ECONOMIC ASSESSMENT OF THE IMPACT OF PEATLAND CONSERVATION MEASURES ON GREENHOUSE-GAS EMISSIONS

L. Schaller[1], J. Kantelhardt[1] and M. Drösler[2]

INTRODUCTION

Large scale conservation projects in Germany are funded by high amounts of public money, provided either by the state or by the European Community. A major part of funding is used for land acquisition, compensatory payments for agriculture, management and development planning or habitat-structuring measures. Until now, costs were first and foremost contrasted by their benefit to aspects like biodiversity, habitat conservation, or the protection of natural resources. As the implementation of such projects usually involves significant land-use changes, a new benefit could be included: as recent science has shown, land-use changes especially in “hotspot areas”, such as peatland, have significant effects on the emission of greenhouse gases (GHG) (Byrne et al., 2004). Therefore, as many conservation projects are carried out in such “hotspot areas”, the high cost in particular of compensation for agricultural losses and land acquisition could also be offset by a significant decrease in GHG emissions. Our study focuses on analysing how public funds used for “hotspot area” conservation projects can contribute to GHG emission reduction. Furthermore, we assess “abatement costs” of such climate-change mitigation and if they appear to be competitive.

MATERIALS AND METHOD

As our study objects, we look at different German peatland regions where large-scale, public funded conservation projects have been implemented or are about to be finished. We analyse flow of funding channelled into the projects by determining amounts, sources and designated use. As regards the data basis for economic calculation we use project-related statements of implementation costs which are provided by the respective regional project management and by the German Federal Agency for Nature Protection (BFN). For the analysis of land-use changes and the derivation of changes in GHG-emissions, we use data provided by our project partners (Drösler et al, in prep.). On the basis of the economic and scientific data we calculate CO_2 abatement costs for two different economic scenarios, one assuming the net present value of the investments for land acquisition not to be subject to devaluation, the other assuming the opposite and therefore depreciating the net present value of the investments for land acquisition to a residual value.

RESULTS

Describing our results, we use the example of our “most expensive” project. The targets of restoration for this project were the reestablishment of the original water tables, the termination of peat cutting and the environmentally sustainable reorganisation of grassland management within a buffer zone. Figure 1 presents the effects of the restoration measures in this region on the main target “reestablishment of groundwater tables”. In 1993 – halfway through the project – only a small amount of the area held high water tables. In 2004 the extent of area showing “wet” conditions has significantly increased and “dry” areas with low water tables are limited to a very small extent. Compared to the situation before the project, area holding high water tables inducing low GHG emissions (-5 to -15 cm) has increased by nearly 70 %. Area with low water tables inducing high emissions has decreased by about 41 %.

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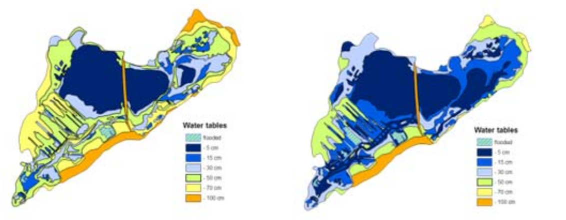
[1] University of Natural Resources and Life Sciences Vienna, Institute of Agricultural and Forestry Economics, Vienna, Austria (Lena.Schaller@boku.ac.at; Jochen.Kantelhardt@boku.ac.at).

[2] Hochschule Weihenstephan-Triesdorf, Fakultät Landschaftsarchitektur, Professur für Vegetationsökologie, Freising Weihenstephan, Germany (matthias.droesler@hswt.de)

The region achieved an annual emission reduction of about 11.400 t CO_2-eq. As regards "abatement costs", under Scenario 1 the measures of the conservation project create a monetary value of €85 per t CO_2-eq. If one only considered the money spent on rewetting – actually causing the emission reduction, the share of this position is with about 47% comparable to land-acquisition costs which also make up only 47%. Under Scenario 2, "abatement costs" are naturally higher. Here the total sum of annual investment leads to costs per ton CO_2-equvalent of about €107. The share of costs causing emission reductions decreases to 38% of total annual costs – while the costs for land make up 58% of the whole sum.



Groundwater tables 1993 Groundwater tables 2004

Figure 1: Change of groundwater tables resulting from restoration measures

DISCUSSION

Our results indicate that costs per ton CO_2-eq. associated with emission reductions due to conservation measures lie within an acceptable range of abatement costs: Common abatement strategies within the transport sector cause abatement costs varying from €20 to €400 up to more than €1000 per ton CO_2-eq. (WBA, 2007). Also the "Methodological Convention for Estimates of Environmental Externalities" (German Federal Environment Agency, 2007), promotes best estimated value of €70 per ton CO_2 and suggests sensitivity calculations based on the values of €20 and €280 per ton CO_2. However, various important points must be considered when interpreting our results. When gathering our data it became clear that no full record of the amounts of money and the flow of funding are kept. In part information about personnel and follow-up costs is missing, which can have significant effects on the derivation of abatement costs. Furthermore the system boundaries within which our study is conducted are narrow. Large-scale changes in area-structures and -functions of extensive ecosystems can have far-reaching consequences within the surrounding area, for example leakage effects as regards agricultural production and GHG Emissions. Last but not least, it has to be said that the high level of public funding which is necessary for implementing the projects cannot only be contrasted by the benefits of GHG emission reduction. As the projects have been implemented in favour of conserving ecologically valuable areas to save biodiversity, endangered species or cultural landscapes further benefits such as biodiversity, water conservation etc. have to be included in the monetary evaluation.

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