Demonstration restoration of a peatland (fen) in Baisogala – Reshaping intensively used agricultural land to meet climate change mitigation

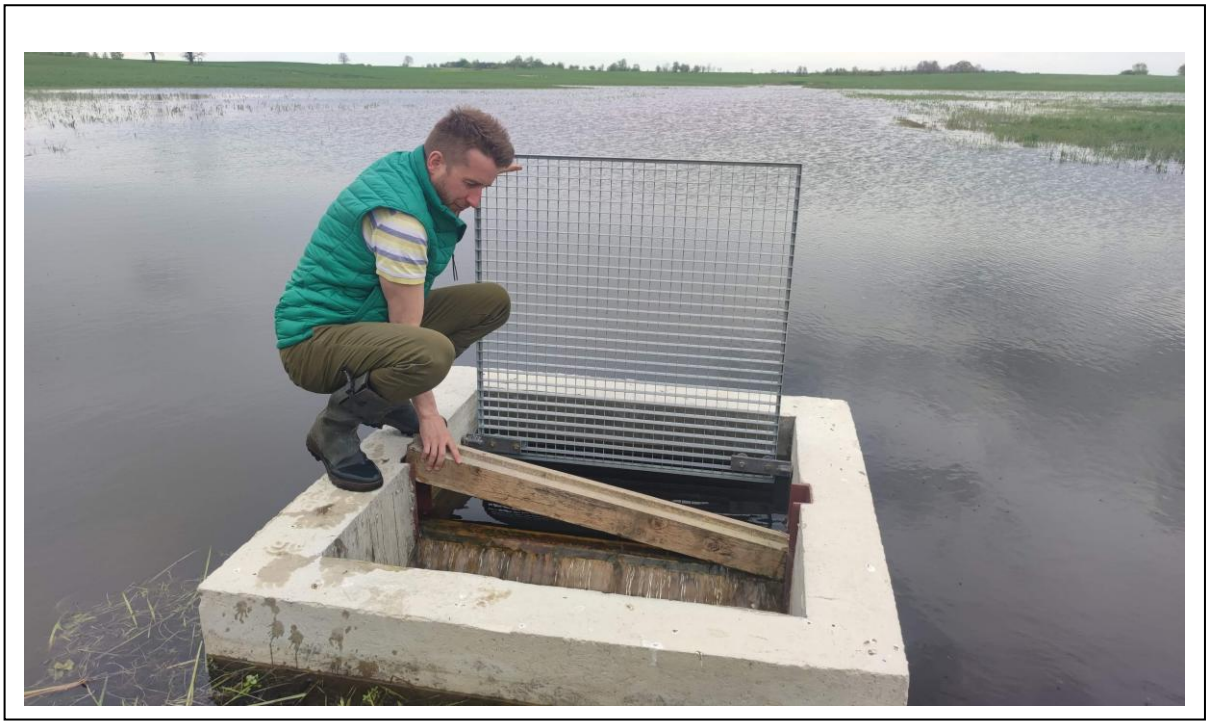

Photo: Jūratė Sendžikaitė

Name	Foundation for Peatland Restoration and Conservation (LT), Animal Science Institute of Lithuanian University of Health Sciences (LT), Greifswald Mire Centre (DE), Michael Succow Foundation Partner in Greifswald Mire Centre (DE).
Country	Lithuania
Biogeographical Region	Boreal
Region	Radviliškis district municipality
Landscape/ Eco system type / protected area	Former fen (peatland), drained and used as perennial grasslands for haymaking and grazing (pastureland).
Size / Scope	5 ha peatland area. The peatland is divided into two parts by a reclamation ditch.
Type of farm	Paludicuture
Agricultural Use	Before rewetting, the drained peatland and surrounding areas on mineral soils were used as intensively managed perennial

	grasslands for fodder production and grazing. Currently, the rewetted area is used as wet grassland (dominated by *Phalaris arundinacea*) for fodder production.
Best-practice / main idea	Rewetting peatland and production of fodder from wet grassland biomass for cattle and horses
Involved Stakeholders/ Partners	Foundation for Peatland Restoration and Conservation (LT), Animal Science Institute of Lithuanian University of Health Sciences (LT), Greifswald Mire Centre (DE), Michael Succow Foundation Partner in Greifswald Mire Centre (DE).
Duration	Restoration: 2020–2022 (as paludiculture site it is ongoing)
Goals	• Establish the first paludiculture site in Lithuania. • Implement the rewetting of a formerly drained peatland in an intensively used agricultural area to stop the degradation of fen peat and minimize CO_2 emissions from dry peat. • Annually production of fodder from wet grassland biomass for cattle and horses.
Activities	• Investigation of the site features • Soil surveys of the site, estimation of GHG emissions • Fundraising to ensure financing from private donors • Preparation and approval of reclamation reconstruction project • Reshaping and destruction of drainage structures • Coordination and construction permit obtained • Works carried out in summer 2021 – reconstruction of the mouth of the collector, installation of a sluice-regulator • Water level regime – maintained close to the surface of the peatland throughout the year, except in the second half of the summer when it is lowered to the surface of the ditch • Water level and vegetation monitoring • The Animal Science Institute of the Lithuanian University of Health Sciences is carrying out paludiculture – the cultivation of reed canary grass as fodder for beef cattle and horses.
Measures addressing water and/or soil management	The restored peatland ecosystem will be able to restore part of ecosystem services lost due to drainage, such as climate mitigation, maintaining biodiversity and improving the quality of water bodies (by reducing the amount of nitrogen compounds entering the surrounding surface waters

	contributing to reduction of eutrophication of Baisogala ponds and Kiršinas stream flowing into the Nevėžis River.
Measures addressing biodiversity, climate	Approximately ~85 t CO_2 eq./year emissions will be reduced from the area, total in 29 years period ~2500 t CO_2 eq.
Funding / Financing	Project was funded thanks to the contribution to the CO_2 reduction, provided by Tamm GmbH (Germany) and the Zero Waste 2020 Festival (Lithuania).
Transferability	This project works as a great example and model to be transferred to other potential areas, where peatlands can or need to be rewetted. The framework of course needs to be adapted to a specific area, however the steps to reach the goal can be used from this project.
Tip / suggestion from the project manager	• Investigate the site thouroughly; • Make good planning and calculations; • Keep the landowner updated and involved constantly.
Role of Landcare Associations	Landcare associations play a major role in implementing such projects, from helping to communicate such an example to farmers in the first place, but also helping them through the implementation process: acquiring all the permits, organizing the documentation, calculating the needed measures and future emission reductions. Also, sometimes such areas are not feasible for raising crops, as you need to buy seed, fertilizer, but they get occasionally wet and the yield is destroyed or minimal. Therefore, Landcare associations could also provide farmers a trade-off calculation, which could make the decision for rewetting easier.
Further information	https://en.pelkiufondas.lt/baisogala
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"This attempt showed that agricultural activity can continue, while the area also provides important ecosystem services." Nerijus Zableck

Reconstruction of a drainage system in Baisogala site and its surroundings, in 2022: A–B – installation of a sluice regulator with a water outlet (© UAB Baisogalos statyba, Jūratė Sendžikaitė), C – cleaned and reshaped drainage ditch (© Jūratė Sendžikaitė), D – restructured and resurfaced drainage headers (left) and dammed drainage ditch (right). © Nerijus Zableckis

II Detailed Description

Description and goals

During 2020–2022, the Foundation for Peatland Restoration and Conservation (Lithuania) together with partners from Greifswald Mire Centre (Germany), Michael Succow Foundation (Germany), and the Animal Science Institute of Lithuanian University of Health Sciences (Lithuania) implemented a first in Lithuania CO2 off-setting project combined with paludiculture on drained degraded peatland, near Baisogala (Radviliškis district).

Combining environmental, scientific-experimental, and land user interests, the project aimed to restore the hydrological regime and encourage the formation of productive wet meadows and typical fen vegetation in the fen peat soils (about 5 ha).
Due to drainage and long-term intensive land use, the Baisogala peatland had been severely damaged and lost most of its natural functions. For many years of intensive use, the site was not sustainable in the context of climate change. Preliminary calculation of GHG emissions by the GEST methodology shows that restoring of the hydrological regime and implementing paludiculture principles on the Baisogala site can reduce emissions up to 85 t CO2 eq./year.

According to the methodologies used in the carbon credit certification schemes (MoorFutures, etc.), GHG emissions are estimated until 2050, when Europe is expected to become the first climate-neutral continent to achieve zero net emissions. Therefore, in 2050 it will be 29 years since the restoration of the Baisogala peatland (restoration works were finished in 2021), which would save at least 2,500 t CO2 eq.
Besides rewetting and reducing the CO2 emissions from the area, the project aimed to establish an experimental restoration area, which could later be used as a showcase and living example for learning and experience gathering. It also works now as an example of paludiculture and shows that such rewetted agricultural areas can still be economically usable and productive while acting primarily as a carbon sink.

The project aims to accomplish numerous significant objectives. Firstly, a restored peatland ecosystem would be capable of supplying the majority of ecosystem services that have been lost as a result of long-term drainage, including preserving biodiversity and enhancing the quality of water bodies. Secondly, it will lessen the amount of nitrogen compounds that enter the nearby surface waters, which will help to reduce the eutrophication of Baisogala ponds and Kiršinas Stream that flows into the Nevėžis River.

Activities and use after restoration and future perspectives

Preparatory, design, and project implementation phases have been distinguished in the Baisogala site to restore the hydrological regime appropriate for paludiculture on formerly drained and intensively used agricultural peatland. The preparatory phase assesses the site's suitability for restoring the hydrological regime and developing paludiculture. The designing phase consists of project proposals, including preliminary technological solutions, as well as the creation of a technical restoration measures plan (technical design) with calculated construction costs. The approved technical design was followed while procuring the works or services throughout the project's implementation phase. To restore the hydrological regime on the site, the building of a dam with a regulated water inflow and reconstruction of the collector's mouth were chosen, taking into consideration the state and kind of drainage systems on the site.

Nerijus Zableckis, Director of the Foundation for Peatland Restoration and Conservation, explains in more detail:

"*The site was selected completely accidentally after a talk with the Animal Institute (Arturas Siukscius, the vice director at the time), as we were looking for a heavily drained peatland and asking here and there. So, it was a good combination since the institute was also looking for experiments, new tests, etc. In 2020, when we found the site and knew that some amount of CO2 e tones will be needed (German contribution, also that time we had a request from Lithuania for CO2) we started to prepare the concept for rewetting. In 2021, the drainage system of the peatland and its surroundings was redesigned. Drainage collectors were either elevated to the surface or destroyed, and a sluice regulator with a water outlet was installed in the drainage ditch to regulate the water level. Shandors (20 cm tall wooden barriers) can be used to regulate the water level in this area if needed. In addition, a sluice regulator is essential for keeping snowmelt and precipitation water in*

the restoration site and for economic reasons, i. e. for maintaining the optimal water level for the entry of mowing and other equipment in the restoration site.

There is a need for special machinery to enter the wet area to harvest the reed canary grass. Therefore, to establish conditions to mow the grassland, the institute lowers the water level by the sluice regulator, which is slightly affects the hydrology of the site. The peatland continues to "act" as a normal pasture since it was not included in the list of wetlands, which are eligible for wetland management payments. So, no special renumeration is paid to the institute for the management efforts.

Regarding biodiversity, which was not the primary goal of the project – some results were also present. In the first year after the restoration, we already had breeding lapwings, also green toads were heard in the flooded area. It also acts as a green island for migratory birds to stop."

The rewetted peatland is used for paludiculture practices, which are being implemented by the Animal Science Institute of the Lithuanian University of Health Sciences. Dr. Artūras Šiukščius, Director of the Animal Science Institute of the Lithuanian University of Health Sciences, explains: "Preliminary results show that Reed Canary Grass is the best option under these conditions. Grassland productivity reaches up to 4 t of green biomass from the rewetted area, which is suitable as a fodder plant for beef cattle, sheep, and partly for horses. We plan to use the biomass for beef cattle feeding and haylage production."

Author: Justas Gulbinas (Baltic Environmental Forum), 03.08.26

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