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Briefing 1406

Illustrative Economics of Peatland Restoration

Summary

Notwithstanding some uncertainty over precise figures the merits of addressing peatland degradation can be demonstrated in monetary terms. It is likely that a greater emphasis on maintaining and restoring peatland capital is merited by the value of securing delivery of a number of related services like water quality and biodiversity.

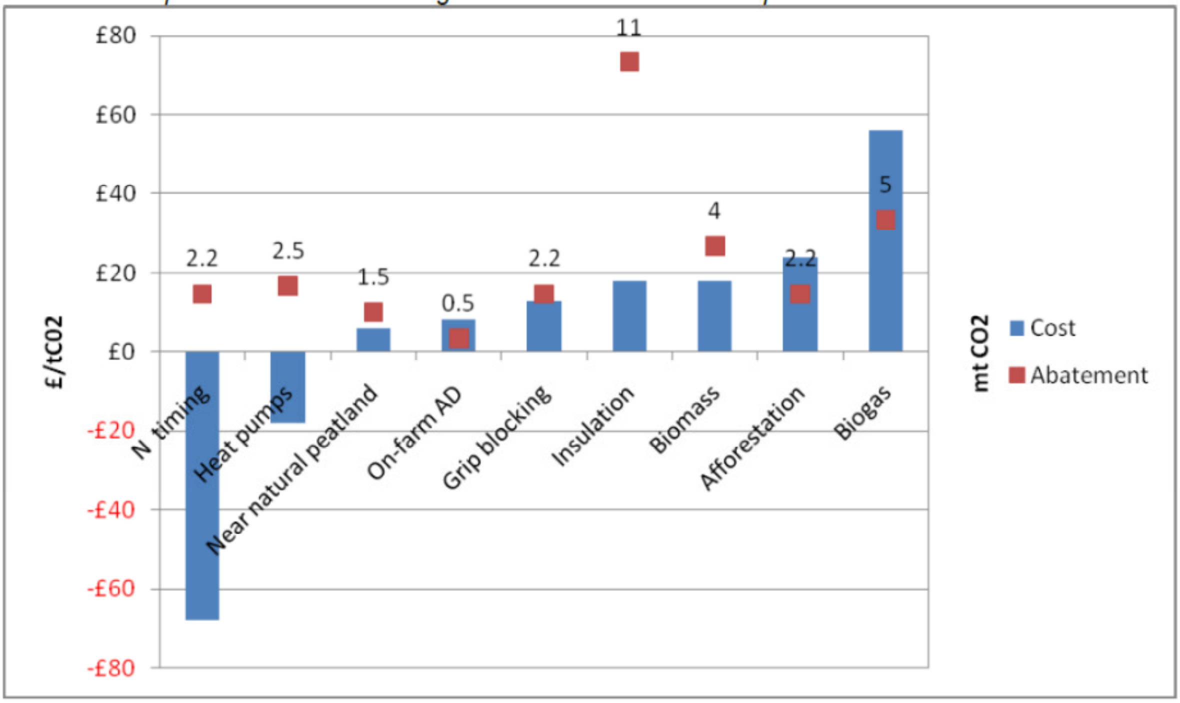
This paper is taken from *'Illustrative Economics of Peatland Restoration'* prepared by Andrew Moxey of Pareto Consulting for IUCN (International Union for Conservation of Nature). The full report is at: http://www.iucn-uk-peatlandprogramme.org/sites/all/files/Illustrative%20Economics%20of%20Peatland%20Restoration,%20June%202011%20Final.pdf

Peatlands generate economically valuable ecosystem services. Running the capital stock down through neglect or degradation impairs their role in mitigating climate change, improving water quality and enhancing biodiversity. Although information gaps remain, this loss and/or the costs of compensating for it through other means can be costlier than peatland maintenance and restoration. For example, peatlands can be rich in biodiversity and landscape values which contribute to ecological resilience and rural employment. Equally, degraded peatlands can contribute sediment and phosphate loadings into river catchments as well as dissolved organic carbon leading to water discolouration. Reducing such pollution at source through improved land management may be more cost-effective than downstream treatment in certain circumstances.

Similarly, peatlands can act as either a source or a sink of greenhouse gases (GHGs). If degraded, peatlands become net emitters, meaning that achieving emission targets requires additional mitigation effort from other sectors. Currently, official emission reporting mechanisms only recognise actual emission savings achieved through restoration of degraded sites rather than emissions avoided through maintenance of better sites, yet even so the cost-effectiveness and total abatement potential of restoring degraded peatlands through grip blocking are comparable to some other mitigation activities currently being promoted (see Chart 1 overleaf). Restoration is also likely to deliver benefits in water quality and biodiversity.

Variation in local conditions and their potential for delivering ecosystem services mean that the economics of altering peatland management will not be uniform. Moreover, estimates of mitigation costs and benefits are imperfectly developed for carbon and even more so for water or biodiversity. As such, the illustrative figures presented here could be refined further.

***Chart 1** Example illustrative GHG mitigation costs and abatement potential*



Some illustrative peatland carbon economics

A near-natural peat bog may sequester around 0.6 t CO_2e per hectare per year. By contrast, a degraded site may emit around 2.9 t CO_2e per hectare per year. The difference between a degraded site and a near natural site may thus be around 3.5 t CO_2e per hectare per year. This is roughly equivalent to the emissions generated by driving an articulated lorry 3500 km or consuming 6500 kWh of electricity from the National Grid. Currently, official reporting of UK emissions does not recognise losses avoided by preventing degradation only actual reductions achieved through restoration - which are lower at about 2.6 t CO_2e per hectare per year.

As a mitigation measure, restoring a degraded site or maintaining a near natural site avoids some emissions that might otherwise occur plus actively sequesters some additional carbon. Over a 20 year period these savings could amount to around 70 tCO_2e per hectare for a near natural site. For a restored site, such as a re-wetted bog, the savings are slightly lower at perhaps 52 tCO_2e. The costs of achieving such net emission savings depends on the degree of effort required: restoration may entail upfront investment in, for example, blocking drains, as well as on-going monitoring and maintenance, such as managing vegetation succession, whilst a near natural site might require only a little maintenance.

Median restoration costs are estimated to be around £1500 per hectare which equates to a mitigation cost of around £29 per tCO_2e. However, although some extremely degraded bare peat sites and some lowland sites requiring land acquisitions can be even costlier, more typical grip blocking restoration may cost nearer to £240/ha which implies perhaps £13 per tCO_2e. For a near natural site, costs would be much lower, perhaps around £6 per tCO_2e or less.

Although some mitigation measures, such as improved fertiliser usage in agriculture or domestic air source heat pumps for renewable heat, may be implemented at no cost or even negative cost, £6 to £13 (and even £29) compares favourably with a range of other mitigation measures such as anaerobic digestion, afforestation sequestration and renewable biomass or biogas heat generation (see Chart 1).

Importantly, whilst active restoration will combat actual emissions the maintenance of sites already in good condition is even more cost-effective. However, most of these savings take the form of what might be termed latent emissions that will arise if maintenance falters and a site degrades; of emissions avoided rather than reduced.

This distinction matters since official recording and reporting that focuses on curbing actual emissions risks neglecting latent emissions that may be costlier to reduce once realised than if prevented in the first place.

Costs arising from restoration and/or maintenance efforts need to be considered alongside possible opportunity costs incurred through displacing other activities. For example, draining, grazing and burning can enhance agricultural output, the value of which may therefore be reduced through restoration activities. However, in many upland areas where agriculture is marginal, the value of forgone commodity outputs will be low or even negative. By contrast, some lowland agricultural and horticultural activities based on modified peatlands are commercially viable. In such cases restoration may not be cost effective.

This variation in the likely cost-effectiveness of restoration highlights the importance of targeted rather than blanket restoration activities. Hence, although the total area of degraded peatland could be considered for restoration, a figure such as the UK Biodiversity Action Plan target of 845,000 ha restored by 2015 may serve as a more reasonable and cost-effective ambition.

Applying the illustrative grip blocking figures presented above to a restoration target of 845,000 ha yields an overall cost of around £580m but an annual emissions abatement potential – relative to allowing degraded sites to remain in poor condition – of around 2.2mt CO_2e. If the area of near natural peatland is around 400,000 ha, maintenance of it yields an amount approaching 0.25mt CO_2e sequestered plus a further 1.2 mt CO_2e of avoided emissions. For comparison, the estimated annual abatement potential of on-farm anaerobic digestion is 0.5mt CO_2e whilst that for renewable biomass heat is 4mt CO_2e (see Chart 1). The total carbon stock held in the estimated 1.7m to 1.8m hectares of UK peatlands is 10,600m – 12,800m tCO_2e whilst annual emissions are estimated to be of the order of 3 mt tCO_2e for England alone.

Some illustrative peatland water economics

Peatland degradation can also impose treatment costs on the water industry to address water discolouration and phosphate issues. This may take the form of additional capital investment in equipment but also in operational and maintenance costs estimated to amount, for all agricultural sediment sources, to in excess of £55m for the UK. Hence, although there will be considerable spatial and temporal variation, improved peatland management can potentially reduce treatment costs by reducing pollution at source in some circumstances. Actual costs incurred through altered management activities need to be viewed alongside any opportunity costs arising from (especially) reduced or displaced agricultural activities. This may not be significant in upland catchments but is possibly relevant in more agriculturally productive lowland catchments. However, it is also possible that the off-site benefits of reduced downstream loadings are accompanied by on-site benefits in the form of higher productivity arising from greater retention of topsoil and nutrients.

Alan Spedding, 29 November 2011