



Forests and Climate Change DR STEVE GREGORY

The UK is at the leading edge of global climate change negotiations. The UK Government played a major role in developing the Kyoto Protocol – an international agreement to tackle climate change - in 1997, and our scientists are among the world leaders in research into the causes, scale and impact of changes.



So what is climate change?

Weather, as the British know only too well, is very changeable. It can change from day to day and also in much longer climatic cycles.

The Earth's climate depends on the amount of energy in the Earth and its atmosphere. Radiation from the sun is absorbed at the Earth's surface and in the atmosphere. This is generally balanced by energy returned from the Earth to space, but gases such as carbon dioxide (CO₂) act to trap some of the heat. This creates what is known as a 'greenhouse effect'. If the amount of carbon dioxide or other greenhouse gases in the atmosphere increases, more energy will be trapped and a rise in global temperature and other changes in the climate will result.

Changes in CO₂ levels can be the result of natural variations in atmospheric conditions. However, human activities, such as burning fossil fuels and clearing tropical rainforests, also generate CO₂, and appear to have been responsible for raising its level in the atmosphere to unprecedented levels.

How big is the problem?

There is now strong evidence that we are experiencing a long-term change in the Earth's climate. Although it is difficult to assess how much of this change is caused by rising CO₂ levels and how much by natural variations, we believe that unless we act to limit the increases in CO₂, the resulting changes in climate are likely to have severe effects around the world – flooding, drought and food shortages are just some of the possible consequences. In the UK, a warmer climate, increased winter rainfall and more frequent floods and droughts are among the predicted effects. The steep rise in CO₂ levels over the last 200 years means that some changes are probably irreversible.

The [Kyoto Protocol](#) is a response to this problem and an international declaration of intent to start solving it. The Protocol legally binds signatory countries to reduce their carbon emissions and other greenhouse gases by 5 per cent of 1990 levels by 2010. Most of the major industrialised nations have signed up to the agreement.

Where does forestry come into it?

Carbon dioxide acts as a fertiliser for green plants, so higher concentrations are likely to increase tree growth. Higher temperatures may also contribute to growth. On the other hand, the changing climate may encourage more attacks by pests and diseases while more droughts would damage some woodland ecosystems.

WWW LINKS

- The UK Programme available at:
www.defra.gov.uk/environment/climatechange/cm4913/index.htm
- www.cru.uea.ac.uk
- www.defra.gov.uk/environment/climatechange/index.htm
- www.jncc.gov.uk/communications/news/monarch.htm
- www.sustainable-development.gov.uk
- www.tyndall.ac.uk



The fact that plants absorb and store CO₂ means that they can help to reduce its concentration in the atmosphere. Processes like this that lock up carbon are known as “carbon sequestration”. Although the main aim of the Kyoto Protocol is to reduce emissions of greenhouse gases at source, it also recognises forestry as a way of helping to reduce concentrations. Countries can therefore offset some of their greenhouse gas emissions by planting more forests or undertaking other activities that increase the amount of carbon sequestered in them. The Protocol also allows for “emission trading”, so if one country or industry surpasses its targets, it can sell its surplus reduction to those who are finding it more difficult to meet targets. This means that forests could acquire an extra financial value from their ability to sequester carbon.

Many countries and organisations, including the UK Government, are cautious about promoting carbon sequestration as a means of reducing atmospheric CO₂ levels, as the size of the potential gains is as yet unproven, and focussing on forestry schemes as a way of achieving ‘carbon neutrality’ deflects attention from the crucial need to reduce emissions of gas at source. Moreover, there is a limit to the amount of carbon that woodland can sequester, and there are risks – through felling, fires or outbreaks of pests and diseases - that woodland could turn into a *source* of carbon dioxide.

Another extremely important attribute of forests is their use as a source of renewable energy and materials. As long as harvested trees are replaced, the CO₂ released by burning wood fuel is reabsorbed by the next crop of trees. The overall emission from the extra energy consumed in processing and transport is small compared to the total loss of energy from burning fossil fuels. Increased use of timber and wood products instead of energy-intensive materials such as steel, plastic and concrete would also represent a saving in emissions – again, of course, providing harvested trees are replaced.

What is the Forestry Commission’s role?

The UK is one of the few countries that have reacted to the Kyoto Protocol by drawing up a comprehensive domestic strategy for climate change. [Climate Change – the UK programme](#), published in November 2000, details the measures the UK will take as part of the international effort to combat climate change, as well as the ways we will deal with the changes that increased global temperatures may bring about.

The Forestry Commission (FC) and [Northern Ireland Forest Service](#) helped to produce this strategy and are responsible for ensuring that our forestry policies and practices allow UK woodlands to withstand the rigours of climate change. We need to understand what the changes might be and how we can plan for robust woodlands that will be sustainable in the long term. Woodlands do not exist in isolation from other habitats and activities. It will become an important part of our function to make sure that forestry can contribute wherever possible to alleviating the impacts of climate change in the wider landscape – providing wildlife refuges and reducing the severity of flooding are examples of ways in which forestry can have a broad beneficial impact.

The gains from carbon sequestration may be uncertain and their contribution in the UK small, but they can be achieved, alongside the many other benefits from forestry, as long as we maintain a clear commitment to sustainable forestry. The Forestry Commission and Northern Ireland Forest Service will do this by promoting compliance with the [UK Forestry Standard](#): the government’s approach to sustainable forestry, published in January 1998 – and making sure that the Standard itself remains relevant. We are also involved in the international effort to keep the principles of sustainable forestry on the agenda as the details of the Kyoto Protocol are negotiated at talks such as those conducted in [Bonn in July 2001](#) and [Marrakech in November 2001](#).

Providing a source of renewable energy is probably the biggest contribution that UK forests can make to reducing emissions of CO₂. We have to work with other parts of government, with industry and with society at large to realise this potential.

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FC PUBLICATIONS

- Information Note 31: Climate Change - Implications for Forestry in Britain
- Information Note 37: Environmental Monitoring in British Forests
- Information Note 41: Forest Condition Survey 2000
- The UK Forestry Standard

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