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Northern peat soils: potential as a carbon sink

Upland peat soils provide a substantial carbon sink if managed properly, according to new research. A study of a peatland area in the UK indicated that it could potentially store approximately 160,000 tonnes of CO_2 per year.

It has been estimated that 20 to 30 per cent of carbon stored in the soil is held in northern peatlands. There are two main drivers that convert this from a net sink to a net source of carbon: a warming climate and land management practices, such as drainage, peat extraction, planting trees, conversion to arable land, burning and grazing.

The researchers investigated whether management practices could be altered to enhance carbon storage in upland peat. They considered a 550 km^2 area of peatland in the Peak District region of the UK over the period 1997-2006. Currently the total area is a net CO_2 sink, storing approximately 62,000 tonnes of CO_2 per year, although the actual level of CO_2 stored or emitted varies by location. Seven different scenarios of land management were considered: business-as-usual, the stopping of burning, the stopping of grazing, planting new vegetation, blocking drains and gullies, the use of all four practices and targeted action that applied the best practices to each plot.

Comparing the different forms of land management, the model indicated that re-planting the land, or re-vegetation, would produce the biggest increase in CO_2 storage as a single land management practice. Re-vegetation would potentially increase the carbon storage in 96 per cent of the area.

In order to quantify the maximum potential CO_2 storage, the study considered land management practices that would maximise the amount of CO_2 stored for every individual km^2 - under the scenario of targeted land management action. If these best practices were adopted for each km^2 plot, the carbon storage capacity of the total area would increase to 160,804 tonnes of CO_2 per year. This also represents an approximate value for the maximum storage potential of the area.

The study assessed the economic benefit of adopting these land management practices. Schemes such as the EU Emissions Trading Scheme[1] could provide projects that increase the stored carbon in peatland with carbon credits and therefore an economic value. By considering the costs of peatland restoration as assessed by a recent survey, the price of carbon as dictated by the UK's Department for Environment, Food and Rural Affairs (DEFRA) and the rate of transition between the current and best possible state of carbon storage, the researchers calculated that for 50 per cent of the area a profit could be made in 30 years. However, this was highly dependent on the price of carbon; for example, no areas would show a profit if the cost of carbon credits was taken from the Chicago Carbon Exchange.

The researchers mention several limitations to their study. They did not include all possible land management practices, such as cutting the moorland shrub heather, and it does not consider the intensity of grazing and wild or accidental fires. The researchers also note that the study assumed the processes would be the same at the scale of the 1 km^2 grid, when in reality carbon fluxes can alter at the 1m scale.

1. See http://ec.europa.eu/environment/climat/emission/index_en.htm#brochure

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