

# Snapshots of the Environment



ENVIRONMENT AGENCY

The National Centre for Environmental Data and Surveillance

## Conserving the land



### Land Use and Resources

#### 1.0 Introduction

1.1 The **Snapshots of the Environment** series explores some of the issues related to each of the nine **Themes** identified in the recent Environment Agency publication 'An Environmental Strategy for the Millennium and Beyond'. Each Snapshot uses the **Viewpoints on the Environment** and the **Stresses and Strains** frameworks to look at some of the pressures on the environment. The second Snapshot in this series focuses on **Conserving the Land**.

1.2 Given the wide range of potential topics and the restricted space, these Snapshots can only touch upon some of the issues and cannot be a comprehensive review. As more information becomes available, or new issues develop, they will be covered in future Snapshots. An important aspect of the Snapshots is that they will look at issues that can be followed across the nine Themes covered in the series.

1.3 This second snapshot looks at some aspects of Agricultural and Urban land use. A guide to the acronyms used is provided at the end of the document.

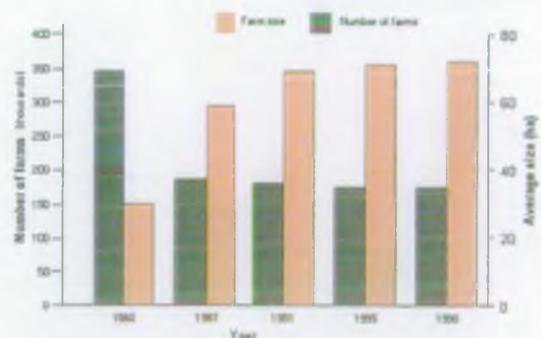
#### 2.0 Agriculture

2.1 The agricultural sector is the largest user of land in England and Wales. Agriculture dominates the rural landscape and in many ways defines its visual, economic and social structure. Currently, about 1.1 million hectares of land (74% and 78% of the land cover of England and Wales respectively) are under some form of agricultural management practice. Agriculture in England and Wales is currently in flux. The reform of the Common Agricultural Policy (CAP) together with recent food scares (typically BSE/CJD) are making the survival of some sectors of the industry increasingly difficult. Amongst the consequences of these changes may be a reduction in the number of farms, an increase in farm size and in some cases, a switch of land use from pasture to permanent arable. This last scenario being especially likely, given the impact of BSE on the British beef industry. Previous changes in agriculture have been associated with an increase in field size and the loss of important landscape features. One of the consequences of the change of land use from pasture to

arable may be an increased risk of soil erosion.

2.2 The reform of the CAP, part of Agenda 2000 (DGVI 1997), is designed to increase the competitiveness in European agriculture, both internally and in the world market. Other aims of this reform include ensuring a fair standard of living for agricultural communities, the creation of alternative opportunities for farmers and the achievement of environmental goals. The previous round of reforms in the CAP have already resulted in some environmental benefits including a reduction in the amount of fertiliser and pesticides used on arable land (DGVI 1997).

2.3 The trend towards fewer but larger farms has been going on for some time. In 1960 there were 344,900 farms with an average size of 30ha. By 1987 this was 185,800 farms with an average size of 59ha. In 1991, 180,676 farms, average size 69ha. In 1995, 174,285 farms and by 1996 the average size of agricultural holdings was 72ha (NRA 1992, MAFF 1996, ONS 1997).



The change in the number and average size of farms, 1960 - 1996

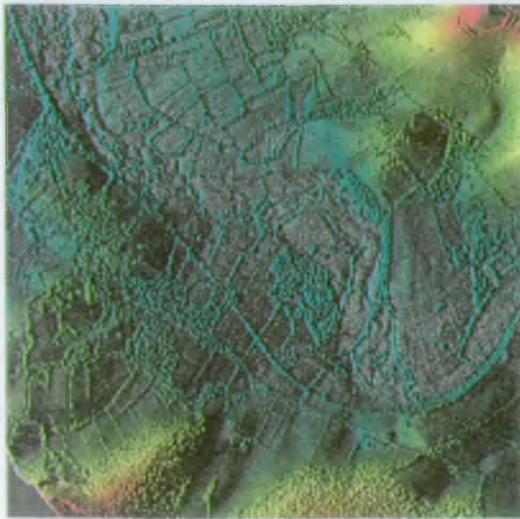
2.4 Within this period there has also been a loss of field boundary features, such as walls and hedges. Much of this loss can be attributed to intensive agricultural practices. These features are important for landscape aesthetics and play an important role in maintaining biodiversity (these aspects will be discussed in future Snapshots) and in controlling soil erosion. Their importance is such that they have been identified as an indicator of sustainable development (DoE 1996).

EA - National centres

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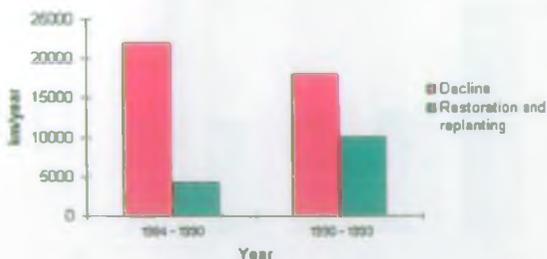


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Field boundary features, including hedgerows, show up clearly on this LIDAR image. LIDAR is a remote sensing device which detects the height of an object.

Data on hedgerows has been collected by a number of surveys carried out by the Institute of Terrestrial Ecology (ITE). These include the Countryside Survey 1990 (CS1990). Analysis of these data show that between 1984 and 1990, hedgerows declined, through removal or neglect, at an estimated rate of 22,000km per year. In the period 1990 to 1993, the rate of decline was lower, 18,000km per year, with an estimated 60,000km of hedges adjacent to agricultural land and 28,000km of hedges adjacent to roads being affected (DETR 1997). In the same period, 29,000km of hedges adjacent to agricultural land were planted or restored. A further estimate of the rate at which these important landscape features are declining will be possible after the completion of the Countryside 2000 survey.



The rate of hedgerow decline and restoration/replanting

**2.5** Currently, around 30% of England is in arable agriculture (DETR 1997) and up to 15% of this land is believed to be at risk from soil erosion by water, in some years (19th Royal Commission 1996). The factors influencing this are slope, soil texture and rainfall. Exposed soil on sloping land is particularly vulnerable. Spring sowing and the preparation of a fine tilth add to the problem. A lowering of the organic content in soil reduces the capacity of the soil to retain water and maintain cohesion, whilst soil compaction causes increased run-off by preventing infiltration into

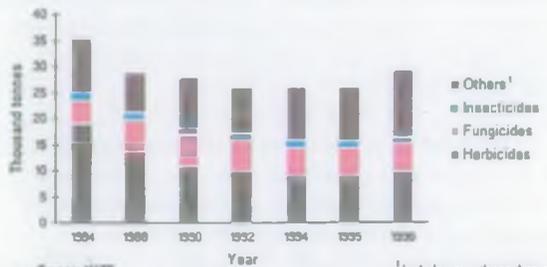
groundwater (19th Royal Commission 1996). Any increase in the area of land in arable agriculture, either through conversion from ley pasture to permanent arable or by bringing into production land that was previously uneconomic to farm (e.g. land on steep slopes) may increase the area of land at risk. It will also increase the risk of diffuse pollution to surface waters from agricultural run-off. Wind erosion is an important factor in drier regions, especially where the soils are light and sandy with little organic matter or where there are light peaty soils.

**2.6** Soil erosion is also a problem in the uplands. Overstocking of sheep can expose the peat soils leading to localised, but severe erosion. Another factor is the damage caused by recreational activities. The Royal Commission identified that fenland peat soils were also being lost. Some 85% of the rich peat soils of East Anglia have been lost since drainage began in the 17th century. Once completely oxidised a different soil develops from the clay that underlies the peat. (19th Royal Commission 1996).

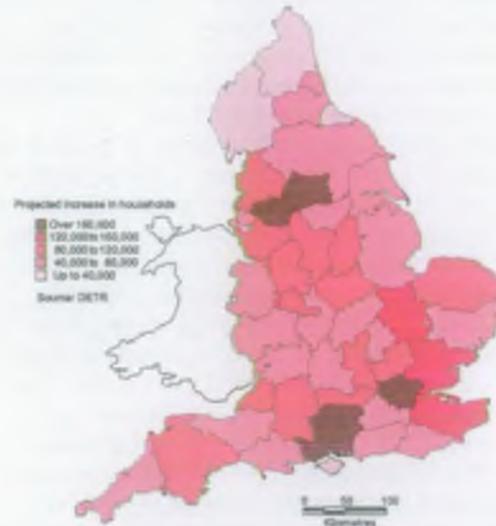
**2.7** The 19th Royal Commission concluded that the erosion of soil from arable land was not a major national problem, nor was it seriously affecting agricultural productivity. However, the main impacts of soil erosion are off-farm, with the costs being born by the wider community, not by the farmer. These include the siltation of fish spawning grounds, impacts on water quality from diffuse pollution and an increased risk of flooding due to increased surface run-off combined with a reduced capacity to buffer this run-off.

**2.8** An important aspect of the CAP reforms is the integration of 'environmental goals' (DG VI 1997) into the CAP. This will be through the use of agri-environment schemes with the aim of supporting sustainable development in rural areas. Existing schemes such as Countryside Stewardship and Environmentally Sensitive Areas, are designed to stimulate more environmentally sympathetic farming practices. The aim being the protection of habitats or landscape features. In the case of Nitrate Sensitive Areas payments are made to control the input of nutrients to protect water supplies. These schemes are beginning the move towards more sustainable agricultural practices. Set-aside offers further potential for environmental benefits. In 1996, 59,000 ha of land were set aside in the UK. Non-food crops were grown on just 15% of this land and the rest was left to green cover (DETR 1997). Managed correctly, this land could produce a wide range of environmental benefits, to wildlife and biodiversity as a whole (ITE 1992) or could be used to provide buffer zones between arable land and water courses to protect water quality. The proposed agricultural reforms will provide increased funding for organic farming, the maintenance of semi-natural habitats, traditional orchards and hedgerows and the up-keep of wetlands (DGVI 1997).

**2.9** Between 1984 and 1995 there was an overall decrease in the use of pesticides, herbicides and other agricultural chemicals. In 1984, 35,507 tonnes were used. This had reduced to 29,242 tonnes in 1996 (Source: MAFF).



Agricultural chemical use 1984 - 1996

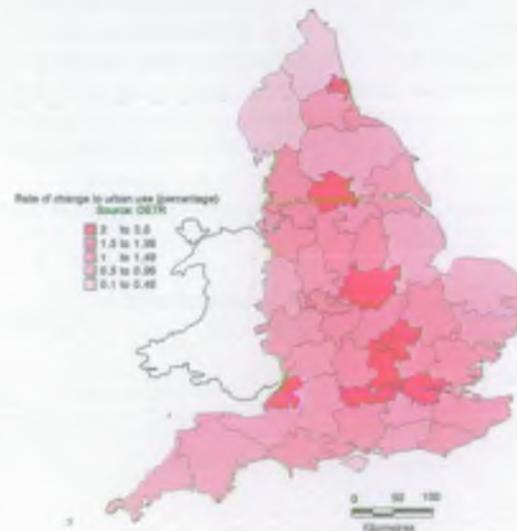


Projected Household Growth 2016

**2.10** The spreading of waste, including sewage sludge, to land for agricultural improvement is another important aspect of agricultural land use. In 1998, the disposal of sewage sludge at sea will be banned. It is predicted that by 2005, 913,870 tonnes of dry sludge, double the figure in 1992, will be spread to land (19th Royal Commission 1996). Care must be taken when selecting areas for sludge application to ensure that the relief of one stress, the disposal of human waste, does not create new stresses by affecting water quality or through contamination of the soil.

**2.11** Agriculture is one area of land use that will be affected by climate change. A note by Sir Robert May, the UK Chief Scientific Adviser, (1997) points out that as temperatures increase and patterns of precipitation change, there will be a northwards migration of farming zones by around 50 to 80km per decade.

**3.2** These changes will not be spread evenly throughout England. The highest rates of change to urban use are predicted to be in Greater London, Tyne and Wear, Berkshire, the county formerly known as Avon, West Yorkshire, Buckinghamshire, Bedfordshire and Leicestershire.



The rate of change to urban use in England, 1991 - 2016

### 3.0 Urban

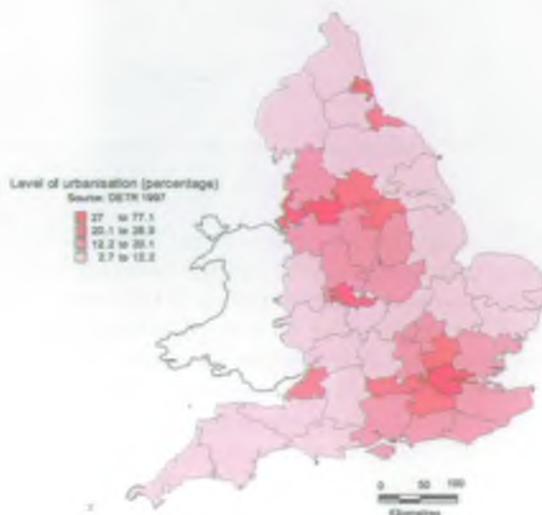
**3.1** Recent government decisions on housing development and the 'Countryside March' have served to focus attention on the increasing urbanisation of England and Wales. Currently 10.6% of land is in urban use (DETR 1997) and this is expected to rise to 11.9% to satisfy the projected demand for 4.4 million new homes by 2016. This demand for homes will largely be driven by an increase in single-occupier homes (DoE 1995).

In highly urbanised areas, much of this change will be the re-use of derelict land and contaminated land, otherwise known as brownfield sites. It will soon be a requirement that 60% of all new homes be built on brownfield land, with 40% on greenfield sites (Hansard 1998). Previous re-use rates for brownfield land have not been particularly high. In the period 1988 to 1993 only 95km<sup>2</sup> of derelict land were reclaimed from a stock of 396km<sup>2</sup> in England alone (DETR 1997).

**3.3** The national stock of derelict land is known and recorded by the Survey of Derelict Land. In contrast, the amount and location of contaminated land is not known and there is no single database of contaminated land in England and Wales. Comprehensive information on the stock of brownfield land, both derelict and contaminated, will be vital to planners to ensure that future developments meet the government requirement for the re-use of brownfield land. Some greenfield sites will be developed and these may well lead to public opposition. Planning conflicts are likely to occur where projected growth is high and there is a need to develop greenfield sites, particularly within the Green Belt. The recent cases in Newcastle and Stevenage have highlighted how emotive the issue of development within the Green Belt is. In 1993 there was 15,557km<sup>2</sup> of Green Belt, the largest areas being around London (4,856km<sup>2</sup>). Green Belts can be found around the projected high growth areas of London, Tyne and Wear and the county that was Avon (DETR 1997).

**3.4** The rate of urban growth is expected to be highest in rural counties without large urban areas. This is projected to occur in Cornwall, Devon, Somerset, Dorset, Wiltshire, Oxfordshire, Buckinghamshire, Northamptonshire, Leicestershire, Cambridgeshire and Suffolk. This development in the counties of the south west reflects the fact that they have experienced the fastest population growth, 10% between 1981 to 1995. In most of these counties there is no Green Belt, though any developments on greenfield sites are still likely to cause public concern as they will threaten the character of the countryside and increase the loss of habitats. There is Green Belt land in Cambridgeshire (261km<sup>2</sup>), this county is expected to have the highest rate of urban growth by 2016 (DoE 1995).

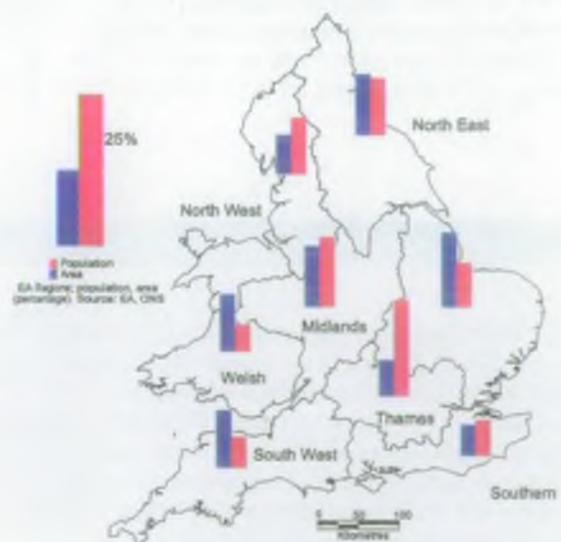
**3.5** By 2016, the most urbanised areas in England will be Greater London, with 77.1% of land in



Predicted levels of urbanisation in England, 2016

urban use and the West Midlands with 66.0%. By county, the area formerly know as Cleveland will have the highest level of land in urban use, with 26.8%, though the rate of change (1.7%) and rate of growth (6.6%) are not particularly high, implying that the area is already highly urbanised. Contrast this with Cambridgeshire, where the overall level of urbanisation will be 9.8%. The rate of change in Cambridgeshire is projected to be 21.3% (the highest for any county). In Devon, where the rate of growth will be 20.7% the overall level of urbanisation is projected to be 6.7%.

**3.6** The national distribution of the population (taken from the 1991 Census) can be summarised by Environment Agency Region to give some insight into where current stresses are located and the implications of future growth. However these figures should be treated with care as the population within each region will be concentrated in urban areas and not evenly distributed throughout the region. Thames Region represents only 8.5% of the total land area of England and Wales but contains 22.5% of the population. This gives a density of 8.7 people per hectare, against a national average of 3.3 people per hectare. A large proportion of this population (about 7 million people) within Thames Region are located within Greater London (ONS 1997). Given this concentration and the projected level of urbanisation, demand for environmental resources (i.e. land, water, waste disposal) and the stresses placed upon the environment by these demands are likely to be high and remain high in this region.



Environment Agency Regions. Area and population as a percentage of the national totals

**3.7** Solid waste disposal illustrates this point. Operational landfill capacity in Thames Region in 1995 was estimated to be 69.3 million m<sup>3</sup>, with potential for a further 128.2 million m<sup>3</sup> of suitable void space. With a total waste arising of 18.9 million

tonnes, the existing void space provides for 3.6 years disposal of waste. The life expectancy of the existing sites is extended by 5 years because waste is exported from the region. Bedfordshire and Essex receive 1.5 million tonnes of waste from London annually. Only 1 million tonnes of waste is used to generate energy and 3.8 million tonnes are reclaimed and recycled. Currently 33% of sewage sludge arising in this region is dumped to sea but this will stop in 1998 and alternative disposal routes will be needed, including incineration and disposal to land. Fifty per cent of sewage sludge from the region is already disposed of on farmland (Biffa 1997). The projected growth in this region can only increase these demands. Household waste arising, household waste recycling and the production of waste from energy have all been identified as indicators of sustainable development for the United Kingdom (DoE 1996).

**3.8** High use of road transport and ownership of cars would appear to accompany high levels of urbanisation. The highest daily traffic flows, on all road types, in urban and non-urban areas, are found in London. In 1995 this was 29,000 vehicles per day, measured as the number of vehicles passing a point. The South East (a Government Office Region), which includes most of Thames Region, has 22,000 vehicles per day and the North West 19,000 vehicles per day. The lowest is Wales, with 9,000 vehicles per day and the South West where 13,000 vehicles per day were recorded on the major roads. As this region is projected to have the highest rate of urban growth by 2016, there may well be an increase in the number of vehicles using the roads and a similar increase in environmental stresses associated with road transport. Car usage, road transport energy use, land take for roads and a number of air quality parameters have all been identified as indicators of sustainable development (DoE 1996).



Average daily motor vehicle flows, by Government Office Region

## Bibliography

- Agenda 2000 - Agriculture. European Commission DGVI 1997. [http://europa.eu.int/en/comm/dg06/ag2000/text/text\\_en.htm](http://europa.eu.int/en/comm/dg06/ag2000/text/text_en.htm)
- Digest of environmental statistics No. 19.* 1997. Dept of the Environment, Transport and the Regions. The Stationary Office, London.
- Great Britain plc. The environmental balance sheet.* 1997 Biffa Waste Services.
- Hansard 23/02/98. [http://www.parliament.the-stationary-office.co.uk/pa/cm199798/cmhansrd/cm980223/debtx/80223-05.htm#80223-05\\_spmi0](http://www.parliament.the-stationary-office.co.uk/pa/cm199798/cmhansrd/cm980223/debtx/80223-05.htm#80223-05_spmi0)
- Indicators of sustainable development for the United Kingdom.* 1996. Dept of the Environment. HMSO, London
- MAFF Agricultural Statistics.* 1996 MAFF.
- May, R. 1997. Climate Change. A note by the UK Chief Scientific Adviser. Office of Science and Technology.
- Projections of households in England to 2016.* 1995. Department of the Environment, HMSO.
- Regional trends 32 1997* Office of National Statistics.
- Sustainable use of soils.* 1996. Royal Commission on Environmental Pollution 19th Report. HMSO, London
- The influence of agriculture on the quality of natural waters in England and Wales.* 1992. National Rivers Authority Water Quality Series No. 6.
- The potential uses of Set-aside land to benefit wildlife.* 1992. Report to the Ministry of Agriculture, Fisheries and Food. Institute of Terrestrial Ecology, Monks Wood Cambs.

## Acronyms

- BSE - Bovine Spongiform Encephalopathy  
 CAP - Common Agricultural Policy  
 CJD - Creutzfeldt-Jakob Disease  
 CS1990/CS2000 - Countryside Survey 1990/2000  
 DETR - Dept of the Environment Transport and the Regions  
 DoE - Dept of the Environment  
 ECU - Environmental Change Unit  
 ITE - Institute of Terrestrial Ecology  
 LIDAR - Light Detection and Ranging  
 MAFF - Ministry of Agriculture Fisheries and Food  
 NRA - National Rivers Authority  
 ONS - Office for National Statistics

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