

SOIL PROTECTION IN THE UK

Background

This document has been produced by the Soil Survey and Land Research Centre and provides a briefing on the evolution of UK policy and thinking on soil protection.

Soil Function

Soil is the top 1 - 2 metres of the earth's surface. It is chemically and physically altered from its geological parent material, is biologically active and is, put simply, the basis of our 'green and pleasant land'. Globally, soil is a vital part of the planet's life support system and performs the following natural functions:

- production of biomass including food and timber crops,
- decomposition of plant and animal remains and organic wastes to recycle nutrients and carbon,
- storage, filtration and release of rainwater to groundwater and to rivers,
- support of diverse, species-rich plant and animal communities including soil organisms.

In the human economy, soil

- supports primary production sectors such as agriculture and forestry,
- provides the foundation for built structures,
- stores, filters and routes rainwater to drinking water sources,
- acts as a treatment medium for human and other organic wastes,
- influences the extent and severity of flooding,
- supports and maintains diverse and aesthetically pleasing landscapes.

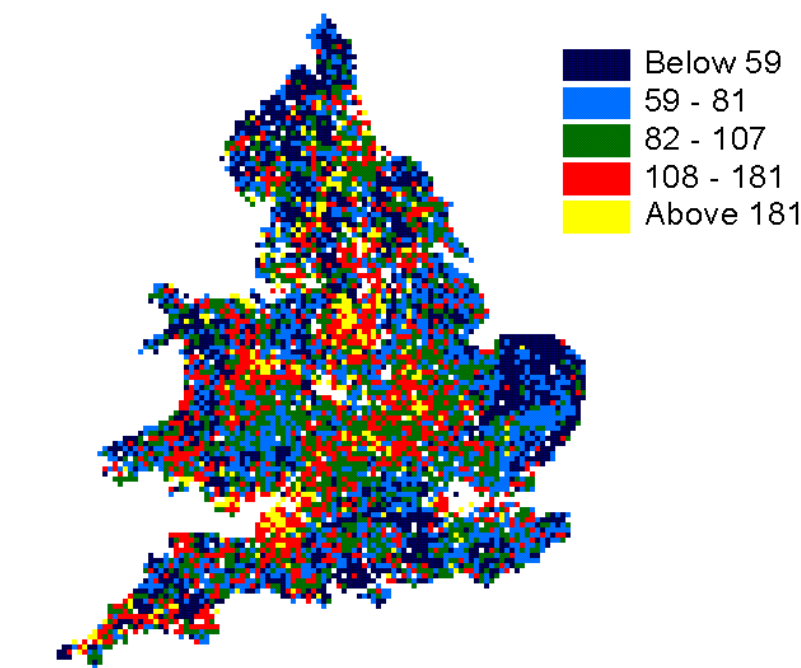
The State of UK Soils

The UK is founded on a variety of rock types and these are overlain by glacial and more recent deposits. UK soils are therefore diverse in nature and vary in their chemical and physical composition (see www.environment-agency.gov.uk/s-enviro/viewpoints/land-use/2soil/1-2.html for a simplified map of soils across England and Wales). This diversity is recorded in soil maps and reports published by the Soil Survey and Land Research Centre (www.silsoe.cranfield.ac.uk/sslrc/services/publications/maps/index.htm) and in the computerised Land Information System (LandIS) that is maintained by SSLRC with funding from MAFF and DETR. Comparable information for Scotland is maintained by



the Macaulay Land Use Research Institute (www.mluri.sari.ac.uk/maps.htm). The following LandIS plot is of topsoil total zinc and shows both the natural variability of soils and also the influence of industrial activity (eg Avonmouth and the Midland conurbations).

Total zinc concentrations (mg/kg)



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Soils are dynamic and respond to climate, vegetation and land use and other environmental stresses. At present, there is concern over:

1. The **acidification** of upland soils from the atmospheric deposition of oxides of sulphur and nitrogen generated from fossil fuel combustion,
2. The **loss of organic matter** in lowland agricultural soils (see www.environment-agency.gov.uk/s-enviro/viewpoints/1land-use/2soil/1-2.html, figure 2) as a result of repeated arable cropping without additions of manure,
3. The **deterioration of soil structure** in intensively farmed soils probably associated with reductions in certain fractions of soil organic matter. Associated 'capping' of such



soil results in a dramatic loss of surface infiltration capacity and an increase in sediment-enriched run-off.

3. The **erosion** of soils in both the uplands and lowlands resulting from land use practices that leave soils bare for lengths of time. SSLRC has recently completed a survey of phosphorus and sediment loss from soils in England and Wales for MAFF. The project indicated an annual total movement of 2.2M tonnes of topsoil from arable soils with 17% of soils exhibiting signs of erosion over one or more of three winter seasons.

4. The **over-fertilisation** of agricultural soils with nitrogenous and phosphatic fertilisers leading to nitrate leaching and the eutrophication of rivers and lakes with phosphorus.

5. The **loss of soil biodiversity** which may result from a range of factors including agricultural use,

6. Levels of **soil contamination** with organic chemicals and various potentially toxic metals. Contamination can be 'natural', can have resulted from the spreading of waste to land, the application or disposal of chemicals or the atmospheric deposition of industrial emissions.

7. The loss of soil under new **development** (currently around 15% of the UK is urban).

UK law and policy on soil protection

Law: There is no specific European legislation or UK legal instrument targeted at the protection of soil *per se*. However the Council of Europe ratified the European Soil Charter in 1972 which charges member Governments with implementing a proper policy of soil conservation including appropriate administrative structures and legislation (SSLRC Research Report 2 *Sustaining Land Resources* available via www.cranfield.ac.uk/sslrc).

While the Countryside and Wildlife Act 1981 provides for measures to protect wildlife and landscape and geological features, it excludes measures to conserve soil. Neither is soil specifically included in the definition of the environment in either the Control of Pollution Act 1974 or the Environmental Protection Act 1990 (EPA). Much effort and attention is being devoted to the identification and remediation of industrially contaminated land (at most 1% of the UK land area) under Part IIa of the EPA but the act affords no general protection from pollution or degradation to the other 99 percent of soils.

Policy: Until recently, the protection of soil has been regarded as of low priority, and little attention has been given to the issue. While £40 - 50M is spent annually on the monitoring of water quality, there is no systematic monitoring of soil quality. In response to increased activity in Europe, DETR funded *An Assessment of the Principles of Soil Protection in the UK* in 1989 (refer to DETR Library). In 1993 MAFF published a *Code of Good Agricultural Practice for the Protection of Soil* (MAFF Publications, PB 0617 1993) which recommends particular practices for agricultural soil management. A separate soil chapter drafted by SSLRC for DETR appears in *Sustainable Development, A*



UK Strategy (HMSO, Cm 2426 1994) and identifies two key sustainability issues that recognise the multi-functionality of soil:

- to protect soil as a limited resource for the production of food and other products and as an ecosystem for vital organisms,
- to ensure that land management practices effectively utilise this resource and take account of the need to maintain soil functions by avoiding inappropriate use and development, by prevention erosion, contamination, burial and loss and by preventing irreversible declines in organic matter and pH levels.

In 1995, the Royal Commission on Environmental Pollution began an inquiry into *Sustainable Use of Soil* which led to publication of its nineteenth report (HMSO Cm 3165 1996). Key amongst its 91 recommendations are that:

- the Environment and Agriculture departments jointly draw up and implement a soil protection policy for the UK,
- that the implications for soil be taken into account by the Environment Departments in setting standards for emissions to air and water,
- a national soil quality monitoring scheme be established to complement those for air and water.

The report's other recommendations are directed to specific organisations, industrial sectors and particular practices and pressures.

Government, in its response to the report, accepted the value of a national soil protection policy for the UK, and a draft of this document was sent out from DETR for restricted consultation in 1998. The draft was the subject of a meeting with interested parties. A second draft is in preparation but has not yet been released for public consultation.

In the non-Government sector, the Council for the Protection of Rural England issued a Charter for Soil in 1998 (see www.greenchannel.com/cpre/) while in 1999 the National Trust published its own Soil Protection Policy. The policy will influence all land-based activities on the Trust's 250,000 hectare estate and is being actively implemented through a number of measures. (www.ntenvironment.com/html/env_iss/_fspapers/fs_soil01.htm). There are a number of separate initiatives on soil resources at the European level.

This document can be downloaded from the SSLRC web site (www.silsoe.cranfield.ac.uk/sslrc/downloads/index.htm). **For further information** on this topic, email soil.survey@cranfield.ac.uk

Summary

1. Soil is a vital resource which supports both live and economic activity in the UK.



2.No legal framework exists for its protection or conservation.

www.silsoe.cranfield.ac.uk/sslrc/downloads/index.htm

3. Government agreed in 1997 that a national strategy for soil is needed. DETR is preparing a consultative draft which has yet to be published.

4. Recognition of the importance of soil protection is growing both in the UK and in the European Union.

