
COP29 | A Future Framework for Negative Emissions:

Multidimensional Interdependencies exemplified by Peatland Rewetting

The role of peatland rewetting as an emission reduction and carbon dioxide removal instrument

At the COP 21 in Paris 2015, the international community set itself the overarching goal to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” with the Paris Climate Agreement.¹ As current data suggests, the 1,5 degree target from the 2015 Paris Agreement is no longer realistic, while the 2 degree target only barely remains within reach, requiring urgent and drastic action.² In order to achieve at least the 2° target, an urgent reduction in emissions is required in view of the current CO₂ content of approx. 420 ppm in the atmosphere topping new records every year and reaching more than 50% above pre-industrial levels.³ Carbon dioxide removal (CDR) technologies only gained increased attention on a broad front when the IPCC emphasized the need for these technologies in its 1.5° Special Report in 2018.⁴ As the IPCC has been calling for ever more vehemently since then, CDR technologies must play a key role on this path alongside the prioritized reduction of emissions. This awareness is only slowly maturing among global decision-makers. CDR technologies fulfil three primary objectives: Supplementing mitigation as most important measure, reducing overshoots and counterbalancing residual emissions from hard-to-abate sectors.⁵ However, the large-scale introduction of these technologies must begin now, in parallel with the conversion of conventional energy systems, in order to keep the climate targets within reach.

In addition to geochemical solutions and technical carbon management measures such as Direct Air Capture and Carbon Storage/Usage (DACCS/CCU) or Bioenergy Carbon Capture and Storage/Usage (BECCS/CCU), ecosystem-based CDR technologies are indispensable in a multi-instrumental approach.

¹ UNFCCC, *Paris Agreement* (Paris 2015), available at: < <https://unfccc.int/documents/184656> > accessed 15 October 2024.

² IPCC, *Climate Change 2023 Synthesis Report Summary for Policymakers*, 10 <https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf> accessed 27 September 2023.

³ World Meteorological Organization, ‘Climate change indicators reached record levels in 2023: WMO’ (19 March 2024) <<https://wmo.int/news/media-centre/climate-change-indicators-reached-record-levels-2023-wmo>> accessed 21 October 2024.

⁴ IPCC, *1,5° Special Report* <<https://www.ipcc.ch/sr15/>> accessed 27 September 2024.

⁵ IPCC, ‘Factsheet CDR’ <https://www.ipcc.ch/report/ar6/wg3/downloads/outreach/IPCC_AR6_WGIII_Factsheet_CDR.pdf> accessed 27 September 2024.

Here, the (re)afforestation accounted in the LULUCF sector is currently the most commonly used means, while the restoration of wetlands has so far remained in the background, specifically peatlands. However, the CO₂ reduction potential of peatland restoration is more than twice as high as for the reforestation. One third of the CO₂ stored on land is sequestered in peatlands, although these only cover around four percent of the global land surface.⁶ At the same time drained peatlands are constant, immense CO₂ emitters. Thus, one of the most effective and quickest instruments for stopping further emissions is the rewetting of degraded peatlands alongside the protection of existing peatlands. Overall in the short and medium term, the focus with regard to drained peatlands is on stopping emissions as quickly as possible and protecting intact peatlands. The long-term goal is to restore their initial storage capacity. Law and governance have a decisive role to play here.

The international stage and questions of equity

In recent years, there have been many improvements at international level that have showcased the importance of sustainable peatland management. Alongside the United Nations (UN) itself, the European Union (EU) in particular has been a driver of change in climate law and governance. With the above-mentioned IPCC findings and general scientific evidence on the need to mitigate and remove carbon dioxide and the crucial role of peatlands in this context, the call for action to protect peatlands and rewet drained areas has grown louder every year.⁷ Since vast areas of former European peatlands were drained during the last centuries (50 % of all peatlands in EU, in Western and Central European Member States much more), there is an increasing number of voices calling for a pioneering role of the EU as a beneficiary of industrialization and drainage in the past. This question is also connected to broader questions of equity and burden sharing between countries in the context of the climate targets, necessary measures and their financing around the globe. Issues relating to the financing of climate measures will play a central role at the upcoming COP29.

The decade 2021-2030 is called the *United Nations Decade on Ecosystem Restoration*. Peatlands are one corner stone in this focus.⁸ At COP26 in Glasgow, their relevance was emphasized by the first global peatland pavilion. At COP27, the Global Peatland Assessment was presented as the largest collection of data on global peatlands.⁹ A comparable forum to Glasgow was not evident at COP28, but the virtual peatland pavilion was introduced.¹⁰ This virtual pavilion is currently planned to be updated for COP29. However, a similarly visible and prominent role for peatlands as at COP26 can only be expected again

⁶ UN, 'Global Peatlands Assessment: The State of the World's Peatlands' (2022), <<https://www.unep.org/resources/global-peatlands-assessment-2022>> accessed 23 September 2024.

⁷ United Nations Environment Programme, 'Resolution adopted by the United Nations Environment Assembly on 15 March 2019 4/4. Addressing environmental challenges through sustainable business practices' (UNEP/EA.4/Res.4, 2019); United Nations Environment Assembly of the United Nations Environment Programme, 'Resolution adopted by the United Nations Environment Assembly on 15 March 2019 4/16. Conservation and sustainable management of peatlands' (UNEP/EA.4/Res.16, 2019).

⁸ UN, 'peatlands' <<https://www.decadeonrestoration.org/types-ecosystem-restoration/peatlands>> accessed 27 September 2024.

⁹ UN, 'Peatlands matter: how the Global Peatlands Assessment can drive restoration action' <<https://www.unep-wcmc.org/en/news/peatlands-matter-how-the-global-peatlands-assessment-can-drive-restoration-action>> accessed 27 September 2024.

¹⁰ Available at <<https://storage.net-fs.com/hosting/6147066/18/>> accessed 21 October 2024.

at COP30 in Brazil, as the host country has huge wetlands and rainforest areas and nature-based solutions and LULUCF will be in the focus of the COP. In this context, the international policy strategies and frameworks adopted in the last years urgently need to be detailed further at COP29 in Azerbaijan in order to accelerate their implementation.

The successes of recent years¹¹ are not yet sufficient to achieve the necessary rewetting and protection rates. Twelve percent of the world's peatlands have been drained - and the trend continues to point upwards.¹² In some regions of the world, peatlands are being drained for agricultural use at an unprecedented rate. Europe is moving forward with its Green Deal and its following Climate Law with regard to the LULUCF sector and the Nature Restoration Law, but has drained large parts of its peatlands over the past centuries, particularly in Central European countries such as the Netherlands, Germany, or Poland. It takes several thousand years to build up a peat layer several meters thick, depending on the conditions, so that the sequestration potential of former peatlands that existed in the past cannot be restored in the short term. As part of the rewetting process, other greenhouse gases such as methane and nitrous oxide are initially emitted before a complete halt to emissions and long-term sequestration can be expected. Also, not all plants are counted as peat forming vegetation. Due to those exemplified complex climatologic consequences, it is absolutely necessary to accompany the rewetting process by competent local partners, proper hydro-ecological planning, and guide it through science-based laws and regulations.

One measure, many successes - aiming for the UN sustainability goals in an interdisciplinary approach

Peatland protection not only serves climate protection, but it also helps protect biodiversity and generates other co-benefits. The rewetting of peatlands fulfils most of the sustainability goals of the UN.¹³ For example, the climate protection-relevant but simultaneously controversial, Nature Restoration Law¹⁴ mainly targets biodiversity and was recently passed on the EU level with specific targets for the restoration of agricultural used peatlands by 2030, which may serve as a global role model in many regards as the first continent-wide, comprehensive law of its kind.¹⁵

¹¹ For instance Ramsar Resolution XIII.13 (2018) 'Restoration of degraded peatlands to mitigate and adapt to climate change and enhance biodiversity and disaster risk reduction'; Global Peatland Assessment 2022; national/regional peatland protection strategies and tighter action against peat extraction on national levels - Compare Strategies in European Countries, e.g. Germany: Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz (BMUV), *Moorschutzstrategie* (2022) <https://www.bmuv.de/fileadmin/Daten_BMU/Pool/Broschueren/nationale_moorschutzstrategie_bf.pdf> accessed 27 September 2024; Bundesministerium für Ernährung und Landwirtschaft (BMEL), *Torfminderungsstrategie* (2022) <https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/torfminderungsstrategie.pdf?__blob=publication-File&v=6> accessed 27 September 2024.

¹² UN, 'Global Peatlands Assessment: The State of the World's Peatlands' (2022) 49 <<https://www.unep.org/resources/global-peatlands-assessment-2022>> accessed 23 September 2024.

¹³ Tannenberger et al., 'The Power of Nature-Based Solutions: How Peatlands Can Help Us to Achieve Key EU Sustainability Objectives' 5 (2021) *Advanced Sustainability Systems* 2000146.

¹⁴ Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869 PE/74/2023/REV/1 [2024] OJ L, 2024/1991.

¹⁵ Nevertheless, it was a highly controversial legislative process, e.g. on the relationship between peatlands and forestry: criticism was voiced on a broad scientific basis regarding the inclusion of active afforestation on drained peatlands, for

Research conducted by Institute for Climate Protection, Energy and Mobility (IKEM) in Berlin and the Interdisciplinary Centre for Baltic Sea Region Research IFZO as (affiliated) institutes of the University of Greifswald sheds light on these and other relationships from an interdisciplinary and international perspective with a special focus on the legal and political implementation. By applying a CDR technology feasibility assessment scheme, the multidimensional challenge of rewetting of peatlands in the European context is assessed from various perspectives: system utility, institutional, environmental, technological, social and economic.¹⁶ A special focus lays on the institutional dimension and in particular on the legal implementation in the multi-level governance framework using a comparative methodology, acknowledging that successful climate governance has to take various challenges into account when implementing mitigation and removal technologies. Ecosystem-based solutions such as peatland rewetting are, from a technical perspective, ready to be integrated into existing legal and political frameworks on a large scale despite still existing legal barriers, in particular compared to newer geochemical CDR technologies and Carbon Management solutions like Carbon Capture and Storage (CCS). However, there are huge economic and social challenges accompanying their upscaling. One of the most important solutions to generate markets and economic perspectives is *Paludiculture*.¹⁷ In paludiculture, biomass can be produced on rewetted peatlands, the GHG emission reduction and potential carbon sequestration potential is manifold: 1) GHG emissions from drained peat soils could be reduced or even stopped by rewetting and wet utilization, potential carbon sinks could be created, 2) biomass and its fibers can be used for long-lasting products such as construction and insulation materials which could store the carbon contained for years or even decades, 3) replacing fossil-based materials in truly bio-economy applications with much better carbon footprint. New value chains are recently developing in collaboration with farmers and companies in Germany in the frame of new alliances.¹⁸

Interdisciplinary expertise is utilised through networking with the Greifswald Mire Centre (GMC) and its partners like the Michael Succow Foundation and the University of Greifswald. The GMC is one of the founding members of the Global Peatland Initiative, which brings together global peatland protection projects and networks.

details see Jurasinski et al., 'Active afforestation of drained peatlands is not a viable option under the EU Nature Restoration Law' (Royal Swedish Academy of Sciences 2024), available at <<https://zenodo.org/records/11394516>> accessed 15 October 2024.

¹⁶ Förster et al., 'Framework for Assessing the Feasibility of Carbon Dioxide Removal Options Within the National Context of Germany' 4 (2022) *Frontiers in Climate*; Borchert et al., 'A Comprehensive Assessment of Carbon Dioxide Removal Options for Germany' 12 *Earth's Future*.

¹⁷ *Paludiculture* (Latin 'palus' = swamp) is the productive land use of wet and rewetted peatlands that preserves the peat soil and thereby minimizes CO₂ emissions and subsidence, see GMC et al., Factsheet Paludiculture (2021) <https://www.moorwissen.de/files/doc/Projekte%20und%20Praxis/desire/paludiculture_definition_short_EN.pdf> accessed 21 October 2024.

¹⁸ GMC et al., tomorrow initiative,

'Nasse Moore für eine nachhaltige Zukunft' <www.toMOORow.org> accessed 21 October 2024.

Contact:

Prof. Dr. Michael Rodi
michael.rod@ikem.de

Dr. Michael Kalis
michael.kalis@ikem.de

Till Reinholz
till.reinholz@ikem.de

**Institut für Klimaschutz,
Energie und Mobilität e.V.**

Alte Jakobstr. 85-86, 10179 Berlin

+49 (0)30 408 1870 10
info@ikem.de

www.ikem.de

Jan Peters
jan.peters@succow-stiftung.de

Michael Succow Stiftung,
Partner im Greifswald Moor Centrum

Ellernholzstr. 1/3, 17489 Greifswald

www.succow-stiftung.de
www.greifswaldmoor.de