FACCE ERA-GAS MONITORING & MITIGATION OF GREENHOUSE GASES FROM AGRI- AND SILVI-CULTURE PEATWISE

Leibniz Centre for Agricultural Landscape Research (ZALF)

POLICY BRIEF: FUTURE POLICY SCENARIOS ON DRAINED PEATLANDS

MAIN MESSAGES

- 28 stakeholders (policy-makers from national, regional and local levels, practitioners and scientists) from **Finland, Germany and the Netherlands** discussed transitions and implications for climate neutral peatland use by 2050

→ Whether the climate neutrality target for the EU should also imply **net-zero emissions from peatlands by 2050 is highly debated** between the stakeholder countries and is considered to be very difficult to achieve by most participants. There was **consensus that peatland emissions should be reduced drastically and sequestration potential should be increased wherever possible**, but still some GHG emissions seem to be inevitable (e.g. methane).

- Solutions which are **flexible** and **locally adapted** to a region's geographic and hydroclimatic characteristics considering peatland uses are key to enabling a fair transition for all actors
- The **Common Agricultural Policy** can be a strong instrument in the transition, but should include eligibility of paludiculture for direct payments
- A **suitable market, or sales niche**, for paludiculture products must be developed
- Stakeholders from all countries expressed a strong need for regional coordinating institutions who can **align the interests of farmers and land managers** in spatially/hydrologically connected peat areas, similar to the agri-environment collectives which exist in the Netherlands
- The transition demands **dialogue across sectors** to coordinate efforts and actions along transparent and stringent transition pathways
- **Wider public support** and **financial action** must underpin the transition

THE IMPORTANCE OF PEATLANDS IN THE EU

In the European Union (EU), peatlands cover only 7.7% of the land surface [1], yet the EU is globally the second largest emitter of greenhouse gases from drained peatlands [2]. As the EU affirmed the core goal of the Paris Agreement which set zero net carbon dioxide (CO_2) emissions by 2050, reducing emissions from peatlands deserves an important place in EU's climate policies. Peatlands have been drained for agriculture, forestry and peat extraction, evoking an irreversible process of soil subsidence and substantial emissions. Conservation of drained peatlands, such as raising the water table or cultivation of wet-adapted crops, or the restoration of natural condition are widely accepted as effective measures for climate change mitigation [3, 4].

However, as they often imply high costs of conversion and management, farmers need economic incentives sufficiently attractive to initiate the transition [5]. Furthermore, to reduce emissions on peatlands at a large scale, cooperation must be facilitated between neighbouring farmers and different sectors. Nevertheless, a comprehensive climate policy target for emissions reductions from drained peatlands is lacking in EU and national policies [6].

In order to identify patterns across European contexts, the three peatland-rich EU countries Finland, Germany and the Netherlands were chosen as case studies for this workshop based on their relevance in terms of mitigation potential

on drained peatlands (Figure 1).

Finland is the second largest emitter for GHG from peatlands in the EU. More than half of the almost 10 million hectares of peatlands in Finland have been drained for forestry use. A smaller fraction of the peatlands is utilized as arable land, and 11% of the cultivated area is classified as peat soil [7].

Germany is the largest emitter of GHGs from peatlands in the EU. The outstanding position of Germany can be explained by the fact that more than 95% of German peatlands are drained and 80% of total are intensively used for agriculture, predominantly as grassland and arable land on sites with low groundwater tables [8], rest is used for forestry and peat extraction. They are responsible for 45 Mt CO_2e (or 5 %) of the total annual emissions [9].

In the **Netherlands**, about 8% of the area of the land is covered by peat soils (about 290,000 ha), mainly drained and in use as grassland for dairy farming [10]. The peat soils are drained with a water table between 30 cm down to 100 cm below the surface. There is certain pressure to react to current peatland use, as it causes soil subsidence of, on average, 8mm annually and nutrient pollution.

16 stakeholders (national and regional governments, water authorities, farmers groups) and 12 researchers from these three countries joined an online workshop, organised and hosted by ZALF, in the context of the research project "**PEATWISE**" on 15.03.2021 to discuss current and future policies for sustainable peatland use. This policy brief outlines the mitigation measures in testing phases and provides recommendations based on the results from the workshop.

WHAT MIGHT THE TRANSITION PATHWAYS FOR PEATLANDS IN DIFFERENT EU COUNTRIES LOOK LIKE?

The European Commission made a proposal for a legally binding target of net zero by 2050 as part of EU climate policy framework and the European Climate Law [11]. However, in the EU, emissions from peat soils are reported in the sector "land use, land-use change and forestry (LULUCF)", which is excluded from overall emission reduction target. LULUCF is only to preserve the net sink at its current strength (cf. "no-debit rule"), making insufficient incentives for reducing

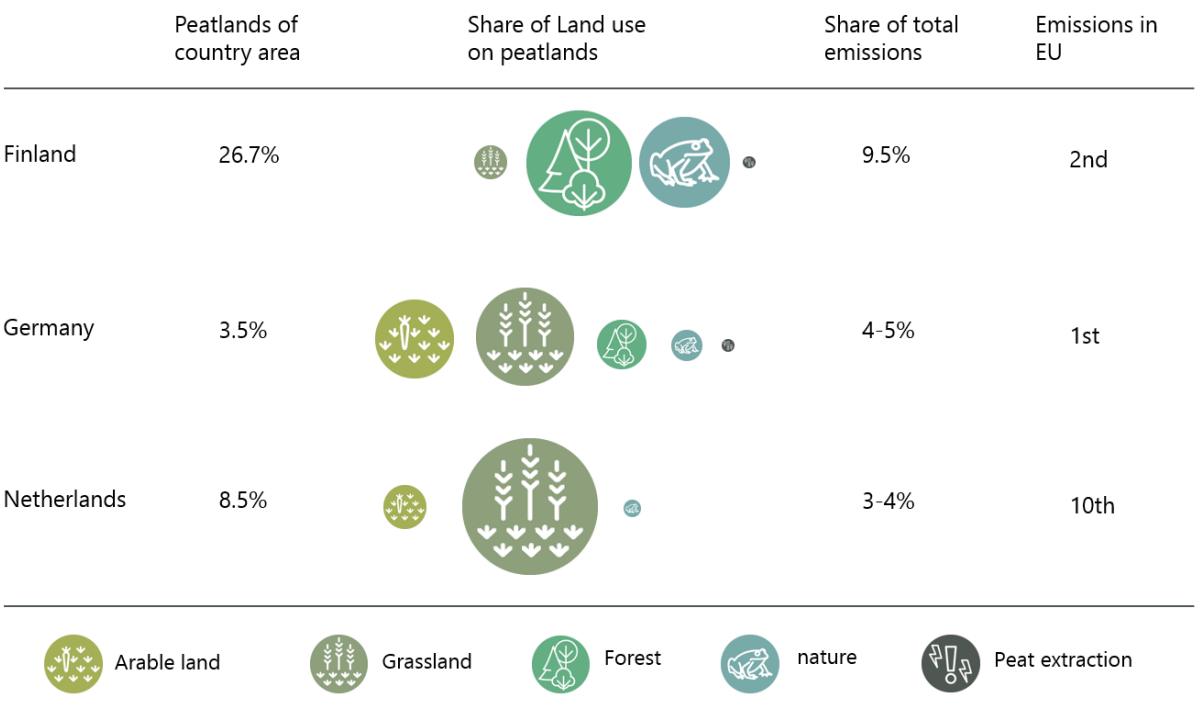

Figure 1: Different starting point for peatland in Finland, Germany and the Netherlands.

peat-related emissions[1] [12]. The stake is high if peatlands can be better integrated into EU's 2030 Climate and Energy Framework and all Member State's climate action plans. But how to translate the ambition of EU climate target to peatlands is not clear.

Germany and the Netherlands have their "climate action plans" to substantiate carbon-neutrality (overall GHG emissions) until 2050 with interim targets for 55 % reduction by 2030 compared to 1990 levels [13, 14]. With a more ambitious target, the Finnish Government is committed to achieve carbon-neutrality by 2035. However, pathways for the land-use sector at a national level are rarely explored and the emission trajectories for peatlands remain largely unknown [8]. For example, Germany aims to make LULUCF an overall sink but does not set reduction targets.

Most participants from **Germany** consider the 2050 climate neutral target to imply climate neutral peatland (CO_2 emissions from peatlands are reduced to net zero) by 2050 and are determined to deliver. Most participants from the **Netherlands** disagree overall emission targets should be synonymous with emission reductions from peatlands. They were clear that peatland emissions have to be reduced drastically but net-zero might be impossible to achieve for technical, natural or management reasons. The opinions from **Finland** are divided. All participants acknowledge the high level of ambition and difficulty to achieve climate neutral peatland by 2050, especially Dutch participants who were rather pessimistic. But no alternative to compsensate peatlands for net-zero emissions can be provided. While stakeholders expect a decrease of intensively used drained peatlands in 2035 in all three countries, their anticipated pathways for the various mitigation measures (Table 1) are very different:

Table 1: Potential mitigation measures on peatlands

Mitigation measures	Mitigation potential
Restoration/Renaturation	Very high
Paludiculture	Moderate-very high[2]
Raising water table on grassland	Moderate[3]
Conversion arable to grassland	Low[4]
Grassland extensification	Low[5]
Submerged drains	Low-moderate[6]
Afforestation	Low- High[7]

The **Finnish** stakeholders estimate that the current structure of peatland use might remain but the management will be improved in a climate-friendly way. Half of the forestry can be managed with less intensive drainage. While agriculturally used peatland can be better preserved with no tillage, the main effect is to avoid wind and water erosion rather than emissions. However, using peatlands for food production might be unavoidable in areas of Finland where peat soil coverage is proportionally higher.

German stakeholders expects a proportional land use change by shifting arable land and

[1] EU LULUCF sector as a whole is likely to remain a massive sink due to sequestration in forests. However, the sector is expected to become a net source already in 2020 (e.g. Germany) due to reduced sequestration in forests

[2] Paludiculture can reduce annual greenhouse gas emissions by 90% but need to avoid unnecessarily large methane emissions. It depends on crop type and particularly and sensitively to water table level within a very narrow range.

[3] It depends on how close to raise water table to surface.

[4] Recent data from Thünen Insititute (showed by Bärbel Tiemeyer in RRR 2021 conference) finds a clear distinction between emissions from arable land and grasslands (no tillage, less need for heavy machinery, CO2 storage in grass sods).

[5] Extensification without raising water table has limited potential (Drösler et al., 2013). But it could be the first step for higher water table. However, like conversion arable to grassland, without a water table change, the effect could be very limited.

[6] Subsoil irrigation by submerged drains failed to reduce the greenhouse gas emissions in the PEATWISE case study carried out as a large pilot on four dairy farms in the north of the Netherlands. Earlier case studies show limited effects of submerged drains on soil subsidence which can be translated to 0% to 15% emission reduction. Moderate effect (25% emission reduction), however, requires pressurized drains related rather than mechanic changes of the peat volume following irrigation.

[7] It depends on water table, harvesting, peatland type and nutrient level. If forest is clear cut and reforested without raising the water table, the potential could be low. Continuous cover forestry with adapted water table might have higher potentials.

grassland to nature, wet grassland and paludiculture. But the development of paludiculture is highly dependent on the income solutions for farmers. Submerged drains are not expected to play a big role.

In the **Netherlands**, stakeholders anticipate that peat meadows will be largely maintained due to the need for land to spread manure and their grass production, but will have better water regulation by submerged and pressurized drainage technologies. Also, some forms of paludiculture are expected to play a more prominent role if revenue models can be demonstrated to generate sufficient income for farmers. Midway targets for mitigation measures on peatlands also warranted discussion: representatives from the national government aimed to raise the water table on 50% of the peat area by 2035 while the water authority aimed for 100% by 2035. This calls for future, open discussions between sectors on the reasons for these contrasting goals.

Key issues emphasised by stakeholders from all countries for the transition pathways and mitigation measures:

1. Raising the water table (near to surface) is essential to minimize emissions and peat degradation, but also impedes drainage-based land use.
2. Technical constrains and legal aspects relating to water availability, pro-active water storage and management.
3. The transition needs political, public and consumer support.
4. Market accessibility for paludiculture products must be further developed.
5. If attractive revenue models and long term (10-15 years) compensation schemes can be presented, this will greatly motivate farmers and land managers to consider adopting mitigation measure.

POLICY INSTRUMENTS TO GOVERN PEATLANDS

The **EU Common Agricultural Policy (CAP)** has a decisive effect on peatland use. Agriculture on peatlands should have different rules than agriculture on mineral soils and the loss of income due to the difference should be compensated. However, points of conflict for climate mitigation were raised, such as the uncertain eligibility of **CAP payments** for wet-adapted crops and continued support for drainage based agriculture. A clear eligibility for paludiculture areas and wet-adapted crops in CAP payments is a key prerequisite for enabling farmers to take up paludiculture and developing the market.

National level could use national money and several EU funds (European Agriculture Fund for Rural Development and European Regional Development Fund) to co-finance and implement **economic instruments** guiding towards sustainable use of peatlands. Many established measures (meadow bird programmes in the Netherlands, grassland extensification in Germany, perennial grasses in Finland) do not directly target the water table and should be refined to support the transition. One exception is ditch blocking in Brandenburg, Germany, but it has few participants and several challenges remain to be addressed.

National policies and strategies should play an increasing role for peatlands by creating legally-binding goals. The 2019 Dutch Climate Agreement explicitly states that the target for peat meadows is an emission reduction of around 1 Mt CO_2e by 2030. However, this Climate Agreement has no juridical status and is fully based on voluntary cooperation of governments and stakeholders. In Germany, a government target agreement on peat soil protection is currently being drawn up [9]. If those national targets can gain juridical importance, they might give a strong signal for protecting peatlands and open additional financial streams (e.g. national climate fund) for peatland protection.

In addition to using EU co-funding, the national government can finance its own large-scale research projects (NOBV in the Netherlands), pilot projects (e.g. 4 paludi-pilots in Germany) and payment schemes. However, some participants expressed the need for established demonstration sites instead of more experimental pilot projects. Other **sectoral policies, such as water, nature, and property laws**, may also affect the ease or permission for implementation.

While economic instruments can help the transition, on their own they are insufficient to achieve the ambitious climate target. It should be c**omplemented by regulation**, to deliver on phasing-out drainage-based agriculture. For example, the federal state Bavaria of Germany has recently prohibited deepening the ditch water table on peat soils. In Sweden, deepening the main canals hasn't been allowed for a long time.

A STRONG NEED FOR COORDINATING INSTITUTIONS

There has been a growing discussion about the advantages of cooperative action to provide landscape-scale ecosystem services from agri-environment payments [15]. In the Netherlands, agri-environmental management between farmers and land managers is coordinated by 40 collectives, each responsible for implementing measures within a specific region [16]. In the context of peatland management, measure implementation at the field level is insufficient to support the wider hydrological network and thus achieve effective climate mitigation at the landscape-level [3]. The participants discussed the desirability and feasibility of spatial coordination between peat sites in their countries, inspired by the Dutch collective model:

- All countries acknowledged that it would be **beneficial** to have **regional coordinating institutions** who can align the interests of farmers and land managers on peatlands in specific areas.
- Such institutions can play an important role in drafting mitigation options which are **flexible** and can be adapted depending on a region's geographic characteristics and specific peatland uses.
- **Locally adaptable programmes** were identified as key to enabling a fair transition for all actors if peatland management should occur at the **landscape-level.**
- **Cross-sectoral workshops** can assist in capacity building and knowledge transfer.
- Involvement of **water management institutions**

CLIMATE NEUTRAL PEATLAND NEEDS US TO CHANGE LIFESTYLE

The transition for peatland will not work by just replacing drainage-based agriculture by mitigation measures. The transition for peatland must be part of transitions to a climate neutral society with a circular bio-economy. The broad transitions require substantial changes in our lifestyles reducing demand for water, food and energy, e.g. diet, construction and transportation. Peatland policies need to foresee this tendency and simultaneously work together with solutions beyond climate mitigation measures, e.g. providing seed money to start building supply chains of both paludiculture biomass and carbon credits.

POTENTIAL FUTURE TASKS FOR POLICY

EU	Finland	Germany	Netherlands
Incorporating paludiculture into CAP payments in pillar I and pillar II eligibility	Peatlands and paludiculture integrated in CAP strategic plans and schemes		
Ambitious conditionality for peatlands by good agricultural and ecological conditions (GAEC 2)	Create measures targeted specifically at raising water table where it is possible		
Enable long-term funding perspectives	Create remuneration taking ecosystem services into account		
	Inclusion of carbon farming into economic instruments		
	More advisory services on mitigation measures for farmers		
	More demonstration sites for mitigation measures and long-term studies		

(10 years or more) Increase cross-sectoral interaction and communications for relevant stakeholders in peatlands, and between countries Including peatlands prominently in 2030 climate & energy framework and set clear and ambitious targets	Improve research on mitigation potentials of mitigation measures, especially related to site specific conditions Cross-sectoral emissions trading to/from LULUCF sector Present business perspectives and revenue models to farmers Build-up local markets for products from rewetted land (e.g. pellets for energy, building materials and horticultural substrates) Engage the public to improve consumer support of products from peatlands with raised water table		
	National targets of emissions reduction Set up regional coordinating institutions for land managers and farmers on peatland More flexibility on the local level Shift production from peat soil to mineral soil where possible	National targets of emissions reduction Set up regional coordinating institutions for land managers and farmers on peatland Affected sectors should work more closely together Adapt collective experiences for agri-environment payments Improve the water targeted measure in Brandenburg to be applicable to the landscape-scale Advantageous public procurement rules and bio-economy policies for paludiculture biomass	Open discussion between sectors about: • submerged drainage as a long-term solution • midway targets for mitigation measures on peatlands

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image of stakeholders in the countries. However, as the need for peatland action is urgent, it is important to have this policy brief to further advice and improve the exchange between stakeholders.

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