SECTION 1

Key activities & results

Key activities and results for 2000-2001

The Land Use Change and Forestry Sector in the 1999 UK Greenhouse Gas Inventory.

- The Removal of atmospheric CO_2 to Woody Biomass Stocks caused by expanding UK forests in 1999 was estimated to be 6827 Gg with an additional sink of 1294 Gg to forest products.
- For 1999 the Emission of CO_2 from soils due to land use change was estimated to be 12961 Gg compared to 15617 Gg in 1990. These reflect revision of Scottish soils data and the use of time constants for rate of change.
- The Land Use Change and Forestry Sector of the UK is estimated in 1999 to have been an overall emitter of carbon dioxide of 4732 Gg due to Emissions of 16271 Gg offset by 11539 Gg of Removals.
- Draft UK specific Sectoral Background Tables for the Land Use Change and Forestry Sector under the Common Reporting Format are presented.

Country specific data for the UK relating to Articles 3.3 and 3.4 of the Kyoto protocol: An Update.

- Data submitted to UNFCCC on stock of carbon in UK soils updated to take account of revised soil carbon densities in Scotland.
- Data submitted to UNFCCC on potential for bioenergy from tree plantations in UK under Article 3.4 Activities updated to take account of revised assessment of amount of carbon in the top 30 cm of agricultural soils. Other underestimates corrected.

Carbon balance of afforested peatland in Scotland

- Analyses completed of flux measurements begun in previous contract from chronosequence of young Sitka spruce plantations (from undisturbed moor to 26 year-old forest).
- Undisturbed peat accumulated about 0.25 tC ha^{-1} y^{-1}.
- Newly drained peatland (2-4 years after ploughing) emitted between 2 and 4 tC ha^{-1} y^{-1}, but when ground vegetation recolonized, the peatland became a sink again, absorbing about 3 tC ha^{-1} y^{-1} 4-8 years after tree planting.
- Thereafter, the trees dominated the budget and afforested peatlands absorbed up to 5 tC ha^{-1} y^{-1}.
- Assuming that the trees accumulated carbon at rates commensurate with Yield Class 10 m^3 ha^{-1} y^{-1}, the peat beneath the trees after canopy closure was estimated to be decomposing at only about 1 tC ha^{-1} y^{-1} or less.
- This is slower than previously thought and suggests that afforested peatlands in Scotland accumulate more carbon in trees, litter, forest soil and products than is lost from the peat for 90-190 years.

Field measurements of carbon loss following ploughing: Part 1

- Field site selected and flux measuring system installed
- Preliminary measurements obtained
- Project suspended due to foot & mouth disease on farm providing field site.

Field measurements of carbon loss following ploughing: Part 2

- Soil samples taken prior to planned ploughing.
- Soil samples analysed for bulk density and loss on ignition.
- Further analysis in progress.

Combining plant and soil C cycling models – consideration of methods

- Preliminary development of methods to link plant components of Century model to RothC soil components
- In general, both models gave a reasonable or good fit to measured long-term SOC data at arable, grassland and forestry management sites
- The linked model tended to give lower estimates of SOC than independent implementations
- Further consideration of these linking problems, including work with the CEH EuroBiota model, in progress

Modelling of carbon uptake in UK forests using the EuroBiota model

- Forest ecosystem model implemented for UK conifer forests at 0.5^{o} scale
- Good comparison with Inventory coniferous forest sink for 1990
- Further development, especially for broadleaf forest, in progress

Estimation of deforestation in Great Britain.

- Different sources on changes in the forest area of Great Britain compared.
- Wide range (2,800 ha y^{-1} to 14,500 ha y^{-1} on average from 1984 to 1998) of deforestation estimates across the sources
- The need for more detailed study highlighted.

Carbon in the harvested wood products of the UK and other countries

- Compared to fossil fuel emissions, construction of baselines for LULUCF and HWP is complicated, requiring many assumptions about past, present and future LULUCF and HWP trade/utilisation.
- It is questionable, however, whether very sophisticated assumptions would yield more reliable BAU projections than simple assumptions.
- The Atmospheric flow method of allocating carbon net sink/source due to HWP is imbalanced and would result in an over-reporting of emissions. There is also a risk of double counting of emissions – as loss of forest carbon at time of harvest and then again as loss of wood-product carbon.
- Adoption of either the Production, Stock Change or IPCC method of HWP allocation can result in differences in percentage changes reported that are as high as ±15%, although the different HWP accounting methods have only marginal influence on the relative ranking of the different countries in terms of reported percentage change in carbon net sink/source, particularly if estimates are accumulated over longer periods.

Ronald Milne April 2001