

A Risk Based Approach to Identify And Combat Areas of Soil Degradation

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Why Protect Soils?

Soil is a non-renewable resource that performs many vital functions. These are worthy of protection because of their socio-economic and environmental importance. Soil functions include food and other biomass production, storage, filtration and transformation of many substances including water, carbon, and nitrogen, a role as a habitat and gene pool, a platform for human activities, landscape and heritage, and a provider of raw materials.

Only nine EU Member States have specific legislation on soil protection, usually targeted at very specific threats. Different EU policies are contributing to soil protection, however as these policies have other aims and scopes of action, they are insufficient to ensure an adequate level of protection for all soil in Europe.

The European Union has adopted a Thematic Strategy for Soil Protection (2006) and has proposed Soil Framework Directive. In the UK there is no specific legislation aimed at protecting soils but soil protection does feature in the following documents: Environmental Standards for Farming (Consultation March – May 2009), Safeguarding our Soils- A Strategy for England (September 2009), and the Code of Practice for the Sustainable Use of Soils on Construction Sites (September 2009).

Threats to Soils

Some soil degradation processes are natural phenomena however they can be exacerbated by unsustainable human activities, as detailed in the table below.

TABLE 1- Threats to Soil

| Threat | Human Influence | Extent of Problem in Europe ¹ |
|------------------------|---|--|
| Soil Erosion | Inappropriate cultivation techniques and inadequate cropping practices | 12% of Europe's total land area affected by water erosion and 4.4% affected by wind erosion |
| Organic Matter Decline | Drainage of soils, land use including tillage and presence of crops | 45% of soils in Europe have low or very low organic matter content |
| Compaction | Excessive stocking rates and inappropriate use of heavy machinery in agriculture | Between 36% and 32% of European sub-soils being very vulnerable |
| Salinisation | Irrigation and addition of fertilizer to the soil | Around 3.8 million ha in Europe are affected by the accumulation of soluble salts |
| Contamination | Use and presence of dangerous substances in many production processes and poor or inadequate management practices over two hundred years of industrialisation | Around 3.5 million sites may be potentially contaminated with 0.5 million sites are expected to be really contaminated and need remediation. |
| Sealing | Urban and industrial sprawl and transport networks | The area of soil surface covered with an impermeable material is around 9% of the total area in EU member states |

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Monitoring of Soil Degradation

Forthcoming legislation aimed at protecting and improving soils is likely to include the requirement for countries to adopt a systematic approach to identifying and combating soil degradation. It will require states to set risk reduction targets for such areas and to establish programmes of measures to achieve these. There is a strong need for a consolidated methodology for the holistic assessment of risk to soils to achieve the requirements of the legislation. Existing soil maps, soil inventories and soil monitoring systems are inconsistent across Europe with widely variable levels of detail, frequency, and sampling methodologies.

Establishing a soil monitoring programme is very capital and labour intensive. The OPAL Soil and Earthworm Survey has provided the opportunity to develop a risk assessment approach using data collected by the public using simple indicators. Public participation goes beyond the aim of the soil thematic strategy to raise public participation in the preparation and review of the programmes of measures adopted by the Member States. It actively engages the public in the collection of data, raising public understanding of the importance of soils.

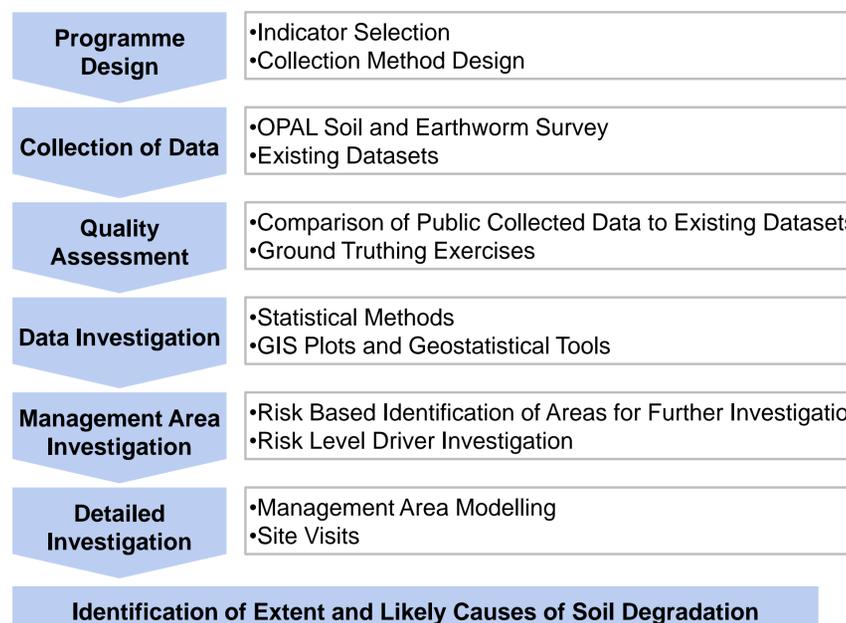


FIGURE 1- Process to Use Public Collected Data to Identify Risk Areas

Further investigation will involve collection of more detailed information from selected sites including presence of soil contaminants and detailed studies of biological activity. This will provide detailed information about areas thought to be at risk of soil degradation and allow calibration of the risk based approach.

REFERENCES

¹ Commission Of The European Communities (2006) Thematic Strategy for Soil. Commission of the European Communities. Belgium.

The proposed risk assessment approach allows ranking of sites for further investigation according to the level of action required. This will facilitate prioritisation of sites at greatest risk of soil degradation, allowing remedial activities to be targeted effectively.

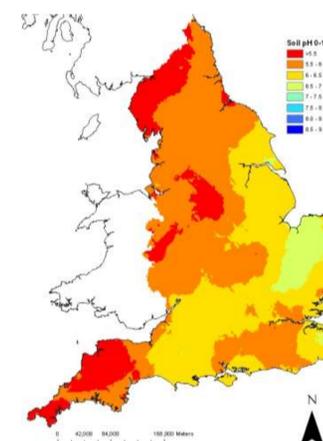


FIGURE 2- Example GIS Plot Used to Investigate Risk Areas