WG 3

“Delineation of priority areas for soil risk”

Mandate, activity, problems

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WG 3 mandate

- **Evaluate the criteria proposed during discussions on the Soil Framework Directive and propose to the JRC further studies and projects to test the results of this evaluation**
- **Provide added value information compared to report of SIWG and projects like RAMSOIL and ENVASSO**
- **Consider socio-economic aspects such as the impact of societies and land use effects on threats**
- **Produce report about delineation of priority areas at risk**

Common Criteria for Risk Area Identification according to Soil Threats

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Each of the threats is considered separately within a **common framework of practical questions**.

1. What is the required **resolution** of spatial and other information?
2. What are the **data requirements** to establish baseline conditions and identify trends?
3. Where models are used, **what calibration data** is required?
4. What potential is there **to use existing data**, particularly that available at the European level?

SECTION 1 COMMON ELEMENTS FOR THE IDENTIFICATION OF AREAS AT RISK OF EROSION
Soil typological unit (STU) (soil type)
Soil texture (STU level)
Soil density, hydraulic properties (STU level)
Topography, including slope gradient and slope length
Land cover
Land use (including land management, farming systems and forestry)
Climate (including rainfall distribution and wind characteristics)
Hydrological conditions
Agro-ecological zone

Back to basics

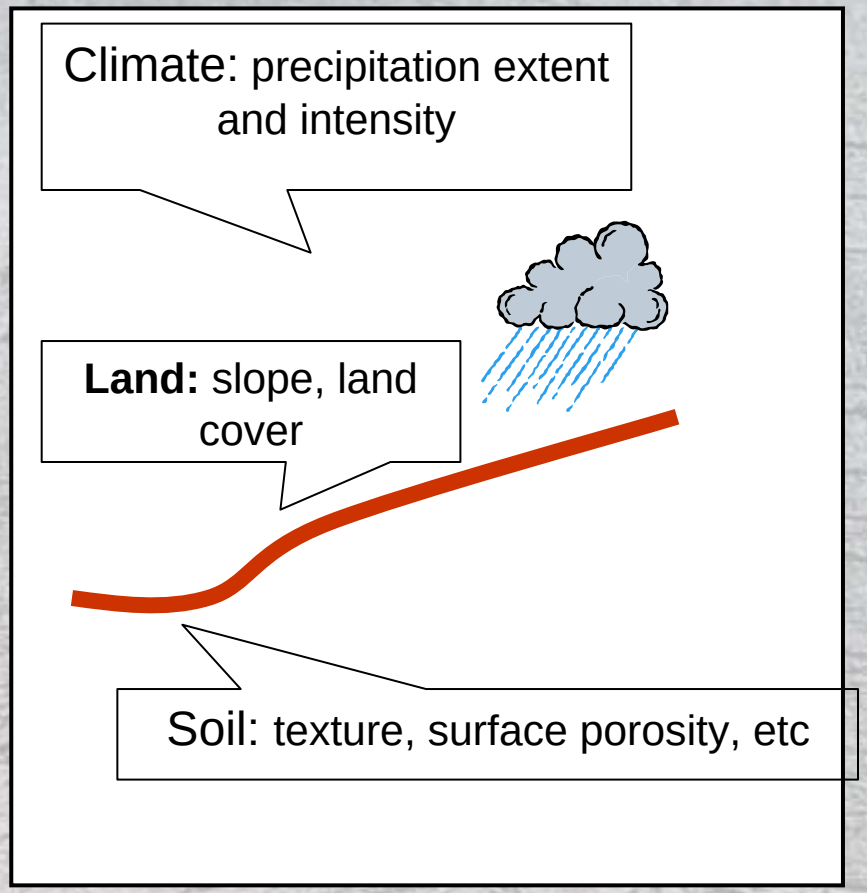
- Risk assessment
  - must be founded on the application of a conceptual model that connects a source of harm to a receptor (e.g. soil)
  - combines an estimation of the probability of harm occurring with an estimation of the impact of the harm on the receptor
- Risk management is informed by and should always follow risk assessment

Harm to soil = loss of functionality

- Harm occurs when the function of the receptor is degraded
- if soil is the receptor, harm occurs when capacity is lost to deliver outputs e.g. food and fibre, water management, support for biodiversity, etc

What is a ‘threat’? Threats are processes that link sources of harm to soil and create a potential loss of function

- For example: erosion is a process that links precipitation + slope + soil properties resulting in a physical loss of soil and harm to the capacity of soil for plant growth



Basis for risk area determination

- What level of harm is acceptable?
- What is the spatial probability of harm occurring above the acceptable level?
- How much uncertainty is acceptable when assessing if unacceptable harm exists?

"Significant possibility
of unacceptable harm?"

Ideal

- Mechanistic models for each type of threat (linkage) that inform
  - receptor (soil) behaviour in terms of functional loss in response to threats
  - the strength of linkages to a source of harm
  - the strength of the sources of harm

Multi-dimensional problem solving

A = FX R x L x S

A = possible risk assessments
F = Functions
R = Receptor (soil) types
L = Linkages (threats or degradation paths)
S = Sources of harm

Issue

- Which is the correct starting point for analysis?
  - Extent of sources of harm (e.g. land management, climate)?
  - Presence of linkages (threats) connecting sources of harm and receptors?
  - Receptor (soil) characteristics?

Receptor (soil) is the logical starting point for spatial analysis

- receptor (soil properties) are relevant to all determinations and focusing on the receptor (soil) properties supports integration
- receptor response is the critical issue (the purpose is soil resource protection)

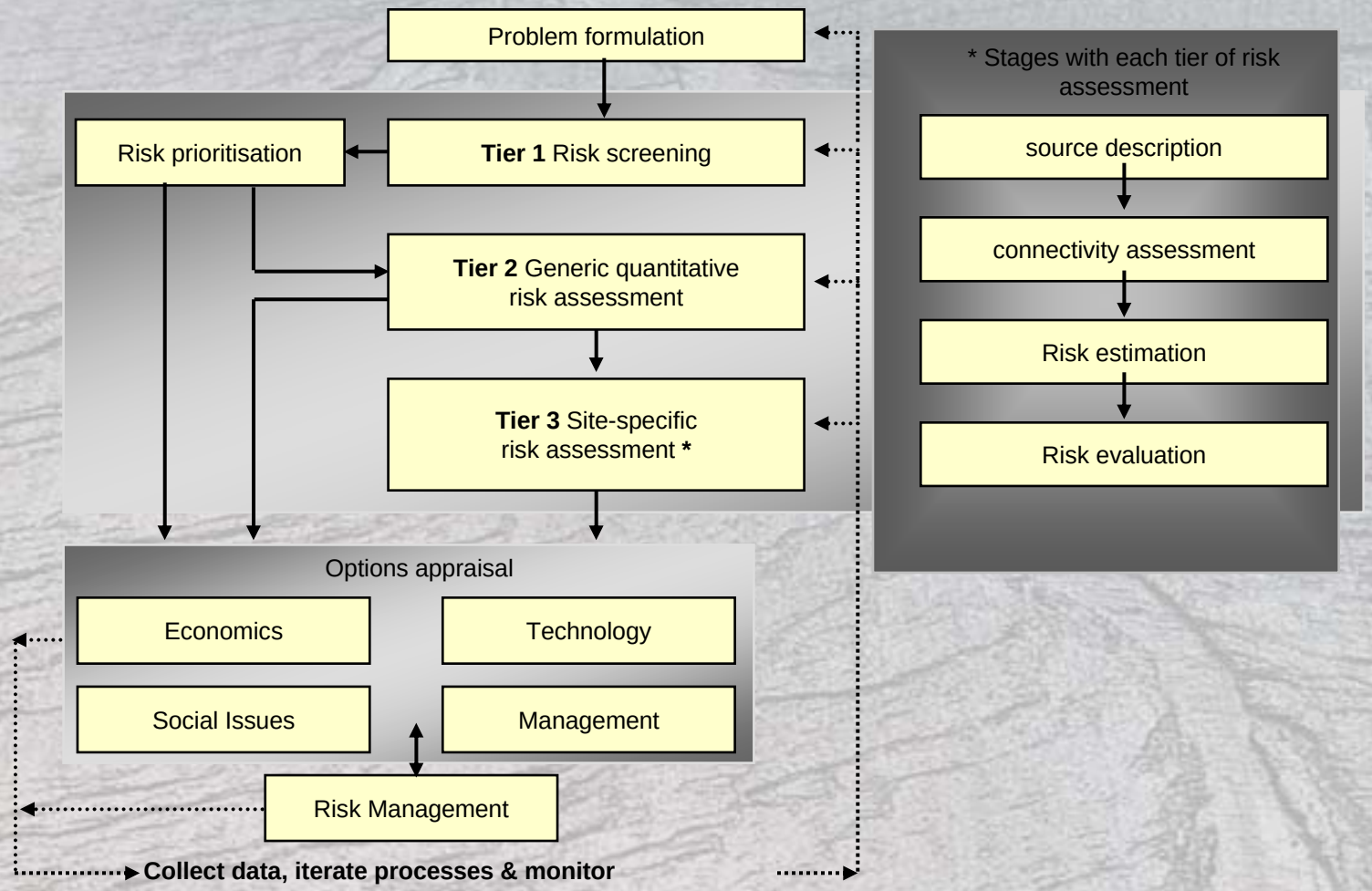
Proposed approach

1. Qualify a spatial inventory of soil types and interpret this in to polygons within which there are dominant soil types
2. Define key sources of harm and qualify spatial inventories of these sources (e.g. climate, slope, land cover)
3. Model (mechanistically or using monitoring data) the strength of linkages between sources and receptor polygons
4. Interpret the nature and extent of linkages (threats) in terms of the probability and degree of their impact on defined functions
5. Test output from above against agreed definition of ‘significant possibility of significant harm’ to identify polygons ‘at risk’

Tiered approach

- A tiered approach allows a progressive lowering of the level at which the probability of significant harm is defined as unacceptable - it is
  - much more efficient than a common threshold and monitor everywhere approach and no less precautionary
  - but technically more complex and costly

Framework


Problem formulation
Risk prioritisation
Tier 1 Risk screening
Tier 2 Generic quantitative risk assessment
Tier 3 Site-specific risk assessment *
* Stages with each tier of risk assessment
source description
connectivity assessment
Risk estimation
Risk evaluation
Options appraisal
Economics
Technology
Social Issues
Management
Risk Management
Collect data, iterate processes & monitor

Receptor description

- Do existing definitions of soil typological units support an adequate receptor characterisation?
- Which scale is appropriate for tier 1 / tier 2 assessments?
- Are Soil Typological Units boundaries delineated with sufficient certainty?

Modelling

- Identify and agree the main sources of harm within each threat process
- Develop and agree adequate models to link sources of harm to receptor types (STUs)

Defining acceptable harm

- Options:
  - No absolute loss of function
  - No loss of function at a higher rate than that of natural recovery
  - No loss of function beyond that can be mitigated at given economic cost

WG3 Report headings

1. Introduction
2. General Framework
3. Receptor (soil) characterisation
4. Conceptual model for each threat and source (risk factor) characterisation
5. Acceptability of harm to function (e.g. functional loss of 10% not occurring with 90% confidence) for successive tiers
6. Quantitative development
7. Proposals for implementation

Thank you