Soil environmental policies in the Netherlands – sharing experiences

- by Dr. Ton Honders
- (Bucharest 14 June 2011)

MENU



- 1. WHICH PROBLEMS DO WE WANT TO SOLVE ?
- 2. EUROPEAN POLICIES
- 3. DUTCH POLICIES
 - TRIGGERS AND PRINCIPLES
 - SOIL PROTECTION
 - SUSTAINABLE LAND MANAGEMENT
 - SITE REMEDIATION
- 4. INSTRUMENTS AND IMPLEMENTATION PROCESSES
 - TECHNOLOGIES
 - QUALITY ASSURANCE AND QUALITY CONTROL
 - DEMING CIRCLE
- 5. EPILOGUE

SOIL FUNCTIONS



- 1. PRODUCING FOOD
- 2. STORING / FILTERING / TRANSFORMING OF MINERALS, WATER, ORGANIC MATTER, GASES
- 3. PROVIDING RAW MATERIALS
- 4. PLATFORM FOR HUMAN ACTIVITIES
- 5. **BIODIVERSITY**



MANY SOURCES OF CONTAMINATION

- 1. URBAN AREAS:
 - INDUSTRY BAD HOUSEKEEPING
 - INDUSTRY ACCIDENTS / SPILLS
 - AIR POLLUTION

2. RURAL AREAS

- OVERUSE OF PESTICIDES
- OVERUSE OF FERTILISERS
- CONTAMINATED IRRIGATION WATER

EXAMPLES OF SOIL CHEMICAL CONTAMINATION





BUT ALSO LAND DEGRADATION

- 1. EROSION
- 2. ORGANIC MATTER DECLINE
- 3. SALINISATION
- 4. **DESERTIFICATION**
- 5. LANDSLIDES
- 6. COMPACTION
- 7. SEALING



EXAMPLES OF LAND DEGRADATION













- 1. HUMAN HEALTH
- 2. FOOD SAFETY

3. **RESOURCE DEPLETION**

- CONTAMINATED GROUNDWATER
- AREA OF CULTIVABLE AGRICULTURAL LAND
- 4. ECOLOGICAL DAMAGE



EUROPEAN ENVIRONMENTAL CHALLENGES



EUROPEAN LEGISLATION RELATED TO SOIL

- 1. SOIL THEMATIC STRATEGY
- 2. WATER FRAMEWORK DIRECTIVE
- 3. GROUNDWATER DIRECTIVE
- 4. LANDFILL DIRECTIVE
- 5. HAZARDOUS WASTE DIRECTIVE
- 6. CONSTRUCTION PRODUCTS DIRECTIVE
- 7. NATURA 2000
- 8. TREATY OF ARRHUS (ARCHEOLOGY)
- 9. ...

10.



EUROPEAN SOIL THEMES

- 1. SOIL DEGRADATION
 - EROSION
 - ORGANIC MATTER DECLINE
 - SALINISATION
 - DESERTIFICATION
 - LANDSLIDES
 - COMPACTION
 - SEALING
- 2. BIODIVERSITY
- 3. CONTAMINATION



EU SOIL ATLAS OF EUROPE

What is sol? When does it come from? How important is soil in our daily activities? Is soil the same everywhere? Is soil at risk? The first ever SOIL ATLAS OF EUROPE uses striking maps, dearly written informative texts and stunning photographs to answer and exclain terse questions

A team of leading European soil scientists have collaborated to produce this unique document. Using state of the art computer mapping techniques, the SOIL ATLAS OF EUROPE shows the changing nature of soil across the European continent.

The SOIL ATLAS OF EUROPE exclains the origin and role of sol describes the different soil types that can be found in Europe and their relevance on a global scale. The atlas also discusses the principal threats to soil across Europe and the steps being taken within the European Union to protect soil resources.

The SOIL ATLAS OF EUROPE is more than just a normal atlas that simply shows the location of places. Rather, this volume presents an Interpretation of an often neglected natural resource that surrounds and affects us all.

The SOIL ATLAS OF EUROPE is an essential reference to a non enewable resource that is fundamental for life on this planet





SOIL ATLAS OF EUROPE

The properties of soil very tramendously from region to region. Clay soils can hinder drainage when wet but produce wide open cracks in dry periods.

Plants and crops are dependent on soil for the supply of water, nutrients and as a medium for growing. Soil stores, filters, buffers and transforms substances that are introduced into the environment. This capability is crucial in producing and protecting water supplies and for regulating greenhouse gases. Soil is a provider of raw materials. Soil is also an incredible habitat and gene pool. Soil is a fundamental component of our landscape and cultural heritage.



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SOIL ATLAS OF **EUROPE**



 \bigcirc European Commission



EU SOIL ATLAS OF EUROPE

processes and global functions that occur within soil are driven by living organisms that, in urn, sustain life above ground. However, despite the fact that soils are home to a quarter of all living species on Earth, life within the soil is often hidden away and suffers by being 'out of sight and out of mind'.

What kind of life is there in soil? What do we mean by soil biodiversity? What is special about soil biology? How activities affect soil ecosystems? What are the links between soil biota and climate change?

activities affects and ecosystemis? What are the links between soil bloba and climate change? The first ever EUROPEAN AILAS OF SOIL BIODWERSITY uses informatine texts, stunning photographs and maps to answ questions and other issues. The EUROPEAN AILAS OF SOIL BIODWERSITY functions as a comprehensive guide allowi specialists to access information about this unscene world. The first part of the blob provides an overview of the below environment, soli biota in general, the ecosystem functions that soli organism perform, the important value it has for activities and relevance for global biogeochemical cycles. The second part is an 'Encyclopedia of Soil Biodiversity', with the smallest organism such as the bacteria, this segment works through a range of taxonomic groups such a nematodes, insects and macro-fauna to illustrate the astonishing levels of heterogeneity of life in soil.

The EUROPEAN ATLAS OF SOIL BIODIVERSITY is more than just a normal atlas. Produced by leading soil scientists from Europe and other parts of the world under the auspice of the international Year of Biodiversity 2010, this unique document presents an interpretation of an often neglected biome that surrounds and affects us all.

The EUROPEAN ATLAS OF SOIL BIODIVERSITY is an essential reference to the many and varied aspects of soil. The overall goal of this work is to convey the fundamental necessity to safeguard soil biodiversity in order to guarantee life on this planet.

SOIL BIODIVERSITY

ATLAS









EUROPEAN ATLAS OF SOIL **BIODIVERSITY**



JRC

SOIL ENVIRONMENTAL POLICIES





LAND USE IN THE NETHERLANDS



CHALLENGES



1. SPATIAL PLANNING CHALLENGES:

- RAPID URBAN DEVELOPMENT
- INFRASTRUCTURAL PROJECTS (HARBOURS, HIGHWAYS, RAILROADS)
- PRESERVATION OF NATURAL AREAS
- 2. ENVIRONMENTAL CHALLENGES:
 - INTENSIVE LAND-USE / LAND-TURNOVER
 - HIGH GROUNDWATER LEVELS
 - INDUSTRIALISED (HISTORIC AND PRESENT)
- 3. SOCIAL CHALLENGES:
 - PUBLIC AWARENESS FOR ENVIRONMENTAL ISSUES
 - MANY STAKEHOLDERS
 - "COMPLEX" SOCIETY

POLICY TRIGGERS

1. ECONOMICAL

- ENABLE SPATIAL DEVELOPMENTS (e.g.BROWNFIELDS)
- RESOURCE PROTECTION (e.g.GROUNDWATER)
- AGRICULTURE:
 - GUARANTEE FOOD SAFETY
 - MAINTAIN AREA OF CULTIVABLE LAND

2. ENVIRONMENTAL

- HUMAN HEALTH
- NATURE PRESERVATION
- PUBLIC AWARENESS



POLICY PRIORITIES

1. SOIL PROTECTION

2. RISK-BASED LAND MANAGEMENT

3. SITE REMEDIATION

WHILST MAINTAINING ECONOMIC AND SOCIAL ACTIVITIES >> Focus on environment



COSTS



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SOIL PROTECTION



- **1. TECHNICAL GUIDELINES AVAILABLE**
- 2. EMBEDDED IN NATIONAL PERMITTING PROCEDURES (FOR COMPANIES)
- 3. OR EU LEGISLATION (e.g. AGRICULTURE AND LANDFILLING)
- 4. SOME EXAMPLES

SOIL PROTECTION IN INDUSTRIAL ENVIRONMENTS











SOIL PROTECTION IN RURAL ENVIRONMENTS



REGULATED USE OF FERTILISERS AND PESTICIDES

LEVEL OF GROUNDWATER PROTECTION
= 0.1 ug / I (PESTICIDES)
= 5 mg / I (NITRATE)



SANITARY LANDFILLING





- MEASURES:
 - COMPLIANCE WITH EU LEGISLATION
 - ISOLATION / SEALING
 - CRITERIA FOR COLLECTION / REUSE / DISPOSAL





DISPOSAL OF AQUATIC SEDIMENTS



THE DUTCH SYSTEM FOR SUSTAINABLE LANDMANAGEMENT AND SITE REMEDIATION



CONTAMINANT CONCENTRATION



(SOIL PROTECTION ACT)



LEGISLATION - "SOIL QUALITY DECREE"



BASIC PRINCIPLES OF SUSTAINABLE LANDMANAGEMENT





SITE REMEDIATION



SOIL QUALITY HIGHLY CONTAMINATED

APPLICATION



REMEDIATION

TREATMENT

LANDFILL



STANDSTILL PRINCIPLE (1)



SOIL QUALITY

APPLICATION



INDUSTRY





INDUSTRY



INDUSTRY







RESIDENCE

NATURE

STANDSTILL PRINCIPLE (2)



SOIL QUALITY RESIDENCE

APPLICATION



RESIDENCE







RESIDENCE

INDUSTRY



RESIDENCE





NATURE

STANDSTILL PRINCIPLE (3)



APPLICATION

SOIL QUALITY CLEAN

YES (NOT PREFERRED) YES YES (PREFERRED)

NATURE



(SOIL QUALITY DECREE)

(SOIL PROTECTION ACT)

SITE REMEDIATION INSTRUMENTS

- 1. LEGISLATION
- 2. INSTITUTIONAL STRUCTURE
- 3. SITE INVENTORY
- 4. FINANCING
- 5. TECHNOLOGIES
- 6. QA/QC

LEGISLATION - KEY ELEMENTS (1)

- 1. DEFINITION OF SOIL QUALITY / SCREENING VALUES (SQS / SSV)
- 2. DEFINITION OF "A CASE OF SITE REMEDIATION"
 - EXCEEDING SQS / SSV
 - IN A CERTAIN VOLUME OF SOIL (e.g. 25 m3)
 - IN A CERTAIN VOLUME OF GROUNDWATER (e.g. 1000 m3)
- 3. LIABILITY / ACCOUNTABILITY ASPECTS:
 - SET A MOMENT IN TIME (HISTORIC / NEW POLLUTION)
 - LIABILITY ORDER (e.g. POLLUTER OWNER USER / LEASER – LOCAL / CENTRAL AUTHORITIES)
- 4. SITE INVENTORY



- 1. SOIL PROTECTION ACT
 - PROTECTION AND REMEDIATION
 - GOVERNMENTAL ORDER TO "REMEDIATE"
- 2. "CIRCULAR" ON SITE REMEDIATION
 - DETAILED TECHNICAL PROCEDURES
 - SOIL QUALITY STANDARDS / RISK ASSESSMENT
- 3. QUICK WINS LAND REGISTRATION / "CADASTER"
 - CHANGE OF OWNERSHIP
 - CHANGE OF LAND USE

RISK PRIORITISATION IS A PREREQUISITE



- 1. HUMAN HEALTH
- 2. AGRICULTURAL PRODUCTS
- 3. GROUNDWATER QUALITY
- 4. ECOLOGY / BIODIVERSITY
- 5. DIFFERENCES FOR URBAN / RURAL AREAS

INSTITUTIONAL STRUCTURE, TASKS AND RESPONSIBILITIES (SIMPLIFIED)



- 1. MINISTRY OF INFRASTRUCTURE & ENVIRONMENT:
 - POLICIES, LEGISLATION AND INSTRUMENTS
 - NATIONAL ENVIRONMENTAL GUARD
 - LICENSING OF CONSULTANTS AND CONTRACTORS
 - NATIONAL MONITORING / REPORTING TO PARLIAMENT
- 2. LOCAL COMPETENT AUTHORITIES 12 PROVINCES & 30 LARGE MUNICIPALITIES:
 - LICENSING SOIL REMEDIATION PLANS OF 3rd PARTIES
 - SITE REMEDIATION WITH PUBLIC MONEY
 - LOCAL ENVIRONMENTAL GUARD
 - LOCAL MONITORING AND REPORTING
 - LAND REGISTRATION AND ENVIRONMENTAL PERMITS



NL MANPOWER EFFORT (ESTIMATES)

NATIONAL MINISTRIES AND AGENCIES	100
LOCAL AUTHORITIES	900
KEY LABORATORIES	100
CONSULTANTS,	1900
CONTRACTORS,	
COMMERCIAL	
LABORATORIES	
TOTAL	3000

SITE INVENTORY



- 1. PURPOSE:
 - SCALE OF THE PROBLEM (ENVIRONMENTAL / FINANCIAL)
 - PRIORITISATION OF REMEDIATION
- 2. DATA GATHERING MECHANISMS:
 - BUILDING PERMIT
 - ENVIRONMENTAL PERMIT
 - CHANGE OF OWNERSHIP / LAND USE
 - ORDER BY THE COMPETENT AUTHORITIES FOR SUSPECTED SITES
 - TARGETED SAMPLING CAMPAIGNS

BUILD-UP INVENTORY OF POTENTIALLY CONTAMINATED SITES



INVENTORY OF POTENTIALLY CONTAMINATED SITES







NL NUMBER OF SITE REMEDIATIONS



NL NUMBER OF SITE REMEDIATIONS

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TYPES OF REMEDIATION (BALLPARK FIGURES)

- 1.TOPSOIL ONLY = 60 %
- 2. SUBSOIL ONLY = 10 %
- 3.TOP&SUB-SOIL = 30 %



BREAK-DOWN OF CONTAMNIATED SITE **INVENTORY**





REMEDIATION POLICY OBJECTIVES

2010-2015 – URGENT REMEDIATION

SITE	NUMBER
URGENT REMEDIATION (TOTAL)	2000
HUMAN HEALTH	400
GROUNDWATER	1500
ECOLOGY	100

2010 - 2030 - 5000-7000 REMEDATIONS (OTHER SITES)

2030 – EXPECTED ENDPOINT = 30.000 REMEDATIONS

FINANCING



1. GOVERNMENT

2. PRIVATE PARTIES:

- PROJECT DEVELOPERS
- LARGE INDUSTRIES

3. VARIOUS SUBSIDY / GRANT PROGRAMMES

SITE REMEDIATION – CUMULATIVE COSTS

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NL REMEDIATION COST FACTORS









THE TECHNOLOGY CIRCLE





INSTRUMENTS AND TECHNOLOGIES

- 1. SITE INVESTIGATION
 - NUMEROUS PROTOCLS
 - SOIL QUALITY MAPPING AND SUSTAINABLE LAND MANAGEMENT PLAN
- 2. RISK-ASSESSMENT INSTRUMENTS
 - SITE REMEDIATION
 - SUSTAINABLE LANDMANAGEMENT
- 3. SITE REMEDIATION / SOIL TREATMENT
 - NUMEROUS IN-SITU TECHNOLOGIES
 - ROBUST EX-SITU SOIL TREATMENT TECHNOLOGIES

EX-SITU TREATMENT TECHNOLOGIES

THERMAL

WASHING

LANDFARMING







OPERATIONAL IN-SITU TECHNOLOGIES

PHYSICAL

BIOLOGICAL

CHEMICAL









LEGISLATION

TECHNICAL GUIDELINES

CERTIFCATION SCHEMES





EPILOGUE - RECOMMENDATION

1. START SIMPLE AND KEEP IT SIMPLE

2. MAKE A SELECTION OF "TESTED AND TRIED" LEGAL, FINANCIAL AND TECHNOLOGICAL INSTRUMENTS SUITABLE FOR THE ROMANIAN SITUATION



EPILOGUE – POLICY AXIS

DEFINE AN APPROPRIATE BLEND OF POLICIES ON:

- SOIL PROTECTION
- SUSTAINABLE LANDMANAGEMENT
- SITE REMEDIATION

BASED ON A COST / BENEFIT ANALYSIS



EPILOGUE – INSTITUTIONAL AXIS

- 1. CLEAR LEGISLATION AND TECHNICAL GUIDELINES
- 2. CLEAR RESPONSABILITIES
- 3. GUIDED IMPLEMENTATION
- 4. MONITOR RESULTS



EPILOGUE – TECHNOLOGY AXIS

- 1. SITE INVENTORY / PRIOROTISING PROBLEMS (e.g. AGRICULTURE, BROWNFIELDS, GROUNDWATER)
- 2. RISK ASSESSMENT INSTRUMENTS
- 3. LOW COST PROVEN TECHNOLGIES ARE AVAILABLE

QUESTIONS ?





FURTHER INFORMATION:

- <u>www.vrom.nl</u>
- <u>www.rivm.nl</u>
- www.bodemplus.nl
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