

Soil carbon stock changes and greenhouse gas fluxes in Irish forests

PROJECT TEAM

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COMPLETION DATE

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OBJECTIVES

- To use the paired plot approach to investigate the effect of afforestation on soil C stocks at 60 forest sites.
- To determine the effect of afforestation and deforestation on CO₂ and CH₄ dynamics in peat soils and to develop CO₂ and CH₄ emission factors for afforested and deforested blanket peat.
- To determine the effect of broadleaf afforestation on mineral soils on soil C stocks.
- To investigate the effect of afforestation on CO₂ and N₂O fluxes in grassland.

PROGRESS

Paired plot sites:

This is being done in collaboration with WP3 from the CARBiFOR II project. The first task completed was the development of soil sampling and laboratory protocols for the mineral soil sites. Forty mineral soil, 10 peaty mineral and 10 peat sites will be sampled. Sites have been selected from National Forest Inventory plots (see CARBiFOR II). Mineral soil sites have been divided into four sampling groups based on soil type (brown earths, podsols, brown podzolics, gleys). At the mineral soil sites paired plots representative of pre-afforestation and post-afforestation conditions will be established. Peat sites will not be paired due to the level of variation in peat depth within sites.

Three National Forest Inventory mineral soil forest sites have been sampled: Killavullen (NFI ID: 6602), Charleville (Ballyhouras, NFI ID: 6610) and Ballingearry (NFI ID: 2769).

At two of the sites (Killavullen and Ballingearry) paired plots have been established. At each of the forest sites soil samples were collected and four soil pits were installed, from which bulk density depth profiles were obtained. Fine woody debris, litter, and humus were also assessed in the afforested plot.

CO₂ and N₂O fluxes in recently afforested grassland:
 The eddy covariance CO₂ flux tower is under construction and is expected to be in operation by January 2008.

ACTIVITIES PLANNED

Analysis of soil samples from the paired plots and peat sites.

C stock change in mineral soils: begin after data collection for WP1.

CO₂ and N₂O fluxes in recently afforested grassland: data collection to begin early 2008.

OUTPUTS

Greenhouse gas fluxes in terrestrial ecosystems in Ireland. Poster presented at EPA conference, Delgany, Co Wicklow, September 2007.