The Role of Peatlands in Climate Mitigation

Policy Review from Central and Eastern Europe

November 2023

The Role of Peatlands in Climate Mitigation

Central and Eastern European policies for the protection, restoration, and sustainable use of peatlands

Acknowledgements

Author: Erzsébet Óhegyi (CEEweb for Biodiversity)

Contributors: Orsolya Nyárai (CEEweb for Biodiversity), Naomi Smith (University of St Andrews, Scotland), Charlotte Grebent (ENSEGID, France)

Copy editor: Thor Morante (CEEweb for Biodiversity)

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Katona József utca 35. 1/1., 1137 Budapest, Hungary

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1. Introduction to peatlands in Europe

The Meeting of the Paris Agreement will not be possible without major changes in how our land resources are utilised (IPCC Special Report 2019). Reaching climate neutrality by 2050 in the EU is also not possible without including peatlands in the equation (European Climate Law 2020).

What are peatlands?

Peatlands are **wetland ecosystems** within which — under permanently water-saturated, oxygen-poor soil conditions — dead plants do not completely decay, resulting in a naturally accumulated layer of peat at the surface (Joosten, Tanneberger and Moen 2017). The semidecomposed plant material accumulates as layers of 'peat' that over time may reach many metres in thickness, resulting in land with organic soil (Convention on Wetlands 2021).

Figure 1. Peatlands are wetland ecosystems.

The thickness of the peat layer varies between countries and interests. However, most peatlands are referred to with a minimum peat depth of 30 cm. (Joosten, Tanneberger and Moen 2017)

Peatlands, due to their special conditions, host a great biodiversity of unique fauna and flora.

Distribution and state of peatlands in Europe

Peatlands, depending on their geographical location and other environmental conditions, have several types; one of the key conditions is the source of its water supply:

- **Bogs** are domed peatlands fed only by *rainfall.*
- **Fens** are peatlands fed by *groundwater.*
- **Transitional mires** have characteristics of both.

A mire is a peatland where peat is actively being formed. In Europe, approximately 54 % of peatlands are still accumulating peat. (Mires and Peat, 2017).

Figure 2. Sphagnum moss, typical peatland vegetation (here in red and yellow colour).

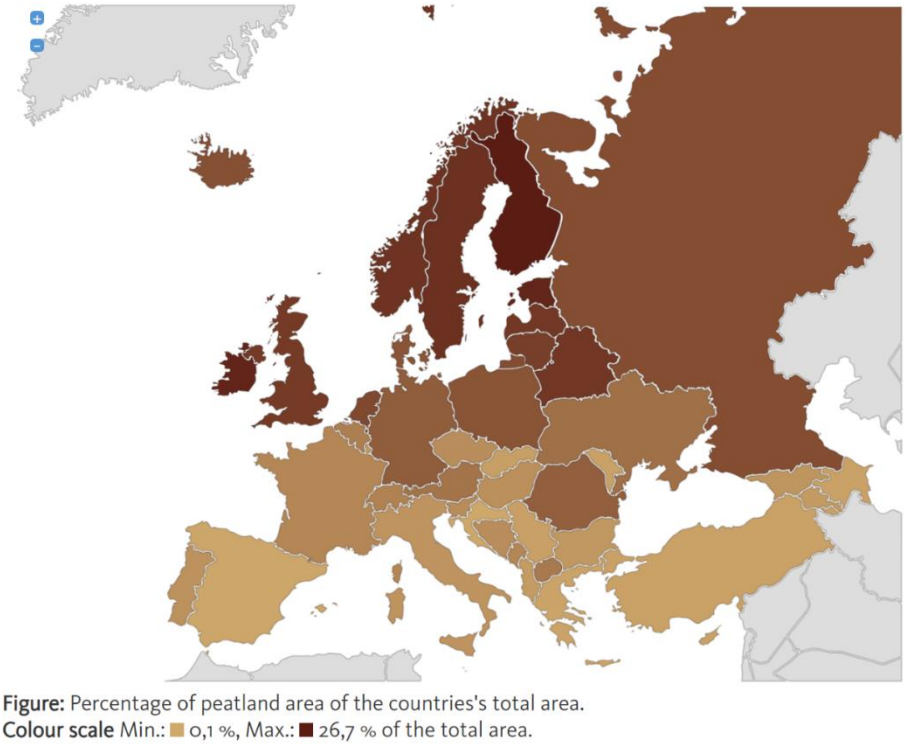


Figure 3. Percentage of peatland area of the countries' total area. Source: Greifswald Mire Centre (Moorwissen), Mires and Peat, Volume 19 (2017)

The latest peatland findings are published in the **Global Peatlands Assessment** (UNEP 2022), which was compiled by numerous voluntary authors. According to it, **6 % of Europe's surface area is covered with peatlands**, which store approximately 43 620

megatons of carbon. About **10 % of the former European peatland area has already been completely lost** through *drainage for agriculture, forestry, and peat extraction*, and about **46 % of the current European peatland area is classified as degraded — in the EU, even 50 %.**

Drained peatlands in the **European Union** alone **generate** close to **25 % of the total agricultural greenhouse gas (GHG) emissions**, while only making up 3% of the agricultural land area (Tanneberger *et al.* 2020).

This makes Europe the world's second largest greenhouse gas emitter from drained peatlands.

Agriculture is the most widespread use of peatlands in Europe — nearly 15 % of peatlands are used as such. In countries such as Hungary (98 %), Greece (90 %), Netherlands (85 %), Germany (85 %) and Poland (70 %) almost all organic soils were cultivated (UNEP 2022).

In Central Europe, 90 % of the peatlands are affected by destruction (Peatland Atlas 2023).

Peatlands as climate mitigators or enhancers?

The answer depends on their condition. Healthy peatlands play a pivotal role in climate change mitigation due to their unparalleled capacity to **store carbon**. Whereas natural peatlands have been cooling the climate for more than 10 000 years, **drained and degraded peatlands are significant sources of greenhouse gases** (GHGs) and **contribute to global warming** (Convention on Wetlands 2021).

Figure 4. Peatlands are diverse landscapes.

Consequently, it is essential to **protect peatlands** to keep them in their natural state, and to urgently **restore** the degraded ones.

Figure 5. From left to right, peatland restoration in process.

2. Policy responses for the protection, restoration, and sustainable use of peatlands

Integration of peatlands to national climate policies

As the European Union and the world in general are making ever greater commitments to **reduce GHG emissions** — according to the Paris Agreement (2015), to keep global warming to no more than 1.5° C, emissions need to be reduced by 45 % by 2030 and reach net zero by 2050; and according to the European Green Deal (2020), containing the ambitious goal to no net emissions of greenhouse gases by 2050 — countries started to **integrate the role of peatlands in their national climate strategies**. Some European governments have published dedicated **national peatland strategies,** such as Finland (2011), Ireland (2015), Germany (2021), the UK (2021), and Austria (2022). Other countries have included peat soils as part of their **national soil strategies** (e.g. Switzerland, Denmark), or to their **national climate agendas** (e.g. Lithuania) (UNEP 2022).

Embedding peatlands into European policy frameworks

Agriculture is the most widespread use of peatlands in Europe. The European Union, through its **Common Agricultural Policy** (CAP), still has contradictions between targets and incentives — even subsidizing agriculture on drained peatlands — (Peatland Atlas 2023); therefore, in the new period, it should incorporate eco-schemes and pay more attention to **wet cultivation**.

Paludiculture is the productive land use of wet and rewetted peatlands that preserves the peat soil and, thereby, minimizes CO_2 emissions and subsidence. (UNEP 2022)

The European Union's **Nature restoration law** on legally binding targets for nature restoration in different ecosystems will apply to every Member

Figure 6. Sundew (Drosera) hiding.

State, complementing existing laws. The aim is to cover at least **20 % of the EU's land** and sea areas **by 2030** with **nature restoration measures** (European Commission 2022a); however, interest groups are struggling to strengthen peatlands' role among the targets (CEEweb for Biodiversity 2023a).

Peatlands are inevitable in the European Union's **Fit for 55**, **Biodiversity Strategy for 2030**, **Soil Strategy for 2030**, the new Soil Health Law, and the **LULUCF regulation** (the latter addresses greenhouse gas emissions and carbon removals in the land use and forestry sector). (European Council 2023)

Central and Eastern European policy responses

Countries in Central and Eastern Europe (CEE) have started governmental responses to climate and soil health challenges integrating the protection, restoration, and sustainable use of peatlands into their national strategies, action plans or laws. **Table 1** summarizes peatland policies from eight Central and Eastern European countries (i.e. Germany, Lithuania, Poland, Hungary, Latvia, Estonia, Austria, and Slovakia).

Table 1. Overview of peatland policies in eight Central and Eastern European countries.

Country	Peatland area (ha)	Degraded peatlands (%)	GHG emissions from degraded peatlands	Reason of peat extraction	Peatland Strategy	Focus	Peatlands in other policies	Related objectives
DE	1 800 000 [1]	92 [1]	Largest emitter in the EU. 6,7% of the country's GHG emission are released from degraded peatland and peat soils.[2]	Horticulture Plans to stop extraction by 2040.[1]	National Peatland Conservation Strategy (2022)[1]	Restore and sustainably manage peatlands.	Federal Action Plan on Nature-based Solutions for Climate and Biodiversity (2022)[1]	Protection of intact peatlands and rewetting.
							Federal Climate Protection Act (2021)	Climate neutrality and -40 million t CO_2 eq by 2045 in the LULUCF sector.
LT	646 000 [3]	70	GHG emissions from converted agricultural land increased by nearly 80% between 2005 and 2017.[4]	Exports	—	—	—	—
PL	1 495 000 [4]	85	Third largest emitter in the EU.[5]	Fuel, horticulture	—	—	Strategy for the Protection of Wetlands (2022-2031)	Rewetting peatlands: the promotion of paludiculture methods

[1] Germany's National Peatland Conservation Strategy (2022). In: https://www.bmuv.de/download/nationale-moorschutzstrategie.

[2] Austria's National Peatland Strategy 2030+ (2022). https://www.impuls4action.eu/peatland-strategy-austria-2030.

[3] Peters, Jan and Moritz von Unger, Peatlands in the EU Regulatory Environment, 2017. DOI: 10.19217/skr454.

[4] Tanneberger et al., The peatland map of Europe, 2017; http://mires-and-peat.net/media/map19/map_19_22.pdf.

[5] Global Peatland Database, 2019. https://greifswaldmoor.de/global-peatland-database-en.html.

Country	Peatland area (ha)	Degraded peatlands (%)	GHG emissions from degraded peatlands	Reason of peat extraction	Peatland Strategy	Focus	Peatlands in other policies	Related objectives
								among farmers, the permission for the state and NGOs to take over agricultural land for nature conservation purposes.[6]
HU	62 344 [7]	97 [8]	Contributes with 1% to the EU's GHG emissions with its *total* - not only peatland related-emissions.[9]	Horticulture.	—	—	Law on Nature Conservation (Act LIII of 1996, Article 23).	Legal protection by the force of the law to all peatlands.
							2nd National Climate Change Strategy 2018-2030.	The strategy mentions the preservation and restoration of peatlands as most threatened habitats as well as to strengthen their role in climate

[6] Peatlands and wetlands in the new CAP: too little action to protect and restore, BirdLife Europe and European Environmental Bureau policy briefing. https://www.birdlife.org/wp-content/uploads/2022/04/Analysis-Peatlands-Wetlands-CAP-strategic-plans-April2022.pdf.

[7] National ex-lege peatland layer, Fertő-Hanság National Park Directorate.

[8] Környezetvédelmi Minisztérium, Természetvédelmi Hivatal, 2002. Lápok – Nemzeti Ökológiai Hálózat 3. ISBN: 963 00 7049 9. ISSN: 1587-8856.

[9] Hungary's National Energy Strategy 2030, looking ahead to 2040. (Nemzeti Energiastratégia 2030, kitekintéssel 2040-ig) 2020. Innovációs és Technológiai Minisztérium.

Country	Peatland area (ha)	Degraded peatlands (%)	GHG emissions from degraded peatlands	Reason of peat extraction	Peatland Strategy	Focus	Peatlands in other policies	Related objectives
								mitigation (nature conservation chapter).
							National Nature Conservation Master Plan V.[10]	Contains the registry of peatlands. Defines the main actions and directions for nature conservation, including the restoration of degraded wetlands.
LV	594 000	60-100 [11]	According to the GHG inventory of 2019, emissions from wetlands in the period from 1990 to 2017 have increased and GHG projections show an increase in GHG emissions also in the future.	Horticulture, fuel.	Guidelines for the sustainable use of peat 2020-2030.	Sustainable use of peat, promoting scientific research, innovative solutions for peat extraction, recording GHG emissions.	Climate Neutrality Strategy for 2050.[12]	GHG emissions forming in the territories of peat extraction and emissions forming upon use of peat in horticulture are evaluated in the category of wetlands.

[10] Hungary's National Nature Conservation Master Plan until 2026 (2022). Nemzeti Természetvédelmi Alapterv V. A természetvédelem 2026-ig szóló szakpolitikai stratégiája. MAGYAR KÖZLÖNY • 2022. évi 203. szám.

[11] Barthelmes, Alexandra, et al. Drainage of the Mires in Latvia. 2015.

[12] Climate Neutrality Strategy for 2050 Latvia.

Country	Peatland area (ha)	Degraded peatlands (%)	GHG emissions from degraded peatlands	Reason of peat extraction	Peatland Strategy	Focus	Peatlands in other policies	Related objectives
EE	1 200 000	90	Damaged peatlands causing the annual GHG emissions to amount to 7.7 megatons [13]	Fuel, horticulture.	Action Plan for Protected Mires for 2016-2023.	Restore 10 000 hectares of peatlands before 2020 as well as keeping 190,000 hectares of peatlands under national protection.[14]	Nature Conservation Development Plan 2020.	Peat mined per year is limited since 2015 but increasing for horticultural use. Peat extraction is allowed on drained, degraded areas. The plan indirectly supports paludiculture and restoration of peatlands.[15]
AT	30 000 [16]	90 [17]	1-2% of the countries' total GHG emissions (estimation).[15]	Medical industry, horticulture. The country finances peat extraction in other countries and imports 100 000 t of peat annually	Peatland Strategy Austria 2030+ (2022).[15]	Strategic basis for the protection and restoration of peatlands and organic soils.[15]	Alpine Convention	Protocol on soil convention has been ratified. Article 9: Conservation of Soils in

[13] Legal Regulatory Framework of Peatland Exploitation, Draining and Restoration in Estonia. 2018.

[14] Legal Regulatory Framework of Peatland Exploitation, Draining and Restoration in Estonia. 2018.

[15] Nature Conservation Development Plan until 2020, Ministry of the Environment, 2012.

[16] Austria's National Peatland Strategy 2030+ (2022). Moorstrategie Österreich 2030+, Bunderministerium Landwirtschaft, Regionen und Tourismus https://www.impuls4action.eu/peatland-strategy-austria-2030.

[17] http: https://www.wwf.at/die-vergessene-klimasuende-moorschutz-wird-in-oesterreich-regelmaessig-ausgehebelt/. (accessed on 27.10.2023.).

Country	Peatland area (ha)	Degraded peatlands (%)	GHG emissions from degraded peatlands	Reason of peat extraction	Peatland Strategy	Focus	Peatlands in other policies	Related objectives
				for horticultural use. Plans to reduce this with 50% by 2023.[15]				Wetlands and Moors.[18]
SK	6000 [4]	90 [19]	—	—	—	—	Greener Slovakia – Strategy of the Environmental Policy of the Slovak Republic until 2030 (2019).	By 2030, at least 15% of degraded ecosystems in Slovakia — including salt marshes, wetlands, peat bogs, etc. — will be restored.
							Low-Carbon Development Strategy of the Slovak Republic until 2030 with a View to 2050.	The Agriculture and LULUCF chapters mention the target "Restoring degraded wetlands" and "Protect and restore peatlands and wetlands in river basins".

[18] Alpine Convention Protocol on Soil Convention. In: https://www.alpconv.org/fileadmin/user_upload/Convention/EN/Protocol_Soil_Conservation_EN.pdf. (accessed on 27.10.2023.)

[19] Bragg, O. and Lindsay, R. (Eds.) 2003. Strategy and Action Plan for Mire and Peatland Conservation in Central Europe. Wetlands International, Wageningen, The Netherlands. vi + 94 pp.

Germany

Restoring and protecting peatlands is now noticeably present in the German climate agenda. Germany adopted its **National Peatland Conservation Strategy in 2022**, which targets the reduction of 5 million t CO_2-eq from peatlands until 2030, as well as brings together all relevant stakeholders to create successful cooperation for the protection and restoration of peatlands.

Germany's Federal Climate Protection Act (2021) has ambitious goals towards climate neutrality and reduction of CO_2 emissions by 2024 (-40 million t CO_2-eq by 2045 in the LULUCF sector).

Besides, Germany dedicated 1.2 billion Euros for peatlands in its National programme for nature-based climate protection (Michael Succow Foundation).

Figure 7. Restored raised bog.

German policies, strategies, and solutions for rewetting peatlands are great long-term examples for countries that are still in the process of planning their actions to restore these sensitive ecosystems. Germany should now focus on the development of attractive incentives and safeguards to increase the willingness among all stakeholders to push forward towards peatland restoration.

Poland

The **Strategy for the Protection of Wetlands (2022-2031)** includes specific objectives related to rewetting peatlands: the promotion of paludiculture methods among farmers, and the permission for the Regional Directorate for Environmental Protection and NGOs to take over agricultural land for nature conservation purposes, among others.

Furthermore, Polish legislation has several plans and strategies that could highlight the need to restore peatlands, including the Strategic Plan of Adaptation to Climate Change, but no preservation or conservation measures are mentioned. This is also the case in Poland's NECP (2021-2030).

Hungary

There is a strong legal nature protection of peatlands since 1996 on the remaining, distributed bogs, mires, or peatland pieces. According to the Act on Nature Conservation 1996 LIII. tv. 23.§ (2), **all mires are protected in Hungary by the force of law** (Act on Nature Conservation LIII. 1996).

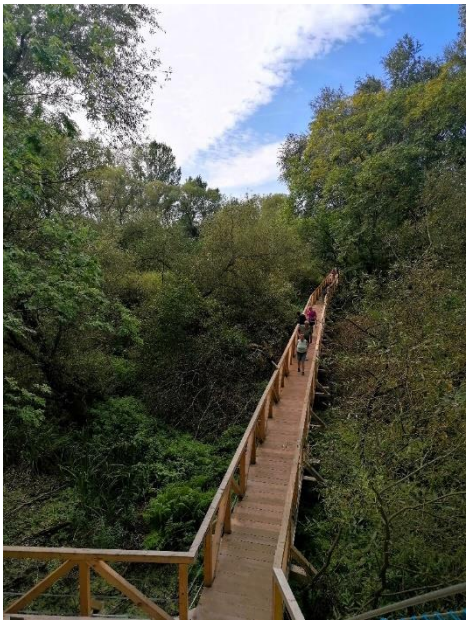


Figure 8. Educational trails on peatlands are usually guided on elevated walkways.

Hungary's CAP Strategic Plan could be a potential solution for increased peatland protection, while still allowing an agricultural use, requiring farmers to carry out practices that are beneficial for the environment through the development and maintenance of grasslands, non-productive areas, wetlands, habitats, and conservation of trees, farmers will also contribute to the improvement of the carbon sequestration capacity of soils and ecosystems (European Commission 2022b). It is planned to introduce peatland protection related measures in the national CAP from 2025.

Hungary's 2nd National Climate Change Strategy 2018-2030 — looking ahead to 2050 — contains the country's decarbonisation plan, where peatlands are mentioned as habitats to be preserved and restored.

The framework for the nature conservation-related tasks of climate adaptation is set out in the National Nature Conservation Master Plan, which also entails that the peatlands registry has been updated in Hungary in 2020. As a result, 1193 pieces of peatlands have been assessed, covering 62 344 hectares, according to the National Nature Conservation Master Plan until 2026 (2022).

There are several good awareness raising examples for peatlands in Hungary, like the peatland educational trail in Dunakeszi handed over in 2023.

Figure 9. Modern awareness raising measures are important, like interactive education trails on peatlands.

Latvia

Due to a prolonged relationship with peat as an energy resource, Latvian peatland laws encourage current rates of extraction and generally focus on the reduction of peat exported from Latvia rather than the protection of national peatlands.

In the **Latvian Guidelines for the sustainable use of peat 2020-2030**, the sustainable use of peat and promoting scientific research and innovative solutions for peat extraction and for recording GHG emissions are important topics. To achieve climate neutrality in 2050, carbon sequestration is supposed to happen in those swamps where no economic activity is carried out (Ministry of Environmental Protection and Regional Development Republic of Latvia 2020).

Latvia still has the potential to halt any further drainage and extraction of its peatlands. Many current policies have the potential to help protect and prevent any further damage, but they still allow extraction and drainage.

Estonia

Estonia's Action Plan for Protected Mires for 2016-2023 (the new plan is currently being completed) included the restoration of 10 000 hectares of peatlands before 2020, as well as keeping 190 000 hectares of peatlands under national protection. EU funds need to be involved, as the allocated national budget is not sufficient.

Estonia may have the available environmental legislation but there are concerns with the lack of importance placed on valuable peatland ecosystems around the country. In Estonia, peat can only be extracted from previously strongly drained sites. From 2011, there is a fast development regarding rewetting and restoration of peatlands (CEEweb for Biodiversity 2023b).

Austria

Austria published its **National Peatland Strategy 2030+** in 2022. The strategy needs to be revised every five years. The strategy focuses on the protection of peatlands and organic soils. The peatland strategy is intended to intensify the dialogue and cooperation between the stakeholders, such as the administration, landowners, or nature conservation officers (Peatland Strategy Austria 2030+ 2022). The country finances peat extraction in other countries and annually imports 100 000 t of peat for horticultural use; however, it plans to reduce this pattern by 50 % by 2023.

Slovakia

The **Greener Slovakia – Strategy of the Environmental Policy of the Slovak Republic until 2030** (2019) indicates that "by 2030, at least 15 % of degraded ecosystems in Slovakia, such as the upper boundary of the forest, especially salt marshes, wetlands, peat bogs and lowland forests, which have been significantly affected by human activity, will be restored."

The Low-Carbon Development Strategy of the Slovak Republic until 2030 with a View to 2050 contains the target "Restoring degraded wetlands" under the "Agriculture" chapter as an additional measure to achieve the climate neutrality target in agriculture by to 2050. "Protection and restoration of peatlands and wetlands in river basins" are also

mentioned under the "Land use, land use change and forestry" (LULUCF) chapter. The strategy expresses that "Slovakia has not yet quantified emissions/removals from the Wetland category as there is no sufficiently accurate input data based on which it is possible to model emission/removal projections in this category." It also states that it will be necessary to quantify and evaluate the potential for CO_2 removals in the LULUCF sector and their possible application to reduce the emission residue by 2050 through additional measures.

Figure 10. Peatland in mountain environment.

Best practices from Central and Eastern Europe

Paludiculture

Germany promotes the form of productive land use of wet and rewetted peatlands that preserves the peat soil and thereby minimizes CO2 emissions and subsidence.

Rewetting

Poland's Strategy for the Protection of Wetlands (2022-2031) includes specific objectives related to rewetting peatlands

Protection by the force of law

Hungary protected all its remaining peatlands by the force of the law "ex lege". (Law No. LIII of 1996 on Nature Conservation).

National peatland strategy

Austria created its National Peatland Strategy 2030+ , containing the strategic basis for the protection and restoration of peatlands and organic soils.

Carbon farming

Farmers are incentivised to set up more sustainable practices which are economically valued in carbon credits, gaining ground in North-West Europe.

Educationail trails

Educational trails - built without the harm of nature - are widespred in CEE countries and are important awareness raising practices, bringing peatlands closer to the general public.

Peatlands online

Social media messages can have power and reach many target groups. Peatland-related posts are most referred to with the hashtags #Power2Peatlands, #PeatlandsMatter, #PeatlandRestoration, #NatureFriendlyFarming, #EuropeanPeatlandsInitiative, #GlobalPeatlandsInitiative, #Paludiculture, and #Rewetting.

International initiatives and cooperation

International initiatives and networks are important steps towards achieving a better position for peatlands in policy, such as the below mentioned ones.

Global Peatlands Initiative

The Global Peatlands Initiative is the leading effort by institutions and experts formed at the UNFCCC COP in Marrakech, Morocco, in 2016, to save peatlands as the world's largest terrestrial organic carbon stock (Global Peatlands Initiative 2023).

European Peatlands Initiative

At the Climate Summit COP26, held in November 2021, in Glasgow, a dialogue was initiated by the Irish government and the Global Peatlands Initiative, hosted by UNEP) and facilitated by Eurosite and the Succow Foundation/GMC, to discuss establishing a European Peatlands Initiative (EPI) to advance action on peatlands across Europe. The initiative is currently in development aiming to bring together national governments and other stakeholders to enable restoration — and conservation — of all peatlands in Europe.

'Power to the Peatlands' Conference

The largest gathering of peatland experts ever held on the globe, the 'Power to the Peatlands', held in September 2023, in Antwerp, Belgium, aimed to reposition peatlands at the core of European nature and climate policy. It came out with a Declaration for European policymakers. More than 500 peat experts co-created

the call to action "Empower nature, climate and future now!" (CEEweb for Biodiversity 2023a, Greifswald Mire Centre 2023).

Flagship peatland projects in Europe

The European Union, as well as other European initiatives, support various projects on peatland protection, restoration, and sustainable management. We highlight five of them where the project websites provide valuable further information.

- **Building the European Peatlands Initiative** - A strong alliance for peatland climate protection in Europe

  European Climate Initiative (EUKI) /Germany

- **CarePeat** - Restoring the carbon storage capacity of peatlands

  Interreg North-West Europe / European Union

- **CConnects** - CarbonConnects aims to reduce the high carbon footprint of peatland soils

  Interreg North-West Europe / European Union

- **LIFE Multi Peat** - A project to restore and manage peatlands in Poland, Germany, Belgium, Ireland and the Netherlands.

  LIFE /European Union

- **ALFAwetlands** - Wetland restoration for the future

  Horizon / European Union

Policy recommendations from Central and Eastern Europe

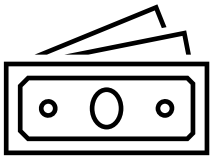
Central and Eastern European countries still have legislative, funding and cooperation strengthening gaps to fill. Below, a set of identified recommendations for Central and Eastern European policymakers:

LEGISLATION

- Phasing out CAP payments for drained peatlands.
- Introducing an eco-scheme to the CAP to support and incentivise sustainable management of formerly drained peatlands with paludiculture.
- Introduce strong controls and regulations on the conservation and protection of intact peatlands.
- Develop a national peatland strategy.

FUNDING

- Provide governmental financial support to rewet and restore peatlands.
- Encourage green financing mechanisms, such as green bonds, that help fund restoration projects.
- Introduce carbon-credits for restoration and low carbon farming on peatlands.
- Combine both public and private investments.
- Support research by establishing up-to-date data systems on peatland extent, conditions and uses.



COOPERATION

- Gain information on, and, if applicable, join international initiatives, such as the European Peatlands Initiative.
- Encourage transnational cooperation (e.g. projects, initiatives, conferences) for the protection, restoration, and sustainable use of peatlands.

3. Summary

Many experts agree that it is the time to confirm 'peatland' momentum — where the focus is getting stronger on the role of peatlands as climate mitigators in Central and Eastern European policies.

Despite a growing interest in the inclusion of peatlands in national political agendas, there is still work to be done, especially regarding the collection of up-to-date data on peatlands' extent, degradation, and monitoring, to better highlight and set ambitious goals for the role of peatlands in national policies and action plans. Advocacy is needed for more multi-stakeholder conversations within a governmental setting as part of the policymaking process, as well as to draw attention to the harmful consequences of peatland drainage due to agricultural use, forestry, and peat extraction.

Peatlands' role in climate change mitigation cannot be avoided since degraded peatlands are significant contributors to GHG emissions, whereas intact and rewetted peatlands have tremendous capacity to store carbon.

It is time to act now!

Figure 11. Peatlands store twice as much carbon as all the world's forests.

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