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A DECISION SUPPORT SYSTEM FOR DEGRADED AND ABANDONED PEATLANDS - A TOOL FOR BALANCING OPTIONS IN PEATLAND MANAGEMENT

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SUMMARY

Within a BMU ICI project (International Climate Initiative of the German Ministry for Environmental Protection) a decision support system (DSS) for degraded and abandoned peatland sites in the European part of the Russian Federation has been developed. The DSS presents possible management and utilisation options to help decision makers in identifying priority sites and strategies. It aims at wise decision making with respect to the management of degraded and abandoned peatlands, and pays special attention to CO₂ emission reduction. The DSS is designed as a brochure (in English and Russian) and downloadable from URL: <http://www.succow-stiftung.de/broschueren.html>. With its general approach, the tool has a broad applicability beyond the Russian Federation.

KEYWORDS: peatland degradation, peatland management, decision support system, fire prevention, GHG emission mitigation

INTRODUCTION

Since the 1990s, millions of hectares of drained peatland have been abandoned in Russia. Drainage systems, installed 30-50 years ago, are, however, largely still working leading to dry and uncontrolled peatland sites that

- * are vulnerable to peat fires,
- * have large GHG emissions, and
- * have little economic value with limited competitive economic claims.

The recurrent extensive peatland fires in the Russian Federation (2003, 2007, and 2010) stress the urgency to (re-)install proper management. In a project sponsored by the International Climate Initiative of the German Ministry for Environmental Protection (BMU ICI) an international project consortium of Russian, German, and Dutch partners developed an implementation strategy for restoring and conserving peatlands in the European part of the Russian Federation. One challenge was to develop a simple tool to support decision makers in identifying priority areas and suitable options for peatland management.

MATERIAL AND METHODS

The dichotomous structure of the Decision Support System (DSS) follows similar DSSs for peatlands, such as DSS-WAMOS (Hasch 2009) and PMDSS (Knieß et al. 2010), but is broader applicable than the former (which concentrates on forested peatlands and small peatlands in forests in Germany) and structurally simpler than the latter (which models longterm peatland development).

Background information and recommendations were compiled from literature and expert consultation. Prof. Dr. Jutta Zeitz (Humboldt University Berlin) and Dr. Yuri M. Plyusnin (Higher school of Economics, Moscow) advised on the conceptual structure of the DSS, whereas Dr. Sc. Andrey Sirin (Russian Academy of Sciences Institute of Forest Science) and Tatyana Minayeva (Wetlands International) provided information on the on the ground situation in Russia.

The DSS builds on basic principles in peatland ecology (Joosten and Clarke 2002), peatland restoration (Joosten and Schuman 2008, Kozulin et al. 2010), and climate impact of degraded peatlands (Couwenberg et al. 2011).

RESULTS

The DSS is designed as a bilingual (English - Russian) brochure and organized in modules (Figure 1) each consisting of:

- I. a guidance part providing the reader with background information and,
- II. a dichotomous decision tree where simple 'No' / 'Yes' decisions lead to recommendations and advice.

Submodule 'Rewetting' discusses the most important factors (water availability, land use, relief, and tree growth) to be addressed when trying to re-establish waterlogged conditions in a drained peatland. The submodule 'Restoration' focuses on the revitalisation of peat accumulation. Constant high water levels in or above the surface are a prerequisite for peat accumulation. The type and intensity of degradation differs from peatland to peatland as different peatland components (relief, peat hydraulic properties, hydrology, and vegetation) might have been affected. Submodule 'Restoration', discusses the vulnerability of the various components and gives recommendations for the prioritization and evaluation of restoration actions.

Utilisation is an effective option to ensure effective fire control of a peatland, provided that a marketable good is produced. For each utilisation option (peat extraction, agriculture, forestry, and paludiculture) a submodule shortly lists the prerequisites for economical feasibility and the environmental consequences. The only sustainable utilisation option that combines all discussed aims (Table 1) is paludiculture, an innovative concept for harvesting fresh biomass under wet conditions with adapted machinery and target oriented harvest times (Wichtmann et al. 2011, Abel et al. 2012, and Wichmann et al. 2012).

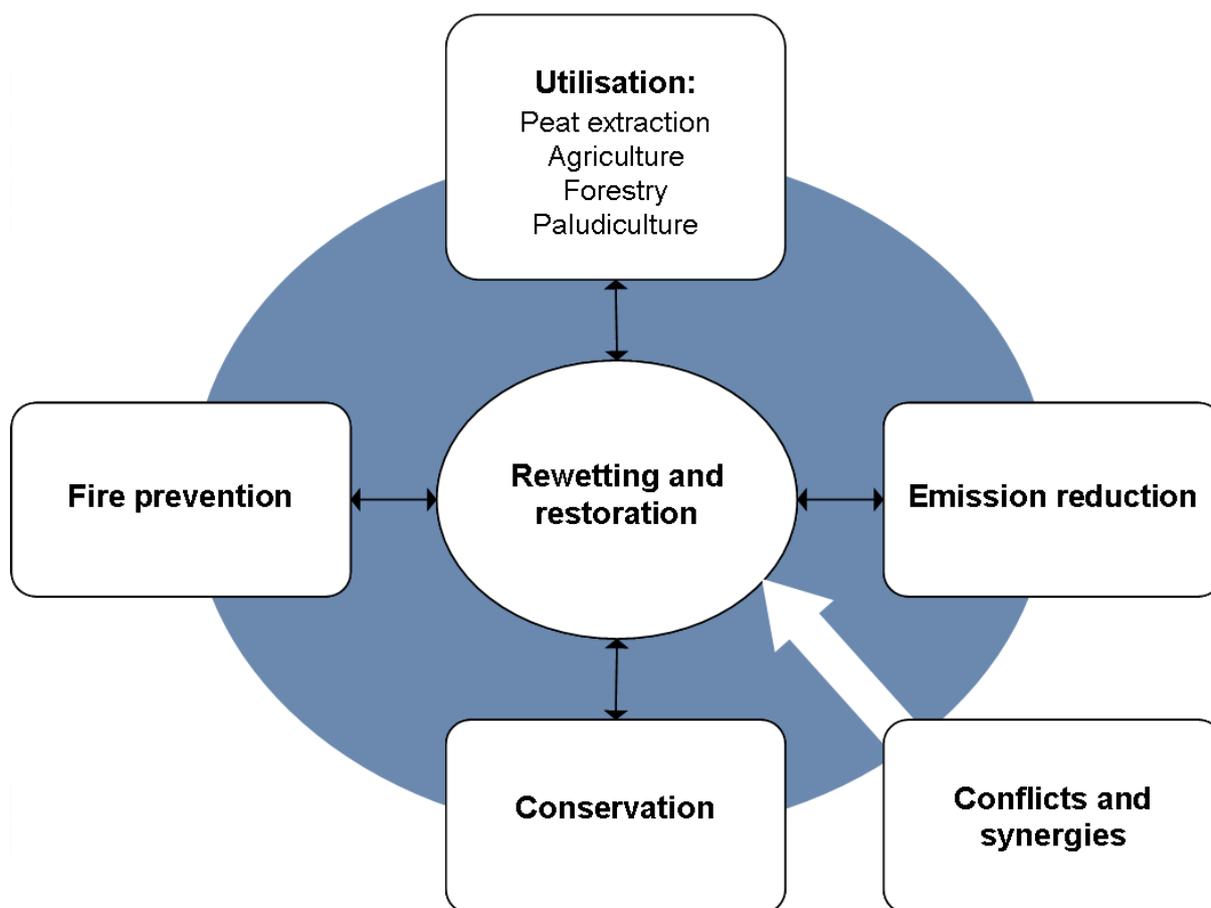


Fig. 1: Scheme of the modules.

Whereas each peatland can be considered to have value for nature conservation, the module ‘Conservation value’ helps to rank peatlands according to their value for biodiversity conservation. The module uses the criteria of the Ramsar Convention (2008) and a classification system for the naturalness of peatlands (Joosten 2001)

The module ‘Emission reduction’ provides a short introduction to carbon offset markets and presents the prerequisites for successful project implementation under the Verified Carbon Standard (VCS 2011).

The module ‘Fire prevention’ helps to estimate how fire-prone a degraded peatland is and refers to other modules for options to decrease fire susceptibility.

The module ‘Conflicts and synergies’ integrates the prior five modules and discusses (in-)compatibilities of the different aims and options (Table 1)

Table 1: Conflicts and synergies of various peatland utilisation options. Red = conflict; green = synergy

Utilisation option \ Aim	Production	Biodiversity conservation	Climate change mitigation	Fire hazard reduction
Paludiculture	Green	Green	Green	Green
Conservation	Red	Green	Green	Green
Rewetting	Red	Green	Green	Green
Peat extraction	Green	Red	Red	Green
Conventional agriculture	Green	Red	Red	Green
Conventional forestry	Green	Red	Red	Green
Abandonment	Red	Red	Red	Red

DISCUSSION AND CONCLUSION

This first approach to condense relevant information can be used for developing detailed scenarios for managing degraded peatlands and can be further adapted and developed. Whereas its application cannot substitute for proper and throughout assessment with expert knowledge, the tool gives a quick overview on the management options for an individual peatland and gives advice where expert input is needed for the concrete development of management plans.

Currently the DSS is under application and further development in running projects of the Michael Succow Foundation in Belarus (Wichtmann et al 2012) and the Russian Federation.

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