# Monitoring & assessment framework — Local contamination

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**Monitoring & assessment framework with regard to local contamination:**

- **— Characteristics of local contamination**
- **— Outline of a proposed monitoring & assessment framework**
- **— Progress of implementation**

# Soil degradation patterns

## SOIL DETERIORATION

**Local contamination**

**Diffuse contamination**

Inorganic trace elements (e.g. heavy metals)
Organic compounds
Acidification
Eutrophication

Salinisation
Compaction deterioration

Loss of biodiversity

## SOIL LOSS

Soil displacement

**Soil erosion**
Wind
Water

Large-scale land movements

Desertification

Soil 'de-functioning'

**Soil sealing**

# ETC on Soil
# Proposal for a European soil-monitoring and assessment framework

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# Soil degradation patterns

## This framework will:

- identify data availability and data gaps;
- provide a frame for a minimum set of data harmonisation;
- provide a frame for integration of relevant information from other environmental compartments;
- produce information by development of indicators;
- enable more comprehensive reporting on the state of soils in Europe.

# Soil degradation patterns

## Outputs of the framework

- Agreed list of policy-relevant indicators on soil
- Suitable assessment procedures
- Improved data flow
- More comparable data and information
- European soil-monitoring network (SoilNet)
- Standard set of measured parameters
- Creation of a EuroSoilBase (SoilBase)
- Agreed reporting mechanism

# Monitoring approaches for the major soil issues

| | Diffuse contamination | Local contamination | Soil sealing | Soil erosion |
|---|---|---|---|---|
| **Monitoring units** | Selected sites 'classical Monitoring' | All European regions | | Selected sites in representative European regions |
| **Monitoring methodology** | Point based monitoring representative selection of monitoring sites | Based on: regional summary reports and modelling of data gaps | Based on regional summary reports (to be specified) | Geographical data-bases; modelling of topographic, climatic, soil, land use and other data; |
| **Data requirements** | Obligatory set of analytical data | Aggregated data on contaminated sites | Aggregated data from European regions | Model results, erosion measurements |
| **Time intervals** | On average 5 years | 1–2 years | 2–5 years | 1 year |

# Specific characteristics

## General aspects

— Occurrence of soil degradation lies in the past.
— Local contamination can be considered as a reversible process.
— Starting point of dealing with local contamination: already occurred impairments.
— Objective of activities: meeting a status with no considerable risks for humans.

## Monitoring aspects

— Subject of monitoring is the improvement of the status of environmental media, respectively soil, as a consequence of remedial or safeguarding measures.
— The extent of local contamination depends in a high degree on local conditions, such as:
  — handling of hazardous substances;
  — implemented security measures to provide soil contamination; or
  — current use of the site.

  As a consequence of this fact, statistical methods can hardly be applied to estimate the extent of problems at a large scale on the basis of single cases.
— The first phase of monitoring of local contamination is rather based on the quantification of human activities to tackle the problem than on environmental parameters.

# European Topic Centre on Soil (ETC/S)

**ETCs support the EEA in the development of a work programme**
**ETCs work under contract to the EEA**

## 'Local contamination'

**ETC partners involved**

Austrian Federal Environment Agency (UBA)

**Objectives of the EEA's work programme**

Improve the level of reliable and comparable information on contaminated sites.

Develop a methodology to collect information under existing national programmes, as a basis for subsequent preparation of a Europe-wide assessment of the:

— extent of contaminated land;
— level of contamination;
— extent of remediation being achieved.

# Expected answers and results

**General requirements of the EEA (see EEA's mandate)**

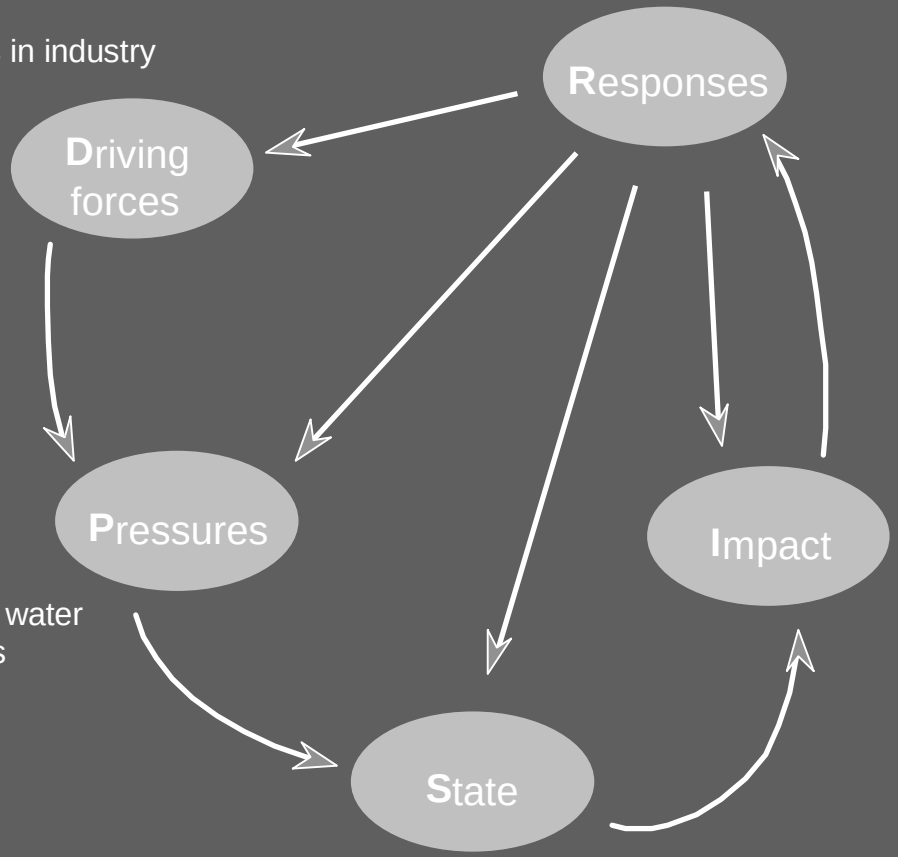
... Provide policy-makers with objective, comparable and reliable data concerning local contamination at European level.

**Policy-makers expect answers to 'simple questions' ...**

| | |
|---|---|
| How bad is it ? | — How many groundwater bodies are affected?<br>— To what extent is land use limited? |
| Hot spots? | — Most affected regions |
| Measures needed? | — Costs and time involved |
| Are we improving? | — Change to the better or to the worse |

# DPSIR approach — Local contamination
# Draft

- Increasing waste generation
- Inappropriate disposal techniques
- Increasing amount of hazardous waste
- Extensive use of hazardous substances in industry
- Careless use of toxic substances
- Accidents, war damages
- Impairment of drinking water supply in densely populated regions




- Emissions to ground-/surface water
- Production of explosive gases
- Soil contamination

Threat to human health by:
- contaminated drinking water;
- direct contact with contaminants;
- explosions of landfill gases;
- uptake of pollutants
- restrictions on:
  - land use;
  - drinking water supply.

- Existence of contaminated sites
- Pollutants in soil, sediments and plants
- Ground-/surface water pollution
- Local contamination of explosive gases

# Soil degradation

## Main parts of the assessment

- Identification of relevant indicators and priorities
- Calculation of the indicators
- Assessment of the results

# Soil degradation

## Basic criteria for indicator development

- Policy relevance and utility for users
- Analytical soundness
- Measurability

# Draft indicators for local contamination

**Type A**

Description indicator: ‘what is happening?’

**Type B**

Performance indicator: ‘does it matter?’

**Type C**

Efficiency indicator: ‘are we improving?’

**Type D**

Total welfare indicator: ‘are we on the whole better off?’

# Draft indicators for local contamination

## Indicators assigned to the element 'Driving forces'

| | |
|---|---|
| • Impairment of drinking water supply in densely populated regions | A |

## Draft indicators assigned to the element 'State' indicators

| | |
|---|---|
| • Number of sites per capita and per defined region | A |
| • Surface of sites per capita and per defined region | A |
| • Number of sites posing significant risk per capita and per defined region | B |
| • Ratio between identified sites and estimated total | A |
| • Total amount of hazardous substances in soil, caused by local contamination (estimation) | A |
| • Increase/decrease of total amount of hazardous substances in soil, caused by local contamination (estimation) | C |

# Draft indicators for local contamination

## ‘Impact’ indicators

| | |
|---|---|
| • Incidents of groundwater impairment deriving from local contamination (l.c.) in a defined region | B |
| • Ratio between total surface of ‘abandoned industrial sites’ per ‘total surface of industrially used land’ of a defined region | A |

## ‘Response’ indicators

| | |
|---|---|
| • Environmental expenditures for site investigation and remediation | A |
| • Extra costs due to groundwater impairment deriving from l. c. | A |
| • Development of extra costs due to groundwater impairment deriving from local contamination over a defined period | C |
| • Change of ratio between identified number of remediated sites per estimated total to be remediated within a defined period | C |

# Problems involved with the monitoring of contaminated sites data

A minimum data harmonisation is needed in order to allow the comparison of contaminated sites data from different Member States.

**CONFLICTS**

There is no legal requirement for data harmonisation. Member States have the freedom to 'choose their own management style'.

**CONCLUSION**

Activities towards data harmonisation can currently only be based on voluntary commitments of the Member States.

# Estimation models

**Problems**

- All EEA countries have incomplete data collections, with regions at different progress levels.
- Some EEA countries do not have any data collections (inventories/registers).

**Proposed solution**

**Estimates based on:**

- experience of national experts included;
- simple models or default values for all EEA countries needed.

# Problems involved with current contaminated sites terminology

- Specific types of contamination will never reach a common agreement; i.e. nuclear waste sites, natural contamination, operating waste sites.

- Results from a workshop with CS experts and country representatives from all EEA member countries revealed that a common agreement on the term 'contaminated site' is difficult to achieve.

# Data collection

## Two approaches

- Collection and assessment of all available data:
  - → easy and quick approach to get some basic information
  - → no comparability
  - → data gaps
  - → no information at European scale
- Demand of aggregated data, based on availability:
  - → willingness of countries to provide information
  - → minimum set of harmonisation, comparability
  - → data gaps handled by estimations and models
  - → information at European scale possible

# Data collection

## Benefits for the countries

- Enhanced data comparison between countries
- Additional understanding of soil issues at different aggregation levels
- Extended communications on soil issues within countries

# EuroSoilNet monitoring tools (draft)

| | Diffuse contamination | Local contamination | Soil sealing | Soil erosion |
|---|---|---|---|---|
| **Development of indicators** | Long-term approach | Short-term and long-term approach | | |
| **Implementation of indicators** | 2000 | 1999 (short-term)<br>2000 (long-term) | | |
| **Test monitoring** | Data collection from European reference sites | Data collection and assessment of selected European test regions | Data collection and assessment of European regions | Data collection from European reference sites |
| **Implementation of test monitoring** | 2001/2002 | 1999 | 1999/2000 | |
| **Up-scaling: from test monitoring to European monitoring** | 1. Development of methods to make available national data comparable<br>2. Definition of a reporting format<br>3. Development of models for data gaps | | | |
| **Output** | Data basis for the calculation of soil indicators | | | |

# Monitoring & assessment framework — Local contamination

## Outline

Monitoring units: All European units

Monit. methodology: — Data collection and assessment based on available and reliable data deriving from regional summary reports
— Estimations and modelling in case of data gaps

Data requirements: Aggregated data on local contamination with a view on representative indicators

Reporting period: 1–2 years

## Progress

Test monitoring: Data collection and assessments of selected European test regions (running)

Draft implementation of test monitoring: 1999 — Presentation and discussion of the 2nd Workshop of Contaminated Sites in Dublin, November 1999

Test monitoring in CEE countries: 2000/2001

Up-scaling from test monitoring to European monitoring:
— Development of methods to make available national data comparable
— Development of models for data gaps
— Definition of a reporting format

Output: Data basis for the calculation of contaminated sites indicators for the state of local soil contamination