireland and Iceland.

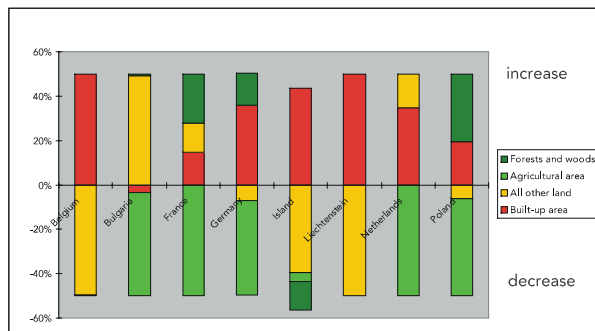
The risk of water erosion is predicted to increase in 80% of EU's agricultural land by 2050 (EEA, 1999; EC, 2000).

1. The food needs of increasing populations is leading to even greater intensification of agriculture, stretching thereby the capacity of soils to release and absorb nutrients and chemicals.
2. Expansion of built-up areas and infrastructure, particularly in large urban agglomerations, is sealing off the soil from productive uses. Each year an additional 20 million hectares of agricultural land become too degraded for crop production, or are lost to urban sprawl.
3. Soils are being degraded physically and chemically due to erosion, exhaustion (nutrient depletion) and pollution.
4. Soil's diverse living organisms are being reduced, and consequently the cleaning and filtering capacities of soils in many localities are being damaged beyond repair.
5. At the same time, abuse of soil organic matter continues to compromise the potential of soils to sequester and provide interim storage for atmospheric carbon.

Why is soil being degraded?

Why is soil being degraded?

Changes in built-up areas vs. other land uses in selected countries in the period 1990-1995



Country	1970	1980	1990	1996
Austria	5,3	10,5	17,8	19,4
Belgium	14,9	36,3	50,8	51,0
Denmark	4,3	12,2	14,2	20,7
Finland	0,4	0,7	0,7	1,4
France	2,8	9,6	12,4	15,1
Germany	17,4	26,4	31,0	32,4
Greece	0,1	0,7	1,5	3,6
Ireland	0,0	0,0	0,4	1,2
Italy	13,3	20,1	21,0	21,9
Luxembourg	-	-	-	-
Netherlands	35,6	52,3	61,7	69,6
Portugal	0,7	1,4	3,5	7,8
Spain	0,8	3,9	8,9	14,6
Sweden	1,0	2,1	2,3	3,2
United Kingdom	4,4	10,6	13,2	13,8

Motorway density in the EU

Source: EEA data elaboration from various sources, 1999

All economic sectors contribute to soil degradation.

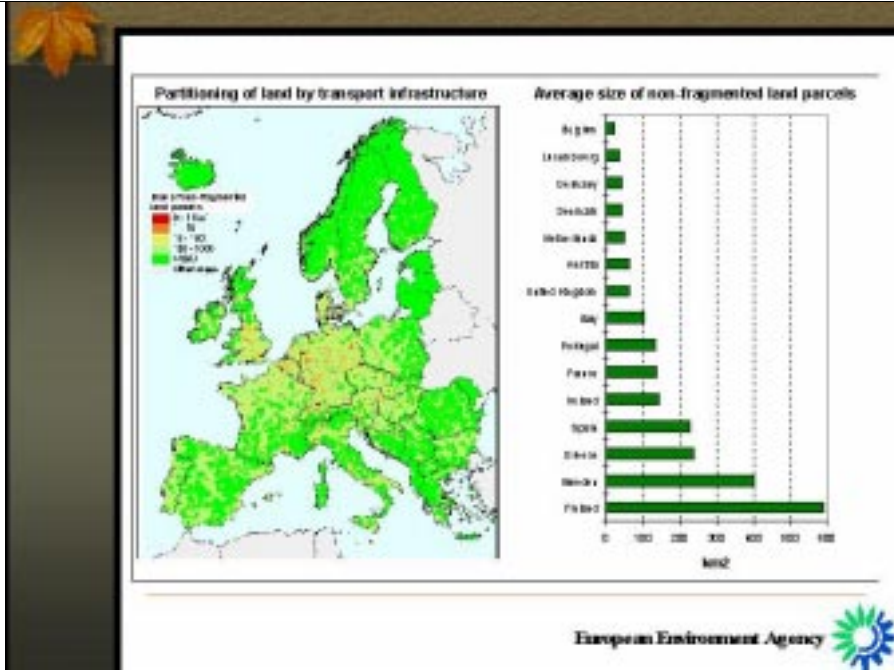
Urbanisation, transport, agriculture and industrialisation, in concurrent and concentrated uses of land and soil (food production, living space, infrastructure), are all sectors putting soils under special pressure.

One of major impacts of these developments on soil is its irreversible loss through surface sealing, affecting the most productive agricultural land. Motorways, for example, have been built across the continent, with large increases in total length (over 200% in the EU alone since 1970), particularly in Greece, Portugal and Spain where the total length of motorways has more than tripled in the period 1980-1996. Occupation of land by infrastructure is high in Belgium, Germany and the Netherlands, where the intensity of motorways exceeds 30 km per 1000 km² of total land area. Soil loss in Germany, due to increase of built-up areas, was on average about 120 ha per day in 1997. (EEA, 1999)



Most of planning activities touch the soil

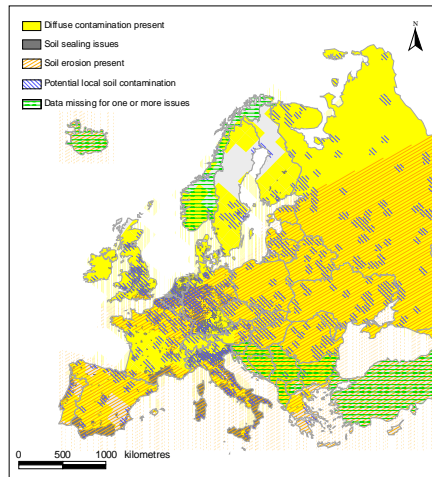
Land is not a flying carpet. Socio-economic activities all touch the soil. Planning mostly concerns interactions of activities with soil and land resources. While impacts of activities often appears on other media (air, water) and biota.



Impacts on other media and ecosystems

The building of infrastructures and the sealing-off of the soil may cause the fragmentation of the territory and its resources (e.g. habitats and forests).

Where in Europe are the major soil problems located?



Source EEA, 2000

The geographical dimension of soil degradation

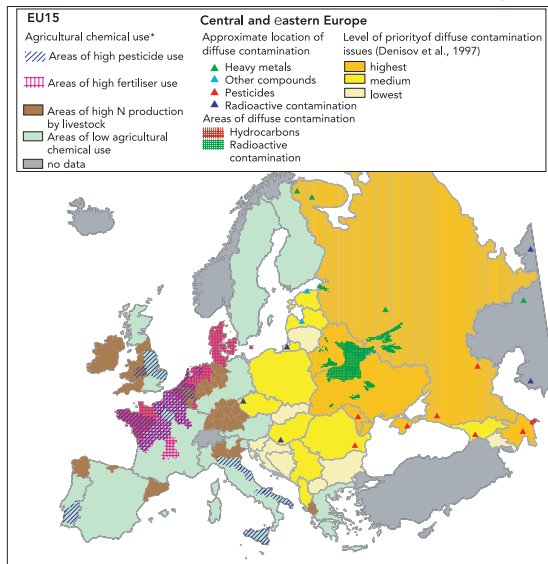
Soil problems are influenced by the diversity, distribution and specific vulnerability of soils across Europe, among other factors.

In Southern Europe, especially in the Mediterranean, soil erosion plays an important role, while in Western, Central and Eastern Europe, soil contamination due to urbanisation and industrialisation occur over large areas.

In Scandinavia, soil health and functions are highly endangered by acidifying air pollution deriving from industrial and other processes in other parts of Europe.

In some part of southern and central-eastern Europe the degradation is so severe that soils are no longer capable of supporting any profitable cultivation, resulting in land abandonment and depopulation.

Problem areas of diffuse contamination in Europe



Source: EEA, 2000

Soil and economic restructuring in Europe


The economic crisis after the collapse of the former Soviet Union has resulted in general in lower pressures on the environment and on soil in particular.

As the economies recover, if proper measures are not taken an increase of soil impacts can be expected following similar trends to those that have been observed in the EU over past decades.

In the NIS, for example, severe soil degradation is currently observed, due to contamination by **heavy metals**, **POPs** and **dioxins** around industrial sites and urban areas as well as **salinisation**, **oil spills** and **contamination by radionuclides**.

In Ukraine, for example, the so-called **industrial desertification** (a term which indicates a heavy transformation of the land by mining and heavy industry) extends to 3% of total land area.

What will happen if no measures are taken?

 <h3>What will happen if no measures are taken?</h3> <p>Soil loss and deterioration will continue and will probably accelerate if proper and prompt measures are not taken to decouple the progress of economic sectors and their pressures on the soil resource through the integration of soil protection measures with sectoral policies.</p> <hr/> <p>European Environment Agency </p>	<p>Decoupling</p>
<p>Soil loss and deterioration will continue and will probably accelerate if proper and prompt measures are not taken to decouple the progress of economic sectors and their pressures on the soil resource through the integration of soil protection measures with sectoral policies.</p>	


 <h3>Enlargement</h3> <ul style="list-style-type: none">• The planned expansion of the European Union in the early 21st century,• the anticipated increase and intensification of agricultural and industrial production in the new member states,• the expansion of built-up areas and infrastructure in Europe <p>will all place considerable pressure on the soil resources of the continent.</p> <hr/> <p>European Environment Agency </p>	<p>Enlargement</p>
<p>Present policies and laws and their enforcement mechanisms may prove inadequate for sustainable soil management, unless provision is made for their wise use in perpetuity.</p>	

What is being done?

What is being done?

Policy initiatives (1)

- There is no legislation or funding instrument at EU level which directly addresses soil protection (primary protection) similar to those in place for air and water.
- Several measures concern soil degradation indirectly (eg. Agri-environment measures, sewage sludge directive, etc).
- There is no mechanism in place to assess and monitor the effects on soil of existing measures.

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Current policy initiatives.

- There is no legislation or funding instrument at EU level which directly addresses soil protection (primary protection) similar to those in place for air and water;
- Several measures concern soil degradation indirectly;
- There is no mechanism in place to assess and monitor the effects on soil of existing measures.

What is being done?

Indirect measures touching the soil

- Directives:
 - Nitrates; Sewage Sludge; Landfill; Water Framework directive; habitats; IPCC; environmental radioactivity.
- Regulations:
 - support for rural development; common rules for direct support schemes under the CAP.
- Community strategies:
 - Acidification; biodiversity; waste recycling and soil quality.
- White paper on environmental liability.
- European Space Development Perspective; Environmental Impact Assessment and SEA.

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EU policy measures

Some initiatives with an effect on soil have been undertaken at the local, national and European levels; few are direct, many are indirect and not all are protective. However, a European policy framework on soil protection, similar to those already in place for air and water, does not exist. Moreover, there is no reporting mechanism in place to assess whether existing measures are leading to improvement of soil conditions or to gauge the level of implementation of existing legislation.

What is being done?

Policy initiatives (2)

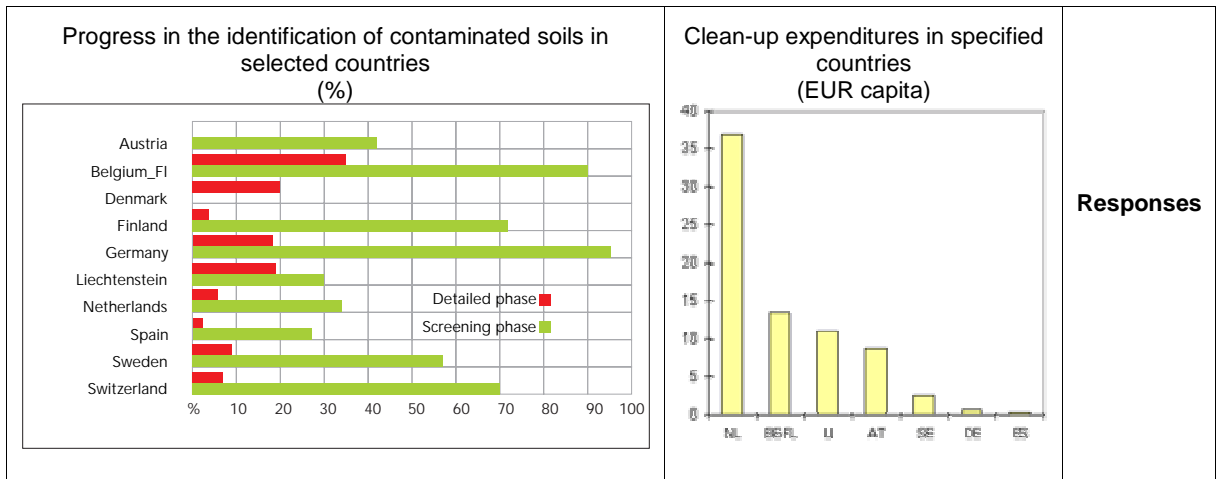
- At the national level, many EU Member States have produced legislation, policies or guidelines to improve soils or prevent them from further degradation (e.g. legislation for soil protection in Germany, Netherlands and Denmark; agri-env. measures in Portugal, Spain and France).
- DG Environment and Member States have initiated a European Soil Forum with the objective to promote the exchange of information, raise awareness and build a common platform for soil protection in Europe.

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The recent initiative put forward by DG Environment and Member States to initiate a European Soil Forum, with the objective to promote the exchange of information, raise awareness and build a common platform for soil protection in Europe can be considered as a first and important step forward.

At the national level, many EU Member States have produced legislation, policies or guidelines to improve soils or prevent them from further degradation (e.g. legislation for soil protection in Germany, the Netherlands and Denmark; agri-environment measures in Portugal, Spain and France include soil protection).

Responses: Clean up of contaminated sites



Local contamination is an emerging issue and usually affects areas with a high density of urban agglomeration and with a long tradition of heavy industry, or occurs in the vicinity of former military installations. Some countries are making consistent progress in identification and remediation of polluted sites, but the situation is not homogeneous across Europe and the information available is far from complete.

What is needed to cope with soil problems?

What is needed?
Integration

Integration

As soil has multiple users, consideration of soil has to be integrated at different levels. There is a need for **administrative** (from local to European and global), **sectoral** (sectors and other environmental issues) and **geographical integration** (landscapes, urban, rural, mountain and coastal areas) of both soil assessment approaches and soil protection policies. Appropriate actions need to be taken at all administrative levels.

**What is needed
to cope with soil problems?**

- Degradation will continue or accelerate if proper and prompt measures are not taken to de-couple the progress of economic sectors and their pressures on the soil resource.
- There is a need for:
 - assessment and monitoring of the effects of existing legislation
 - better information to support policy development

Actions to support policy

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What is needed?

Towards a European policy for soil protection

- The effects on soil of the implementation of existing measures need to be analysed and monitored. Such assessments would also help identify what else may be necessary but is not covered by existing legislation.
- Showing the gaps in policy terms will help to increase the awareness of importance of soil protection in sectoral policies and possibly lead to the development of a policy framework which will recognise the central role of soil in the environment.

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Towards a European policy for soil protection

The development of a policy framework which recognises the role of soil, takes account of the problems arising from the competition among its concurrent uses (ecological and socio-economical), and aims at the maintenance of its multiple functions could have multiple benefits and could achieve a consistent improvement of Europe's environment as a whole.

Beforehand, the effects on soil of the implementation of existing measures need to be analysed and monitored.

What is needed?

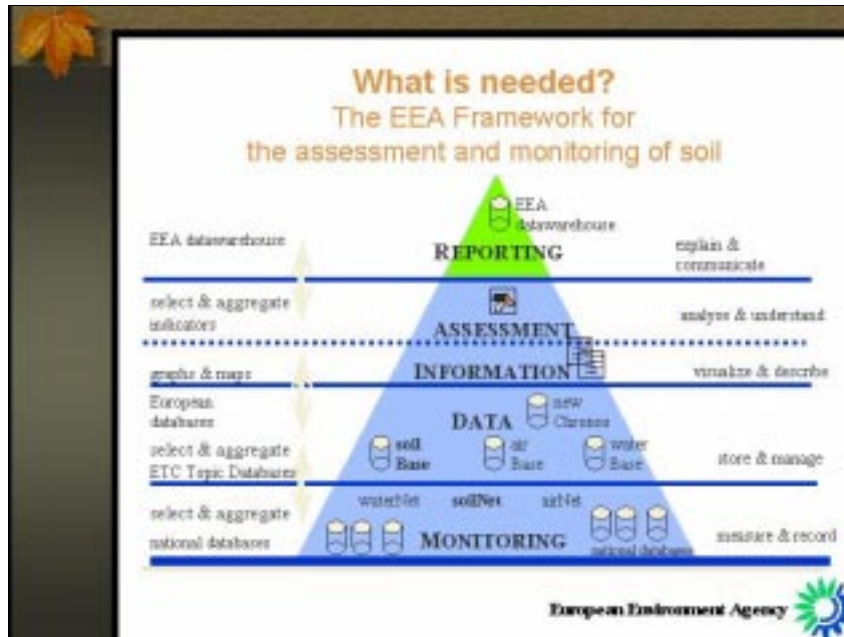
A better information for policy

- A coherent framework for monitoring and assessment of Europe's soil, including the establishment of a data flow/reporting mechanism on Europe's soils.
- Streamlining of existing activities and collaboration of relevant stakeholders (who does what; how collaboration between existing institutions can improve Europe's soils).
- Development of a work programme for soil at the European level.

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A better information for policy

There is an urgent need for a coherent framework for monitoring and assessment of Europe's soil, including the establishment of a **data flow/reporting mechanism** on Europe's soils.



EEA framework

Some progress has been made to close data gaps and to produce better information to support policy making. A framework “from national monitoring to European reporting” is being developed by the EEA, together with its EIONET partners and with the support of EC.

CONCLUSIONS

A common approach to soil and territory

In the end it is a matter of people and the interactions they have on the natural resources and the limited space available. The problem calls for new policies, including fair pricing, fiscal policies, and strategic planning concerning the use of land and natural resources. There is resistance from economic interest groups for such measures. This may become the biggest challenge for sustainability. If we do not get a proper sustainable use of territory and soil there is no chance for more sustainable development. Consequently, while some regions of the world and Europe, have a common approach to the environment, it is a matter of concern that the issues of space, soil and land resources are not yet themselves the subject of a common approach.