Wetland restoration and management

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- Introduction

Wetlands, especially peatlands, are the biggest store of carbon on land. The draining and degradation of wetlands turns them into a net source of greenhouse gas emissions. The restoration of damaged wetlands can halt emissions of carbon dioxide and even reverse them, causing carbon removal from the atmosphere. Emissions of nitrous oxide and methane can also be reduced or halted by restoration, so wetlands restoration can overall neutralize the GHG budget or create a net sink.

Emissions from wetlands are sizable, as is the mitigation potential of wetland restoration, on a global scale and in an Annex I context. Yet, there are few incentives in the current climate regime for wetland restoration, nor disincentives to drain or damage wetlands. The inclusion of wetland restoration and management as an activity in the second commitment period would lead to improvement in methodology in measuring emissions and carbon sequestration of wetlands, which will be a step forward towards a more accurate accounting of LULUCF.

Given the magnitude of emissions from wetlands and especially peatlands, and bearing in mind opportunities for significant co-benefits by wetland restoration, Iceland has suggested that wetland restoration be added as an activity available to Annex-I countries to meet their commitments in a new commitment period. This background paper is intended to put that proposal in context and help further discussions on ways to develop a concrete proposal on wetlands restoration and management as an activity in the second commitment period.

- Wetlands and GHG emissions – a global perspective

Soils are the biggest store of carbon on land, especially in the form of peat and other soils formed by wetlands. Peatlands are estimated to store more than twice the amount of carbon as all global forest biomass. Drained and disturbed peatlands emit a massive amount of carbon dioxide and other greenhouse gases. A recent study (Global assessment on peatlands, biodiversity and climate change, financed by UNEP-GEF, and implemented by the Global Environment Centre, Wetlands International and others) estimates that carbon dioxide emissions from drained and damaged peatlands are well over 3,000 million tons annually, or over 11% of global fossil fuel emissions. Despite this, there is little effort to stop and reverse these emissions.

Wetlands cover about 6% of the Earth's area, with peatlands covering about half of them. Degraded peatlands cover less than 1% of the global land surface, and the high emissions from their degradation are thus substantial and disproportionate to their size. In other words, the problem is large but concentrated and may therefore be easier addressed than many other emissions sources. Wetlands and peatlands occur in all latitudes, from the polar areas to the tropics, and occur in most countries.

According to the Ecosystem Milennium Assessment, wetlands are the habitat that has been most affected by development and are being lost more rapidly than any other habitat in the world. With regard to peatlands: Eighty percent of the global peatland area is still pristine (i.e. not severely modified by human activities). Sixty percent still actively accumulates peat /sequesters carbon. Globally, natural peatlands are destroyed at a rate of 4000 km2 per year, with 50% attributable to agriculture, 30% to forestry and 10% to peat extraction.

- Wetland restoration: Mitigation potential, co-benefits and possible negative consequences

Mitigation potential

The technical mitigation potential for drained and damaged wetlands, including peatlands, would appear to be sizable on a global scale, perhaps equivalent of up to 10% of global emissions, counting emissions from wooded peatlands. Feasible mitigation by wetland restoration would be smaller, taking into account that much of degraded wetlands are used for food production, habitation and other use, that would render it difficult to restore them. Most countries would have a much lower mitigation potential than Iceland, which has a relatively large surface area compared to its population.

Co-benefits

Wetlands perform a number of ecosystem services, some of which are well recognized, others less so. Wetlands are internationally recognized as being one of the most important ecosystems/biomes/habitats for the conservation of biodiversity. The Convention on Wetlands (Ramsar 1971) aims to conserve wetlands worldwide for their full range of values. Apart from a disproportionately high biodiversity value, wetlands also have important functions in water regulation and purification, and coastal wetlands can help alleviate the impacts of storm surges. There is growing documented evidence that wetland restoration and improved management of wetlands may warrant high priority in relation to climate change adaptation strategies. Restored wetlands can also have significantly increased tourism potential.

Possible negative consequences

Restoring wetlands would in many instances involve change in land use, where the costs and benefits would have to be assessed in each case. Restoring drained wetlands presently used for agriculture, for example, could lead to reduction of food production. It is clear, however, that there are significant areas of drained wetlands where restoration would lead to an increase in net benefits, in some cases even if the climate benefits would not be counted.

Permanence

Restored wetlands would probably be a comparatively resilient stock of carbon. Risks of fire would be relatively low, although clearly present in for example wooded peatlands. Drought, brought on by climatic variation or long-term climate change could, however, lead to loss of carbon. The monitoring and reporting of carbon stocks in restored wetlands would be subject to the same rules and criteria as other LULUCF categories.

Accounting and leakage

Including wetland restoration, management and degradation would call for comprehensive accounting in the country involved. Technically, there is a possibility that reduction in emissions from drained wetlands by restoration would lead to increase pressure on wetlands elsewhere. This problem of potential “leakage” is recognized in other mitigation activities, and needs to be assessed and addressed. Comprehensive accounting should prevent leakage within a Member State, as there would be no net gain in substituting newly drained wetlands for restored wetlands. The chance of leakage on a wider scale could occur, for example, if agricultural lands decommissioned from production due to restoration would increase demand for agricultural products that might cause pressure for drainage or disturbance of wetlands elsewhere into agricultural land. It is difficult to assess the risk of leakage of this kind, but if wetland restoration is concentrated on lands of marginal agricultural use, this risk would be low or negligible.

- Drained and damaged wetlands and wetland restoration – an Icelandic perspective

Iceland drained much of its lowland wetlands in the 20th Century, mostly in order to convert them to agricultural use. In recent years, studies have been made that show that there are considerable emissions of CO2 from these drained and damaged wetlands from underlying peat stocks. A small project on restoration of wetlands has shown that blocking draining ditches and raising water levels can restore the biodiversity and functions of the original wetlands to large extent. CO2 emissions can be stopped or significantly reduced through restoration.

Emissions from drained and damaged wetlands can vary from place to place, and it is therefore difficult to give an exact figure of estimated emissions from drained and damaged wetlands in Iceland. Using Tier-1 methods from IPCC 2006 Guidelines, these emissions are $1{,}788 * 10^6$ tons of CO_2 eq, ($1{,}468 * 10^6$ tons from CO_2 and $320 * 10^6$ tons from N_2O) which Icelands reports to the UNFCCC under the Convention. These emissions are sizable in relation to Iceland’s overall GHG emissions, or almost half of the combined emissions from fossil fuel use and industrial processes. Clearly, this means that there is high technical mitigation potential in wetland restoration in Iceland, which could be utilized by providing incentives. The real potential for mitigation is most probably much lower than these figures indicate, as part of the drained and damaged wetlands in Iceland can not be easily restored. Some of the land is used for habitation and most of it is used for agriculture, croplands and grazing. It is economically, politically and technically impossible to restore all disturbed wetlands to their former state. It is also unclear if emissions can be halted or reversed in all areas or merely reduced. However, there is clearly a portion of the land that is neglected or only marginally used. It should be noted that the reported emission is based on Tier-1 methodology and real emissions might be even higher. The line between “managed” and “unmanaged” land can sometimes be blurry, for example some land may be classified as grazing land, even if the grazing intensity could be very low and sustainable. A key issue in peatland degradation and related emissions is drainage, which automatically leads to oxidation of soil carbon and thus to carbon dioxide emissions.

A possible national programme to restore wetlands in Iceland would most likely focus on neglected and marginally used lands, especially in the beginning. The first phase of a programme would focus on establishing and improving land inventory and methodology for evaluating the effect of wetland restoration on GHG emissions.

- Wetland restoration as a possible LULUCF activity under the Kyoto Protocol

The elements of wetland restoration as an activity in a new commitment period could be similar as in the present mandatory and elective activities under Article 3.4 of the Kyoto Protocol. The principles guiding the activity would be those listed in Decision 16/CMP.1, with any possible changes and amendments.

A party electing wetland restoration as an eligible activity would have to account for all such activities as well as all activities that would degrade wetlands such that it would cause an increase in GHG emissions and a net loss in carbon stocks. This would mean that a comprehensive inventory of wetlands, both disturbed and undisturbed would have to be in place, and a system to monitor activities that would cause degradation and restoration. Electing wetland restoration as an activity would provide an incentive to restore and manage wetlands, and a disincentive to drain or degrade wetlands.

Credits from wetland restoration could be based on evaluation of decrease in emissions of GHG due. Estimations can be used where solid scientific knowledge exists, in a similar manner as in other LULUCF activities. A stock-based methodology could also be considered.

- Definitons and guidelines pertaining to wetlands

Wetlands are covered in the IPCC 2006 guidelines, where they are defined for the purposes of GHG LULUCF accounting: "Wetlands include land that is covered or saturated by water for all or part of the year (e.g. peatland) and that does not fall into the forest land, cropland, grassland or settlements categories defined in Chapter 2 of this report (Section 2.2, Land Categories). This category can be subdivided into managed and unmanaged according to national definitions." This definition could be reviewed or elaborated upon to include peatlands in this category, as many natural and degraded peatlands are forested or covered by grassland or crops.

Below are suggestions for possible definitions of key concepts:

- "Wetland restoration" is a direct human-induced activity to reduce GHG emissions and increase carbon stocks from previously drained and degraded wetlands that covers a minimum of xx hectares.

- "Wetland degradation" is a direct human-induced impact resulting from wetland conversion to a specific sectoral or multi-sectoral economic use, causing an increase in GHG emissions and loss of carbon stocks.