Remuneration Schemes for Paludiculture and Carbon Farming Guidance

Imprint

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Section 1: Introduction to peatlands, carbon farming, and paludiculture

1.1 Peatlands and the climate

Healthy peatlands are the most space efficient terrestrial long-term carbon store and sink in the planet's biosphere. Despite occupying just 3 percent of the planet's land-surface area, peatlands store in their soils twice as much carbon as all forest biomass. However, when peatlands are drained and degraded for agriculture, forestry, extraction of horticultural substrates or energy fuel, or other purpose, these areas emit huge quantities of carbon dioxide (CO_2).

According to the United Nations Environment Programme Global Peatlands Assessment for 2022, 46.4% of Europe's peatlands are degraded (50% in EU countries) and 10% are completely lost. Europe is the world's second largest greenhouse gas (GHG) emitter from drained peatlands, with 582 Mt of CO_2eq (CO_2 equivalent) emitted annually. Despite occupying only 3% of agricultural land area, drained peatlands in the EU alone generate nearly 25% of total agricultural land use GHG emissions. Even amongst undrained peatlands, most cannot be deemed "pristine" due to disturbances in hydrology. Increased incidences of drought are also causing peat loss and increased emissions due to decreased water levels and peat fires.

Beyond their potential for mitigating climate change, healthy wet peatlands can also serve as an effective nature-based solution for climate change adaptation. Rewetted peatlands can contribute to flood retention, reduce fire risks, and increase groundwater reserves in the peatland's catchment area.

The main drivers of peatland degradation in Europe are agriculture, forestry, and peat extraction. Peatland rewetting and restoration activities, in the past, were mainly focused on drained peatland areas no longer in use. However, to achieve the EU's ambitious goal of climate neutrality by 2050 followed by net zero emissions in line with the goals of the Paris Agreement, peatland rewetting and restoration must be significantly scaled up and accelerated.

1.2 Peatland rewetting and management for emission reduction, carbon storage and removal

To reverse the damage to peatlands and restore their climate-cooling properties without compromising the livelihood of farmers, rewetting and paludiculture are game-changing approaches. Rewetting, as defined by Ramsar (2021), refers to "all deliberate actions that aim to bring the water table of a drained peatland (i.e., the position relative to the surface) back to that of the original, peat-forming peatland. When this goal has been reached, the peatland is 'rewetted'." Ramsar defines paludiculture as "A farming and forestry system that targets the production of plant- or animal-based commodities on (wet) peatland while preserving the peat carbon stock and minimizing greenhouse gas emissions from the peat soil".

Paludiculture has the potential to create a truly sustainable bio-based circular economy, offering resilient and profitable business models for farmers and landowners. It is also key for climate, biodiversity, water security, flood management, and fire protection. While the options for food production on rewetted peatlands might be currently limited, high-quality biomass for fibres, construction materials, substrates in horticulture and others can be produced with a low, or even negative, carbon footprint. By rewetting just 3% of the EU agricultural land, the EU can cut up to 25% of GHG emissions from EU agriculture and agricultural land use. Carbon farming refers to the IPCC Carbon dioxide Removal (CDR) measures: "anthropogenic activities removing CO_2 from the atmosphere and durably storing it in geological, terrestrial, or ocean reservoirs, or in products". Peatland rewetting is one of the most cost-effective solutions for reducing emissions in the near future, and it serves as the foundation for long-term carbon removal. Similarly, paludiculture can be considered a carbon farming activity.

The implementation of paludiculture on a large scale presents challenges, particularly considering the current economic importance and incentives to drainage-based peatland use. Additionally, the investments involved in establishing a paludiculture operation (though they vary regionally) can be significant, and include the costs of rewetting, establishing the paludiculture and seed planting, infrastructure and technology for biomass removal, water retention, and planning and construction costs. However, as the technology develops, opportunities for cost reduction will arise. Production and processing of renewable raw materials produced through paludiculture are one possible income stream. However, if paludiculture is to be as profitable as traditional agriculture, demand for the products of paludiculture must be generated and markets should be established.

Section 2: Remuneration schemes and considerations

2.1 Result-based payments

A result-based payment scheme is one in which farmers receive payments based on the mitigation results they deliver, not primarily based on the methods and effort used to obtain the results. Mitigation outcomes must be quantified and verified before payments are distributed.

To have a successful result-based scheme, a few elements are necessary:

- An environmental objective that farmers endorse and achieve with a reasonable level of certainty.
- Result indicators that are robust and well correlated with the objective, relatively stable, respond to management but are not unduly influenced by factors outside the farmer's control, and are easy to measure. The result indicators should be simple, repeatable, objective, unambiguous, and understandable to farmers.

- Involvement of experts of all types and the ability to provide advice, support, and facilitation to farmers.
- The ability to secure the engagement of farmers and other stakeholders without compromising the environmental focus of the scheme.
- Timely review to ensure lessons are learnt and enacted upon.

Advantages of Result-Based Schemes

- Environmental certainty and credibility of emissions reductions are high because of the direct link between mitigation results and payment.
- Result-based schemes give farmers flexibility in the methods used, encouraging adaptability, innovation, mutual learning, entrepreneurship, and building farmers' understanding of and interest in environmental land management.
- Potentially more effective, as carbon impacts are the objective rather than a side-effect.
- Some of the challenges and limitations can be addressed at the design stage, especially if farmers are involved from the start.
- There are cost-effective measurement, reporting, and verification (MRV) options available for peatland restoration and rewetting for land use, water table, and vegetation indicators.

Limitations of Result-Based Schemes

- Mitigation outcomes must be quantified and verified, requiring MRV that can be complex and costly. There is a trade-off between the cost of MRV and the accuracy of the results.
- As payments are based on the delivery of specified results, farmers are exposed to some degree of uncertainty and financial risk. When the risk is too high, an activity-based or hybrid scheme should be considered.
- In practice, almost all indicators can be influenced by factors beyond the farmer's control (e.g. drought, wildfires).
- The permanence of the achieved carbon impacts needs to be secured to avoid a reversal of beneficial changes.
- A long-time frame is needed to achieve results in peatland schemes.
- A strong advisory support system must be established to support farmers, who act more independently than in an activity-based scheme.
- Windfall payments if areas are becoming anyway wet (additionality).

2.2 Activity-based payments

In an activity-based payment scheme, farmers are paid for their compliance with specific practices or technologies established by the managing authority. They either refrain from certain actions or perform specific actions, such as implementing specific farming

technologies. Activity-based payments are commonly applied in the EU's Common Agricultural Policy (CAP).

Advantages of Activity-Based Schemes

- Farmers are more likely to be interested, as they are paid upfront and do not bear the risk of non-delivery as is the case in result-based schemes.
- Payments are relatively simple, with low monitoring requirements for farmers and administrators.

Limitations of Activity-Based Schemes

- As payments are made to farmers upfront, the body running the scheme bears the risk.
- The actual mitigation impact is uncertain, as payments depend only on actions and not results.

2.3 Hybrid payment scheme

A hybrid payment scheme mixes activity-based and result-based payments. Farmers receive an activity-based payment at the start for implementing the specified actions along with a result-based payment if the desired result is achieved.

Advantages of hybrid payment schemes

- The risk is shared by both the project developers and the farmers.
- Upfront payments help to compensate farmers for significant project startup costs, helping to persuade risk-averse farmers to participate.
- Provides flexibility in the methods that farmers use to obtain results while still removing upfront financial barriers.
- Guarantees verified results by still requiring mitigation outcomes to receive the remaining payment.

Limitations of hybrid payment schemes

- The hybrid schemes share disadvantages from both schemes.

2.4 Other considerations related to scheme costs and remuneration

Measurement, reporting, and verification (MRV)

Measurement, reporting, and verification (MRV) refers to how the climate actions and emissions of participants are measured, how reporting to authorities is done, and how the accuracy of the data is verified in a transparent manner. MRV is an integral part of a result-based scheme because it quantifies the results of the climate actions. However, designing an MRV system that measures impacts adequately at an acceptable cost is a challenge.

When it comes to available methods of MRV, there is a trade-off. The use of indirect, proxy, physical indicators, and modelling approaches are cheaper but provide less precise measures of GHG emissions reductions or carbon sequestration. Often, there is no region or country-specific information (e.g., long-term (>10 years) GHG fluxes after rewetting from different soil types) available which makes modelling results more uncertain. Direct measurements are more precise but also more expensive. Costs must be low enough to encourage farmer uptake while still ensuring accurate monitoring.

The type of MRV system used also depends on the source of funding used by the scheme. If the intention is to fund the scheme through the sale of carbon credits for offsetting, the MRV system must be very stringent. When it comes to voluntary emission reduction credits, however, the requirements are less stringent. The MRV for publicly funded schemes (by the EU, Member States, regions) or schemes funded by public companies are at the discretion of the scheme administrators but are generally more relaxed. In general, the more distance there is between the scheme administrator and the funder of the project or purchaser of the credits, the greater the MRV requirements are.

When choosing a MRV system, another factor to consider is that higher costs take away from funds available for other things, such as paying farmers. The amount of work that must be taken on by farmers undertaking monitoring tasks should also be considered as well.

Verra's VCS standard has established a methodology for estimating the reduction of net GHG emissions from rewetting drained peatlands in temperate climatic regions, and it is currently being updated (https://verra.org/methodologies/vm0036-methodology-for-rewetting-drained-temperate-peatlands-v1-0/). The methodology applies to projects which aim at rewetting peatlands that have been drained for agriculture, forestry, or peat extraction, but where these activities are no longer profitable. Activities that are allowed post-rewetting include agriculture, forestry, nature conservation and recreation, activities that aim to reduce GHG emissions, or a combination of these things. The Verra VCS methodology for temperate peatlands uses water table depth and ground vegetation composition as proxies for peatland GHG emissions, which are following the Greenhouse Gas Emission Site Type, or GEST approach (after Couwenberg et al. 2011).

Monitoring

Monitoring refers here to the act of quantifying the carbon removals and GHG emissions associated with a project over time. Monitoring in carbon farming presents a challenge, as emissions and sequestered carbon are spread over large areas. Additionally, the findings can vary widely from one geographic region to another and depending on the plant species involved. Monitoring approaches include:

- **Direct measurement** – this method calculates changes in carbon stock, which can in turn be translated into GHG emissions or removals. Direct measurement is resource-intensive and costly because it requires site visits, sampling, and laboratory tests to calculate changes in carbon.
  Two methods used for determining fluxes of CH_4 (methane) and CO_2 at different spatial scales are chamber-based methods and eddy covariance systems. Chamber

measurements are done on a smaller scale. The findings are then upscaled to reflect the entire area, accounting for different landscape elements like fields, ditches, and ditch edges. Closed chambers are used, and the air inside is circulated in the chambers between the headspace and a gas analyser. Chamber-based methods are often used for determining source and sink distributions in landscapes that are not uniform. These methods are very sensitive but have a level of uncertainty. Eddy covariance measurements cover a much larger area and are used for continuous quantification of landscape-scale temporal variability of CH_4 and CO_2. Eddy covariance techniques are based on sensing temperature, turbulent wind fields, and gas concentrations at high frequency at specific measurement points. This method doesn't disturb the environment, covers large areas, and has continuous coverage over time (Schrier-Uijl et al., 2010).

Limitations include:

- Direct measurements, involving closed chamber methods, assessment of biomass and litter carbon stocks and eddy covariance (Jauhiainen et al. 2019), provide accurate results, but the investment, both in time and finances, can be significant and could decrease farmer participation and therefore the overall impact of the project. Due to increased costs, the net benefit of the scheme is decreased and the funds available to pay farmers are reduced. Establishing a larger monitoring scheme where farmers contribute without bearing the majority of the setup costs could increase project participation and help reduce overall expenses while at the same time support interoperability and transparency.
- To assess full balances, site specific methods e.g. chamber methods are required. Upscaling options to larger regions are limited and need verification through repeated studies in different locations.

- **Modelling** – this strategy estimates carbon removals and GHG emissions based on measurable proxies, usually acquired through remote sensing tools, and using modelling relationships that have been built on previous scientific research. The models can be either simple (i.e. using few explanatory variables) or complex. Limitations include:
  - Modelling approaches are based on meta-data and averages, which are not a perfect match for any individual case, leading to greater uncertainty.
  - Existing measurement data on GHG fluxes is sporadic and short-term, which does not always provide a good match for modelling.
- **Combined direct measurement and modelling** – using a combined method, the accuracy of models can be tested through 'ground truthing' or limited direct measurements in situ. Additionally, most direct measurement approaches require the use of modelling to scale up measurement results to larger scales.

The selected monitoring approach depends on several variables, including the specific scheme, its objectives, location, and conditions such as farmer capabilities, data availability, and farm advisory. If a goal of the project is to sell carbon credits, the level of monitoring must be high to ensure credibility with buyers and other stakeholders and demonstrate that the

avoided emissions are real and additional. It should be noted that regardless of the monitoring system used, quantifying GHG fluxes will always involve a degree of uncertainty which must be accepted as unavoidable. The level of uncertainty should be presented as part of the monitoring results.

Factors that should be considered when selecting a monitoring approach include:

- **Scientific robustness** – this criterion is the most important and refers to the ability of a given approach to qualify results reliably. There is no set measure for scientific robustness, but key criteria include transparency and scientific process quality (alignment with best practices or standards established by bodies like the IPCC). The selected method should be based on the best available science and involve expert scientific review.
- **Practicality** – the chosen monitoring approach should be easy to implement under local conditions. Approaches that are quick and simple tend to have lower costs for farmers and administrators. Additionally, more complex monitoring approaches generally require a greater time and financial investment from farmers, and this presents a barrier to voluntary participation. Consider how easily the technique can be taught and how much data needs to be collected—more data is costlier. It is useful to take advantage of data that is already being collected for other purposes, such as comprehensive monitoring systems. The practicality of an approach also depends on the skills and knowledge of the farmers, advisers, and project administrators, as a lack of capacity can slow down project implementation significantly.
- **Co-benefits and other objectives** – another important decision that scheme administrators must make is whether or not co-benefits will be measured. If there are approaches which can allow the simultaneous monitoring of co-benefits such as water retention, biodiversity or local livelihood options for communities and potential negative externalities, this will be preferred. Demonstrating the provision of co-benefits can increase the value of the emission reductions, making the project more financially appealing.

There are ways to increase accuracy while also managing costs that must be borne by scheme participants:

- Scheme administrators could cover monitoring costs for the farmers.
- Monitoring requirements could be differentiated to be stricter for larger or riskier participants and less costly for smaller participants (e.g. monitoring water level and vegetation versus complex monitoring of GHG fluxes, waterborne fluxes, hydrology, etc).
- Indicators that are more expensive to monitor accurately could be excluded. Measuring GHG fluxes is the most expensive and can be replaced in sites if there are relevant scientific research or monitoring results available, which can be used for modelling for that specific site.

- Schemes may accept only a specific type of participant, for instance, farmers located in a specified geographical area, with specific physical conditions, and with specific soil types (among other factors) so that monitoring can be tailored.
- Find opportunities to use existing data, systems or science rather than developing new methodologies.

Reporting

Reporting refers to how participants are required to record and communicate the data they obtain through monitoring to relevant authorities and/or government entities. Reporting of emissions reductions should consider the National Inventory Report (NIR) principles and requirements, which look to avoid double-counting and ensure transparency. Overall, increased transparency and data sharing can facilitate the continuous improvement of reporting for various purposes. However, at present, most carbon farming schemes do not correspond share data with GHGI teams. This means that the emissions reductions that are generated are not accounted for in national inventories. To ensure alignment, links with NIRs must be considered in the project design scheme.

When developing a scheme, looking at national data, methodologies models, and emissions factors can serve as a starting point. Developing methodologies and precise modelling tools may be challenging for small and regional schemes, and the results may not be precise enough to be used in national inventories. To avoid this, scheme methodologies can be aligned with national inventory requirements. For example, higher, or at least the same, spatial resolution data should be used, alignment with land cover and land use data categories should be facilitated, and similar projections and assumptions for baselines and reference levels could be used. However, it should be noted that for paludiculture development, there is a shortage of relevant data. Therefore, monitoring at carbon farming/paludiculture schemes could be a way to overcome this. In Estonia, for instance, no data or experiments are available to demonstrate the results of rewetting agricultural land. Monitoring on such could therefore be considered an investment requiring several years to accomplish.

Verification

Verification is the process of establishing the truthfulness and accuracy of the reported information. It is generally conducted by an independent third party, which verifies the results.

MoorFutures® standard

MoorFutures® is a regional voluntary carbon credit standard in northern Germany intended for voluntary carbon credits from small to medium sized peatland rewetting projects. A certain stock of emission reduction (minus a risk buffer for project failures or shortcomings) can be purchased by private entities to support their environmental performance. The costs of project implementation and monitoring must be covered by the revenue from the forward selling of MoorFutures credits (https://www.moorfutures.de/). MoorFutures® was first developed in the federal state of Mecklenburg-Western Pomerania and later taken up by other peatland-rich federal states in Germany, including Brandenburg, Schleswig-Holstein, and Lower Saxony.

To quantify the emission reduction, MoorFutures® uses a method that combines observable proxies with more complex monitoring approaches. The proxy measures, such as vegetation changes and water depth, are input into a model, which estimates GHG emissions savings. This method is used in place of direct measurement. MoorFutures® also extended its methodology to quantify co-benefits including flood protection, groundwater, water quality, biodiversity, and evaporative cooling. These co-benefits are then be bundled with their carbon credits as premium and potentially boost the prices that buyers are willing to pay.

MoorFutures® are very transparent, with all of its monitoring and verification data publicly available. Documentation for all of its projects, their location, project status, and an assessment of emissions reductions are all available. All credits sold are linked to specific projects and buyers can visit project sites. MoorFutures® are registered at the regional level through regional coordinating bodies.

Section 3: Establishing a remuneration scheme for paludiculture and carbon farming

3.1 Considerations for planning a peatland carbon farming scheme

3.1.1 Assessing scheme feasibility

When establishing a rewetting or paludiculture scheme, the first step is to do a feasibility assessment. It is important to assess the scheme's potential to deliver positive climate impacts and co-benefits and which remuneration scheme should be used. The ease of implementation and the degree of certainty with which results can be measured also require consideration.

Other criteria to realise alignment to carbon trading schemes when assessing the feasibility of a scheme:

- **Permanence** of GHG emission reductions should be a primary objective. For time-limited voluntary schemes in which farmers depend on continued payments this presents a challenge. To avoid or reduce this risk, reversals must be prevented with long-term contracts or legal measures (restrictions on use, land easement, designation as a protected area, etc.). Furthermore, in a peatland rewetting project, avoided emissions are not nullified by project reversal. If peat oxidation resumes after few years due to dam failures, the atmospheric CO_2 remains permanently lower than it would have been without the project.
- **Additionality**, meaning that the positive results of the scheme would not have happened without the revenue from the sale of credits, must be demonstrated, especially when carbon credits will be used. Assessing whether a project meets the principle of additionality can be challenging because only an actual implementation of measures is decisive in assessing additionality. Moreover, there are numerous assumptions underlying the hypothetical baseline scenario. Peatland rewetting, overall, is not occurring at the necessary speed and scale, despite available funding and directives. Consequently, it could be argued that any peatland rewetting is

additional. No standardized guidelines exist for meeting the additionality criterion, with authorities and organizations employing a variety of interpretations, tests, and criteria tailored to their unique needs and perspectives. The criteria selected significantly influence the number of credits a project can generate, the associated costs, and thus the project's economic viability. A strict interpretation of additionality can disadvantage regions that have taken early climate action, as such actions might be deemed as something that would have happened anyway. To promote peatland rewetting through carbon credits, simple criteria could be established for additionality. Furthermore, alternative remuneration schemes to carbon credits should assess the necessity and stringency of additionality criteria. The most common types of additionalities are:

  - **Environmental additionality** ensures that a project results in real, measurable, and additional reductions in GHG emissions beyond what would have occurred in the absence of the project and therefore, carbon leakage was avoided.
  - **Financial additionality** assesses whether the project would have been financially viable without the revenue from carbon credits. If the project could not have gone ahead without the additional funding provided by the sale of carbon credits (or other remuneration schemes), it is considered financially additional.
  - **Regulatory additionality** requires that the scheme's actions are beyond those already required by law. This is particularly relevant in the EU where almost all farmers receive payments through CAP for their actions on drained peatlands. For this reason, promoting peatland rewetting and paludiculture almost always require an additional effort to redirect payments towards sustainable wet peatland management and to avoid double payment restrictions. Under the CAP, Member States have the possibility to set up eco-schemes for agricultural practices carried out by farmers on agricultural areas, presenting an opportunity to promote paludiculture. CAP is revised every 7 years, and therefore the conditions for regulatory additionality can change.

- **Risk of leakage** refers to the displacements of harmful activities or land uses to other pieces of land outside the project area. In such an event, the emissions are displaced elsewhere, reducing or even negating the positive effects of the scheme. For instance, the benefits of peatland rewetting will be negated if farmers simply drain other peatlands outside of the scope of the scheme to maintain their levels of production (activity shifting). Market leakage is another type of leakage that occurs when a project impacts the supply of goods, and market demand drives a shift in land use outside the project area. Ecological leakage is a third type of leakage that happens when rewetting causes negative effects in hydrologically connected area outside the project. For example, increased groundwater levels can lead to reduced tree growth or even forest die-back outside the project area. Therefore, it's important to consider the hydrological position of the peatland within the broader landscape when planning rewetting projects.
- **Conservativeness** means that emissions should be underestimated in the baseline and overestimated in the project scenario. An overly conservative estimate unnecessarily

lowers the number of credits; thus, uncertainty should be reduced as much as possible to maximise the number of credits. Uncertainty refers to issues with the reliability and accuracy of the measurement which may be attributed to calculation errors, modelling assumptions, estimates of future values, or lack of data.

- **Coordination and harmonization with EU policy** are important, as remuneration carbon farming and paludiculture schemes should be harmonized with the CAP, Nature Restoration Law and others to enhance their effectiveness, reduce costs and bureaucracy burden.
- The **primary objective of the scheme should be clear and consistent** to effectively guide inevitable trade-offs that will arise during the setup of the scheme. For example, if the main goal is to scale up peatland rewetting, and thus farmer uptake of the remuneration scheme, certain trade-offs, such as aligning with NIR or eligibility criteria, should be determined and agreed upon.
- **Costs and risks to the farmer** are important considerations as they directly influence project uptake. The initial assessment should evaluate the additional management that farmers will need to engage in and weigh that against the expected mitigation benefits. The amount of risk that farmers are exposed to in the event of non-delivery of the expected climate benefits is an issue unique to result-based schemes that must be measured. Nearly all result indicators can, to some degree, be influenced by factors outside the farmers' control. If there is a high risk of non-delivery, this could significantly reduce uptake of the project by farmers, and an activity-based or hybrid scheme should be considered.
- **MRV costs, transaction costs, and opportunity costs** for farmers and all other stakeholders should be assessed.

3.1.2 Key elements in designing an effective result-based carbon farming scheme

For a remuneration scheme for paludiculture and carbon farming scheme to be effective, the following elements are needed:

- Given the limited number of existing remuneration schemes for peatland rewetting, a pragmatic approach is recommended. Start with a simple, flexible system that can be adjusted as implementation progresses and lessons are learned. Striking a balance between robustness and ease of adoption is crucial to avoid bottlenecks that could hinder progress. Since many factors influencing this area are beyond the control of legislators, the focus should be on gradually developing a transparent, step-by-step system that is refined over time.
- An environmental **objective** that is both understandable and achievable for farmers with a reasonable level of certainty.
- **Result indicators** that measure project mitigation benefits in tonnes of CO_2eq and robust MRV procedures to allow measurement of these indicators. If direct measurements need to be taken, these should preferably be cheap and reliable.

- **Eligibility criteria** require careful consideration and can determine scheme effectiveness. Restricting eligibility and coverage can allow scheme administrators to design a project that is simpler and more targeted, which will have lower uncertainty and transaction costs, and therefore higher uptake. Local and regional circumstances should be considered, and negative externalities should be avoided.
  CAP criteria which define land eligible for direct payments restrict the area that farmers are willing to enter into peatland rewetting or restoration schemes, as they could lose direct payments, leading to significant financial loss that the scheme would likely be unable to compensate for. This barrier would be removed if eligibility requirements for CAP direct payments were modified to include rewetted peatlands and payments towards draining of peatlands eventually phased out.
  In the Peatland Code, eligible condition categories and condition change scenarios were defined (Peatland Code | IUCN UK Peatland Programme (iucn-uk-peatlandprogramme.org)). A condition change scenario is an allowed change from one state of drainage and management to another, for instance, from drained peat soils to paludiculture. Condition categories include a combination of landscape features, vegetation, and hydrologic regime. Areas of land that do not meet the defined condition categories are not eligible for the scheme. Condition categories include: pristine, near natural, modified, drained, and actively eroding.
- A degree of **permanence** is required for the climate benefits of a result-based carbon farming scheme, which is challenging for shorter-duration projects relying on payments to farmers. The risk of non-permanence comes from intentional and non-intentional reversals of the changes in land management that have led to the benefits. An intentional reversal is caused by the participant either through intentional action or negligence. Non-intentional reversals are caused by factors outside the participants' control, such as drought, fire, or erosion, or by requirements for land management that are provided by authorities. Risk buffer pools, which hold between 5-60% of the produced credits, can be established to manage the risk of non-intentional reversal.
  It is hard to guarantee permanence solely through scheme design. In some cases, the land can be transferred to non-commercial ownership, but this is not always possible. Result-based payments could be given for long-term retention. Ensuring farmers are well-informed and advised can create a stronger commitment to the scheme's goals. The development of markets for paludiculture products is crucial to ensure paludiculture is profitable in the long-term. Policymakers can support permanence by placing restrictions on the future use of the land, a measure recommended by MoorFutures®. For instance, a "ratchet principle" could require that any beneficial changes cannot be reversed after they are made.
  Funding and payment options must be carefully considered. Carbon farming projects allow for the potential of funding through the carbon market by selling carbon credits. After the results of the scheme are monitored and verified, credits are issued by a registry and sold as carbon credits that can be used to offset emissions, generally on the voluntary markets. To ensure integrity and prevent greenwashing, one effective approach is to sell carbon credits only to companies that can demonstrate they have

taken all feasible measures to reduce their own emissions first. But that requires the existence of such buyers. Other funding options, which will be expanded upon in detail, include public and other types of private sector funding, which can be done in addition to the sale of carbon credits.

- **Partnerships** – a large and multidisciplinary team is necessary to execute this type of project.
    - **Experts** with specialized skills and expertise will be needed for all stages of the scheme, including design, formulation, and operation of the MRV system, scheme implementation, and farmer support. Farmers will require support and value advice from qualified advisers who are preferably available to them for the duration of the scheme.
    - **Independent carbon audits** will be needed if carbon credits will be sold. In many schemes (including MoorFutures), audits are done by the organizations that perform monitoring tasks, as this can lead to cost savings. Fully independent audits are crucial for persuading buyers of the integrity of carbon credits.
- **Co-benefits** are additional benefits that may occur as a result of the scheme, and they should be considered at the planning stage. Many climate mitigation schemes can deliver several environmental co-benefits, but these benefits need to be measured and cannot be assumed. Including co-benefits can make the scheme more appealing to stakeholders. Peatland rewetting has co-benefits including flood peak reduction, improvement of biodiversity, and improved water quality. At the same time, it can displace food production, causing carbon leakage, or disrupt food processing enterprises. Scheme administrators must consider if result-based compensation will be extended to the delivery of any specific co-benefits. If this is the case, co-benefits should be measured within the MRV system.
- **Linkage to wider climate targets and programmes** is important, including whether the GHG emissions reductions will help meet national, EU, or international climate goals. Linkage to other national and EU policies like CAP is crucial.
  For publicly funded schemes specifically, it may be required that GHG reductions count toward national inventories, so national inventory authorities should be involved in scheme design. This is very important for the criteria of additionality and avoiding double counting. There may be conflict between policy objectives, however, when properly implemented, peatland rewetting to reduce GHG emissions, climate change adaptation, and biodiversity protection generally have a significant positive overlap. A possible area of tension will be with EU policies aimed at maintaining the production levels of certain goods. In Estonia, for instance, national policies require that timber production levels and efficiency of drainage systems be maintained, which undermines the feasibility of paludiculture, particularly on forestry lands, as well as potentially affect larger areas that are hydrologically connected within the broader river basin. Measures to avoid **non-compliance and fraud** must be considered. In any scheme with a financial reward, this risk exists, especially when outcomes are difficult to verify (as they are with carbon emissions reductions). There is the possibility that farmers may submit false data, scheme administrators may inflate the generated

benefits when credits are being used, or credits may be double counted. To reduce fraud, good governance and robust MRV systems are key. Independent operators should be involved, transparency should be an overarching principle at every step, and methodology details should be made public and its development should involve a comprehensive public consultation. A public registry that records all project data is recommended and independent auditors can perform accounting and verification, though this increases costs. In cases where farmers are self-monitoring, some compliance testing is required. Independent registries can prevent the issue of double counting.

Double-counting occurs when, whether accidentally or deliberately, the same unit of emission reduction or carbon sequestration is used more than once. For instance, one or more parties claim the same emission reduction or removal to comply with their own mitigation targets. This can happen without a robust registry to account for credit sales and ownership. Double-counting can also refer to accounting for emissions reductions in more than one place. For instance, a company may report reductions while the same reductions are accounted for a second time in the NIRs of the Member State.

- **Capacity building** – generally, all people involved in a result-based carbon farming scheme will be required to develop new skills or apply existing skills in new ways. For instance, peatland rewetting requires farmers to learn how to maintain high and stable water tables. Building the necessary advisory capacity is challenging, and the larger a scheme is, the greater this capacity must be. Scheme advisers must have a vast and deep range of knowledge that covers all aspects of the project. They should also understand the culture of the farming community in the area. In most cases, there are not enough advisers available, so recruitment and training are necessary. Creating the expectation that farmers must employ and pay advisers on their own will reduce scheme uptake. Appointing lead farmers, who can be paid through the farmer payment budget, can reduce costs. These farmers can provide demonstrations, field walks, and one-on-one advice to their peers. A well-respected farmer is likely to be considered more persuasive and trustworthy among their peers than an outside adviser is. The training also transfers skills and knowledge to the farming community.

3.1.3 The EU Carbon Removals and Carbon Farming Certification

The European Commission (EC) has proposed an EU Carbon Removals and Carbon Farming Certification (CFCR) Regulation, which will influence carbon farming schemes established in the future. The CFCR aims to simultaneously scale up carbon removal activities while fighting greenwashing. It is part of the European Union's commitment to achieving climate neutrality by 2050 and net negative emissions thereafter. The EU has called for sweeping emissions reductions and compensation for hard-to-abate emissions through carbon removals. The regulation is provisionally agreed by the European Parliament and the Council (mid 2024).

The CFCR proposal sets out a voluntary framework for certifying carbon removals as well as carbon farming and soil emission reductions generated in the EU. This includes establishing

criteria for high-quality carbon removals and MRV processes appropriate for verifying their authenticity. The CFCR proposes, based on the EU QU.A.L.ITY[1] standard, specific activities covered by the CRCF Regulation, divided into three main categories: permanent carbon removals, carbon farming and soil emission reductions and carbon storage in long-lasting products. The rewetting and restoring of peatlands and wetlands to reduce carbon oxidation and increase carbon sequestration is a specific activity included in the second category. Tailored certification methodologies will be formulated for each type of activity. Peatland rewetting is considered as one of the proposed activities under this scheme. An expert group on carbon removals with a special chapter on peatlands advises the EU Commission on the development of specific methodologies. The QU.A.L.ITY criteria are used for the purpose, i.e. Quantification, Additionality, Liability and Sustainability. Particularly, for the sustainability criteria there are three levels: (1) mandatory minimum sustainability requirements (i.e. broader sustainability objectives similar to those of the Taxonomy Regulation and compliance with the Do Not Significant Harm technical screening criteria), (2) mandatory biodiversity co-benefits for carbon farming and (3) voluntary co-benefits beyond the previous two. The EU Commission plans to publish drafts of delegated acts for first certification methodologies including peatland rewetting in 2025 and start implementing acts for verification and registry rules. During the certification process, private and public certification schemes will need to be recognised by the Commission and independent certification bodies will issue audit reports, and certificates of compliance. First certification is envisaged to start in 2026 while certification registries and a Union-wide CRCF registry is envisioned from 2028. Additionally, the regulation states that carbon removal activities might be funded through CAP, the Innovation Fund, the Regional Development Fund, the LIFE programme, and the Horizon Europe Programme. An expert group, comprising around 70 members from various sectors including national authorities, businesses, NGOs, and research institutions, advises the European Commission on developing tailored certification methodologies. This group ensures broad stakeholder representation and meets biannually to provide guidance.

The CFCR aims to create incentives for land owners and managers through the aforementioned structures to engage in carbon farming activities.

3.2 Potential sources of funding

3.2.1 Carbon markets

When carbon markets are used to fund carbon farming projects, credits are issued by a registry after the results are monitored and verified. Then, the credits are sold as emission offset credits or emissions reduction certificates. This is beneficial because the costs of the scheme are covered partially or fully by credit buyers. If a scheme aims to sell carbon credits, carbon audits must be performed by an independent body to ensure the integrity of the credits. Transparency is important, and scheme administrators can also incorporate co-

[1] Abbreviation for: Quantification, Additionality, Long-term storage, Sustainability

benefits to make the credits more appealing and perhaps charge a higher price premium. Methodologies and best practices of the scheme should be published.

Funding through carbon markets carries a level of uncertainty due to price fluctuations. To reduce uncertainty for farmers, scheme operators can offer farmers a fixed payment per tonne of carbon sequestered. Farmers may be offered a price guarantee instead of relying entirely on market prices. The payments to farmers can be covered by project funds or by funds that organizers anticipate to recoup later. These measures transfer the uncertainty from farmers to scheme administrators, increasing scheme uptake.

Advantages of funding through carbon markets

- Scheme costs are covered partially or fully by credit buyers, which significantly increases the potentially available funds for peatland rewetting.
- Provides longevity and legitimacy to result-based carbon farming schemes, allowing them to be self-perpetuating.
- An increase in demand for carbon credits is expected in the future, and this will influence prices positively.
- There is experience in Europe that demonstrate significant price premiums for carbon credits from peatland rewetting, especially when bundled with co-benefits.

Limitations of funding through carbon markets

- During the initial stages of setting up the scheme, and for certain types of projects, the current regulated markets alone are unlikely to generate enough returns to cover project costs and fully reward farmers. Therefore, non-market sources of funding, such as public payments from CAP, LIFE, or other EU funds are also needed, especially during the initial phase.
- Auditors and independent bodies must be hired for verifications, and this often means a large fix cost to every project. In this sense, larger projects tend to be more financially attractive.
- There is the possibility of double counting or double selling, though this can be avoided by using a robust registry system to track all credits. The UK Peatland Code, for instance, uses a registration to track each credit to its owner.
- Reputation and greenwashing risks can be minimized through sound and transparent setting of the scheme, and awareness raising.

3.2.2 Public funding

Though the EU has ambitious climate goals that are legally binding for Member States, there is a general lack of coherence between climate policy goals and incentives established with EU funds.

EU Common Agricultural Policy

The EU Common Agricultural Policy (CAP) is an important source of funding for environmental land management schemes. The CAP 2014-2020 funded a wide range of schemes through

Pillar 2 Rural Development Programmes. CAP 2021-2027 has continued to fund such interventions through the European Agricultural Fund for Rural Development (EAFRD). The current CAP gives Member States more options that encourage carbon farming through Pillar 1 interventions and eligibility rules.

The Communication on Sustainable Carbon Cycles, adopted by the European Commission (EC) in December 2021, sets out short- to medium-term actions aimed at addressing challenges in carbon farming to upscale it and reward land managers for actions leading to carbon sequestration. This includes promoting carbon farming through CAP and other EU programmes such as LIFE and Horizon Europe for more research and knowledge. It can be used to drive the standardization of the necessary MRV methodologies and provide land managers with improved knowledge, tailored advisory services, and data management. This communication lists peatland restoration as an effective carbon farming practice. Based on the Communication, carbon farming initiatives can be financed by CAP. For a scheme to qualify for EU funding through CAP, which can be both stable and substantial, it must comply with conditionality and eligibility requirements.

The current CAP offers flexibility to Member States, allowing them to adjust their legislation according to their national and regional needs in their CAP Strategic Plans (CAP NSP). CAP NSPs encompass measures within both Pillars of the CAP in the respective Member State, including measures to deliver environmental and climate benefits within the CAP framework. They will be reviewed and accepted by the European Commission. The downside of such flexibility is that CAP NSPs can be formulated to maintain harmful business-as-usual practices.

Within the new CAP legislation, eco-schemes are a key element intended to support farmers adopting practices that are beneficial for biodiversity and the climate under Pillar 1. Eco-schemes allow for the use of the Pillar 1 direct payment budget for achieving climate and environmental objectives. The EC lists peatland rewetting as a recognized activity under CAPs eco-schemes, but Member States must clearly state in their CAP NSP that paludiculture and peatland rewetting are recognized eco-scheme options. Only a small fraction of paludiculture is explicitly defined as an agricultural activity within EU CAP regulations, only the ones in which products from Annex I to the TFEU are produced. Rewetted land cultivated for paludiculture must should also be explicitly included in the definition of “eligible hectares”. Additionally, Member States should list a range of paludiculture crops (i.e. wetland species preferably native to the area) as eligible for direct payments under their CAP NSP.

Paludiculture practices that produce goods included in the from Annex I to the TFEU, such as peat mosses, should now be eligible for CAP subsidies, but only the production of certain crops is accepted as official agricultural activities, despite the growing demand for biomass crops. The production of other crops such as reed or cattails is not currently considered an agricultural activity, but these crops can be made eligible through the direct payment scheme for “eligible hectares. The definition of “eligible hectare” can make paludiculture eligible for payments as a result of area-based interventions or national schemes for GHG reductions or biodiversity. To apply, however, farmers and/or landowners must go through additional bureaucratic procedures to obtain the required approvals, a process that is unattractive to most farmers. Member States should put mechanisms in place so that paludiculture is not

only eligible as an exceptional case but is considered common practice. CAP NSPs can make it easy for farmers and landowners to assess their eligibility for this option.

A broad toolbox of measures from Pillar 2 is also needed for the implementation of peatland restoration and paludiculture via agri-environmental and climate schemes (AECM), advisory services and investment support for adapted machinery which can operate on wet ground, and for water-logging installations. These tools should be accounted for within CAP NSPs to make it possible to implement paludiculture. Agri-environmental measures (Article 31 of the Regulation) and investment aid (Article 73 of the Regulation) can also offer support for paludiculture.

Within CAP, the EIP-Agri Programme can fund bottom-up initiatives through Pillar 2 to support the formation and functioning of "Operational Groups". Such groups can be formed to develop a range of innovative or pilot projects, including projects for climate change mitigation and adaptation. Additionally, the LEADER and community-led local development measures under Pillar 2 offer opportunities to develop bottom-up or area-based carbon farming initiatives.

Good Agricultural and Environmental Condition 2 (GAEC 2), which is part of CAP, is the EU standard for "appropriate protection of wetlands and peatlands by 2025 at the latest". Though Member States can adopt GAEC 2 now, those with suitable justification can delay implementation. The requirements of GAEC 2, unfortunately, are relatively vague, and in many cases allow agricultural activity on drained peatland and wetland areas to continue. Additionally, paludiculture is not explicitly mentioned within GAEC 2 and is only included broadly as sustainable use of functioning peatlands.

Despite all of this, a lot of uncertainty remains about the eligibility of paludiculture to receive direct payments. The situation also differs by Member State and their established CAP NSP. Estonia's Strategy Plan does not include paludiculture as an agricultural activity, making it uncertain that paludiculture in the future will be eligible for direct CAP payments. Estonia has made the decision to implement GAEC 2 from 2024 but has not taken advantage of funding availability through eco-schemes, agri-environmental measures, or investment aid. Lithuania and Latvia will implement GAEC 2 only from 2025 onwards and keep regulations at a basic level. Figure 1 gives an overview over the on-farm practices prescribed for the implementation of GAEC 2 in EU Member States including Baltic states.

Figure 1: GAEC 2 – On-farm practices for the protection of wetlands and peatlands; Source: EC Agriculture and rural development (2023).

Features	MS	No of CSPs
Ban/restrictions on drainage	AT, BE-FL, BE-WA, BG, DE, EE, EL, LV, LT, LU, MT, NL, PT, RO, FI	15
Tillage restrictions/ ploughing ban	AT, BE-FL, BE-WA, BG, DE, DK, EE, EL, IT, LV, LT, LU, MT, PT, RO, SI, FI, SE	18
Extraction/ burning of peat	AT, BE-FL, BG, EL, LT, PT, RO, SI, FI	9
Other*	AT, BG, DE, DK, EL, LU, MT, NL, PT, RO, SI, FI, SE	13
Not yet included	CZ, IE, ES, FR, HR, CY, HU, PL, SK	9

* Other practices include restrictions on fertilisation, or machinery use, or obligatory maintenance requirements to prevent overgrowth of the area, prohibiting a change in the water level.

EU LIFE Programme

The EU Life Programme is the EU's funding instrument for environment and climate action, and peatland management is an area supported within the programme. LIFE can be considered another major potential source of funds, though on a smaller scale than CAP. LIFE can assist in various aspects of developing result-based carbon farming schemes, including development of methodology and advisory capacity and in building partnerships. LIFE funding can be used for schemes that will later be market-funded and for schemes that plan to make use of CAP funding. LIFE projects always require an additional funding source for co-funding and own contribution of implementing partners. The EC offers financial support for pilot initiatives on carbon farming through the EU LIFE Programme (https://www.st1.com/st1-life) and the European Regional Development Fund (https://northsearegion.eu/carbon-farming/).

Outside of EU funding sources, there are also regional and national sources of funding that Member States can consider.

Advantages of public funding

- Payments from public funded schemes are generally more secure than from private sources, as these rely on the ongoing success and commitment of the company.
- Payments are more reliable and consistent than those from carbon markets, as market prices fluctuate.
- CAP is a relatively stable funding source for remuneration schemes. It is possible to have multi-annual agreements under both Pillars of CAP, with the requirement that schemes comply with rules on conditionality and eligibility.
- Payment to those who are eligible is a legal right under the CAP, so farmers cannot be excluded for budgetary or other reasons.

Limitations of public funding

- Though appropriate instruments exist to encourage the implementation of paludiculture, they do not have a steering effect on operational decision-makers. There is not sufficient incentive and regulation (e.g. via GAEC 2) to give up using drained peatlands, especially as farmers using drained peatlands for agriculture continue to receive direct CAP payments.
- Public funding can be altered or discontinued with evolutions in public policy. Payment rates could change, which creates a risk for farmers.
- Schemes are funded by CAP on a seven-year policy cycle. Priorities, funding levels, and regulations are all subject to change between cycles, therefore long-term planning is hampered.
- In terms of transparency, a balance must be struck between the farmers' right to privacy and the public's right to know how their tax euros are being spent. The requirements for this are largely determined at the state level, but generally, if a project is receiving CAP funding, extensive data must be published.

- As Member States have flexibility in terms of the design of eco-schemes, this could lead to ineffective measures in terms of climate and environment if Member States choose to adopt lower standards to reduce costs or administrative burdens.
- Long-term monitoring is not enabled under these programs as project timescales remain short, the monitoring costs are too high, or the monitoring costs are not covered by or eligible for funding.

3.2.3 Private funding

In some cases, a company will finance carbon farming schemes among its suppliers to reduce the environmental footprint of its products. These schemes rely on the continued success and commitment of the funding company.

The Forest, Land, and Agriculture Guidance (FLAG) by the Science Based Targets Initiative (SBTi) is the leading standard used by companies in their corporate responsibility strategies. The FLAG Guidance provides a standard method for companies in land-intensive sectors to set science-based targets, and enables them to make emissions reductions in line with the Paris Agreement's goal to limit global warming to 1.5°C within the categories of agriculture, forestry, and other land use (https://sciencebasedtargets.org/sectors/forest-land-and-agriculture). The SBTi recommends setting "no-conversion" and "no peat burning" commitments across their value chains and meet those commitments as soon as possible.

3.2.4 Combined financing sources

In nearly all schemes, multiple sources of funding are likely to be required. If the intention is for a scheme to rely on the sale of carbon credits, for instance, start-up funds will still be required. When multiple funding sources are used, clear records should be kept outlining what each funding source is used for to avoid double counting. In general, the more stringent the MRV system is, the more funding options will be available for a scheme.

Schemes that use a combination of public and private funding are becoming increasingly common (blended finance), such as the Flow Country Green Finance Initiative (https://theflowcountry.org.uk/projects/green-finance/) as a locally-led initiative to raise money to restore peatlands at scale or the NatureScot Peatland ACTION initiative which is using public and private funding for peatland restoration across Scotland. In such an arrangement, it should be clear which partner is entitled to the mitigation outcomes.

Similarly, the max.moor peatland restoration scheme used public financing to cover its startup costs and now relies on selling carbon credits (https://www.wsl.ch/en/projects/klimaschutz-durch-hochmoorschutz-1/). In this system, the Swiss authorities retire one Clean Development Mechanism (CDM) credit for each credit issued by max.moor. The retired credits are referred to as "shadow" credits and they prevent investors from complying twice with the same credit through double counting.

3.3 Determining payments

3.3.1 Market-based determination

When relying on carbon markets, prices vary greatly. In voluntary markets, most often used in result-based peatland carbon farming schemes, prices are generally lower than in compliance markets. However, factoring in co-benefits creates an opportunity to boost prices and demand.

There are also ways in which scheme administrators can shield farmers from the complexities of carbon markets:

- The use of a **scheme platform** where credits are generated and sold to customers. This approach is used by MoorFutures®, which generates batches of credits from different peatland restoration projects and then offers them for sale at a price that captures the cost of delivery for the project.
    - Strengths: If there is demand for the credits, this system offers a better price premium. This system also reduces administration and transaction costs.
    - Limitations: Only one marketing channel exists, limiting pricing influence. It may not meet certain standards for independency (Verra VCS or EU ETS) (https://verra.org/methodologies/vm0036-methodology-for-rewetting-drained-temperate-peatlands-v1-0/; https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en).
- In an **intermediary-driven** system, the buyer of the credits covers the early costs of the project while at the same time gaining the right to market and sell the produced credits when they are issued. The scheme may operate a registry to track the credits. This is the system used by max.moor and the UK Peatland Code.
    - Strengths: This system allows for flexible setup and reduces the centralized costs of scheme operation. It creates opportunities for both experts and businesses and makes it easier to grow and scale the scheme.
    - Limitations: Landowners may have to hire advisers or developers to manage this work. This creates the necessity for more contracts and legal arrangements. However, this can be managed by the intermediary to make things simpler for farmers.
- In an **exchange-driven** system, project developers from different schemes make use of the same central registry to both issue and track credits. These credits can be traded between buyers. The Green Deal scheme in the Netherlands uses this system for many sectors, including peatland restoration (https://www.greendeals.nl/english).
    - Strengths: Price setting is done in a transparent way that is cost-effective and can be used at a national level. This system performs better with increasing scale.
    - Limitations: This system offers limited or no opportunities to ensure price premiums for co-benefits. Peatland credit cost levels have difficulty competing with credits from industry or energy efficiency. Depending on the scheme and

exchange rules, aggregation of projects may be difficult and create costly project preparation, including legal arrangements and contracts.

3.3.2 Non-market-based reward determination

This system is used when governments or other public bodies purchase the produced credits directly, for instance, to meet national emissions reduction targets.

Reverse auctions may be used to determine the rewards to be paid to farmers. In these auctions, project administrators offer bids, which state the amount of GHG emission reductions and the price. The purchaser (governments, regulators) then makes an offer up to a set amount of GHG reductions or a set amount of money. The downside of this approach is that it encourages competition based on price, which can lead to shortcuts in quality. It is important that bids only be accepted from projects, which can demonstrate certain social and environmental standards in their protocols.

3.3.3 Payment based on costs

The payment received by farmers can be determined based on costs. Under CAP, EU environmental land management payments (eco-schemes, agri-environment & climate schemes) are set with the principle that they must cover costs incurred through the effort of farmers as well as any foregone income. For CAP result-based payments, the level of reward can be based on the estimated costs of achieving the desired results and the MRV costs paid by farmers.

3.3.4 Reward timing

By definition, payments in a result-based payment scheme are generally made after the desired mitigation results have been confirmed. However, this can lead to cash-flow issues and uncertainty for project participants, particularly in projects such as peatland rewetting where a large upfront investment is required. This delay between the payment of upfront costs and the reward can be an issue, and result-based schemes without any form of ex-ante payment are unlikely to attract sufficient uptake.

Offering an initial payment at the start of a project can increase uptake by resolving concerns about upfront costs and reducing uncertainty for participants. Payments can be done in a few ways:

- A separate payment could be made to cover upfront costs. For schemes funded by CAP, Pillar 2 rural development measures for funding productive or non-productive investments could provide the required funds.
- Ex-ante credits can be sold to buyers at a discount in order to fund ex-ante payments to farmers. The buyers of the credits or the scheme administrators must accept the risk of non-delivery of the expected climate benefits. The UK Peatland Code and the Dutch Green Deal use this approach, applying discounts of between 10-15% to the ex-

ante credits. The disadvantage of funding ex-ante payments through carbon markets is that financial returns, are reduced.

- Credit purchasers can receive their credits in two instalments. One payment of less than 50% would be made ex-ante and the balance would be paid ex-post.
- A hybrid scheme could be adopted in which farmers receive an annual activity-based payment to cover their costs in addition to an ex-post result-based payment upon delivery of the desired GHG reductions.

3.4 Stakeholders and scheme governance

For a project to be successful, a range of stakeholders must be involved from the design stage onward. This not only ensures the satisfaction of all stakeholders but brings in a greater range of engagement, expertise, and knowledge. It also counteracts any tendency for certain interests to take precedence over the delivery of climate and environmental benefits. The governance structures of the scheme should be formalized after the scheme is deemed to be feasible but before any major decisions are made. The governance structure of the project will inevitably include people with conflicting interests and communication, which can, at times, be difficult.

The first step is an analysis of local stakeholders to determine who must be involved in the governance structure. All key stakeholders must hold a meaningful role. If they cannot take part in the design stage, they should at minimum be consulted and agreements should be reached with them where possible. Some projects, such as those established by local authorities, require more formal governance structures. In this case, “rules of engagement” should be agreed upon by all stakeholders at the outset of the project. In general, projects that receive public support, such as from the LIFE Programme, must have relatively formal governance arrangements. Additionally, schemes intended to operate on a large scale must also have more formal and elaborate systems of governance, whereas local grassroots projects generally have less formal systems. Public-private partnerships tend to profit from innovative approaches and good outreach while also having secured public support and finance.

If the aim is to sell carbon credits, the governance structure should have a clear separation of roles to increase efficiency, ensure standards are maintained, and avoid corruption. If there are plans to sell as offsets, external verification is necessary, though some schemes (such as MoorFutures®) use internal verification and rely on their reputation to assure buyers that the certificates are valid.

If schemes have more than one owner, a public multi-stakeholder board or steering committee is common. Peatland projects, due to their complexity and the particularity of land-use sector projects, should have an expert working group as part of their governance structure.

Both the MoorFutures® and max.moor projects are directed by their scheme owners, a small group of experts. Local governments play a secondary role, and both projects have a scientific

advisory board and steering groups. The MoorFutures® steering group includes representatives of the local government, farmers, businesses, NGOs, and academia. The governance structure of both projects has evolved over time.

3.4.1 Key stakeholders in a result-based carbon farming scheme:

- **Financier (private sector/public institution)** – potential financiers can include the government (national, regional, local), civil society organizations, private entities, and international bodies.
- **Farmers**
    - This may be individual farmers or a group or organization of farmers.
    - Farmers are likely to be the most sceptical and risk-averse of all stakeholders. They may be concerned about project complexity and transaction costs, and they must be convinced that the return on this project will be as good or preferably better than what they are currently obtaining. For peatlands, the eligibility rules for drained and undrained peatlands for CAP direct payments are extremely important to calculate opportunity costs.
    - Involving farmers early in the scheme development can significantly increase uptake and increase their confidence in the project's benefits.
    - In the early stages, raising awareness (targeted information campaigns, advisers) and recruiting farmers' representatives can help increase the sense of ownership and thus project acceptance.
    - Recruiting farmers is time-consuming, and several months up to a year should be allotted for interacting with and on-boarding farmers. Local advisers, water and soil administering agencies or people who are familiar with the farming community can help identify farmers who are likely to be interested. Farmers can speak to experts and scheme operators and may visit an operational scheme to speak to participating farmers (peer-to-peer learning).
    - Ongoing training and advisory opportunities to allow for peer-to-peer exchanges, enable continuous learning, and facilitate targeted problem-solving should be available.
- **Land owners:** If the land for the implementation of the project is not owned by the farmer(s) an agreement with the land owner(s) in form of a contract should be concluded to confirm their approval for the full project period or the land needs to be purchased from landowners.
- **Advisory or implementing agency** – this group includes those with expert knowledge of the processes being used in the project. These people may support and manage project implementation by providing advisory services or facilitating and monitoring implementation processes. They may work on recruiting farmers, assisting them with project implementation and management.
- **The research community, using current scientific works,** is essential for supporting projects by filling in knowledge gaps alongside the implementing agency, land owners, and farmers. Cooperation with scientific partners can provide guidance on

establishment of monitoring systems and analysing collected data, sampling protocols, and support potential estimates.

- **Representatives of relevant national, regional and local governments**, particularly regulators of potential public funders.
- **Representatives from local communities** where the scheme is intended to operate.
- **Third-party verifier or auditing agency**
- **NGOs** play an important role in initiating and facilitating schemes, raising awareness and capacity building, putting pressure on governments and administrations through advocacy and lobbying to ensure transparency and social and environmental integrity, and also do a great deal of public communication.
- **Other representatives** from relevant farmers' groups, environmental stakeholders, and citizenship representatives. These stakeholders will become increasingly important, as the issue of private property vs. public welfare interests comes to the forefront. Involving citizens has already proven to increase project acceptance and engagement in the transformation process.

3.4.2 Involving stakeholders

- Design: All relevant stakeholders directly or indirectly affected by the scheme should be integrated from the design stage of the project through means adapted to the target audience. Their expertise and knowledge can support scheme development.
- Consultation:
    - Information from **farmers** should be collected, regardless of whether they are participating or not. Farmers can be asked what they like or dislike about the scheme, what would prevent their participation, and how the scheme might be improved. Questionnaires can be used to gather this information, using closed and open-ended questions. Farmers' organizations should be consulted in addition to individual farmers ensuring representation of diverse groups and gender balance.
    - **Scheme staff, including advisers and intermediaries**, should all have an opportunity to review the scheme using techniques similar to those used with farmers. Advisers, who visit farms and talk directly to farmers, will provide especially important information.
    - The **general public** is often involved in the case of publicly funded schemes, in which a formal public consultation is necessary. In some jurisdictions, there are fixed minimum periods for public consultation. The format of consultation documents is important. Open-ended questions, though harder to analyse, elicit more detailed information. The public should be given the opportunity to share the reasons behind their answers and to address points not covered in the questionnaire. Engaging with citizens transparently and meaningfully, with clear explanations of how their feedback and input will be utilized, is crucial for just transformations.

In general, early communication is best for addressing the concerns of the public. Planning can involve local residence. Involving the public has the benefit of providing an opportunity to communicate with them on the positive side effects of the project.

- **Other stakeholders** can include buyers of credits or people with a major interest in the scheme, whether they are part of the governance structure or not. Semi-structured interviews or workshops could be used to gather input.

- MRV: Measurements before the start of the project are essential as they establish the baseline against which the outcomes of the project will be monitored and evaluated. Testing on the selected indicators should begin as early as possible, and while a range of stakeholders should be involved, it is most important to have well trained personnel conducting accurate and regular measurements. The goal should be to build confidence among farmers and end users of the credits and to ensure that the indicators are scientifically sound.
- Maintaining participation: A well-designed scheme is the best way to ensure that farmers become and remain involved. There are several ways to ensure this:
  - Recognition of efforts from an early stage, not only after the results have been confirmed.
  - Positive public framing of carbon farming and the provision of ecosystem services as goods provided by the carbon farmer. It must be emphasized that the carbon storage and the many other ecosystem services provided by the scheme is an essential and life sustaining good, as important as the food that farmers grow. While carbon credits are crucial for attracting financing, the project's framing must extend beyond carbon to highlight the numerous benefits of peatland rewetting for local communities and the broader population, tailoring the message to the specific context, their values, concerns and needs. The concept of long-term sustainability of the current drainage-based practices, along with the impacts of maintaining the status quo, should be explored with a focus on collective responsibility rather than placing blame.
  - Simple agreements and plans that are visual, relatable, and relevant.
  - Simple reporting requirements that do not place a large burden on farmers.
  - Flexibility of approach, which allows farmers to choose the management practices they prefer to achieve the agreed-upon results.
  - Free access to trusted advisory services.
  - Farmers and land owners must be assured that participating in the scheme will not influence their ability to receive other forms of agricultural support and will not violate any rules or regulations.
  - Systems of penalties should be fair and fairly applied.
  - An appeal system should be established to settle disputes.
  - Administrative systems should be reliable to ensure timely and accurate payments.
  - Mechanisms that make it easy for farmers and land owners to cooperate with one another.

3.5 Evaluating scheme efficacy

3.5.1 Selection of indicators

After the scheme has been implemented, climate benefits must be measured in tCO_2eq either as net reductions of carbon emissions or a net increase of stored carbon. The contribution of other GHGs, such as methane (CH_4), must be converted to CO_2eq using the IPCC's global warming potential (GWP) values. For peatlands, the "2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands", also known as the Wetlands supplement, acts as the guiding document to report on emissions and removals from drainage and rewetting of organic soils (i.e. peatlands managed for forestry, cropland and grazing land, and peatland rewetting). It includes GHG emissions from fires and carbon dissolved in water. For guidance on peat extraction sites, the main methodology remains the IPCC 2006 Chapter on Wetlands (https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_07_Ch7_Wetlands.pdf). For peatlands converted to permanently flooded land, the IPCC 2019 refinement (https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch07_Wetlands.pdf) is the currently applicable guidance document.

In the case of peatland rewetting, carbon removals are difficult to calculate over short time periods, and therefore most schemes focus on measuring the very large GHG emission reduction that take place after rewetting.

Peatland restoration may result in short-term peak emissions of methane as the ecosystem recovers its natural function and creates the conditions that enable peatlands to continue sequestering and storing soil carbon. Such peak emissions can be mitigated through use of best practice techniques. The longer-term climate benefits of restoration are much higher than maintaining the drained status quo. This is because CO2, which is continuously emitted by drained peatlands, has a long atmospheric lifetime (centuries), accumulates in the atmosphere and thus causes continuously rising temperatures, whereas CH4, which is continuously emitted by wet and rewetted sites, has a short lifetime in the atmosphere (12 years) so that its atmospheric concentrations after some decades reach a steady state. Thus, in contrast to CO_2, do not contribute to an overall long-term rise in global temperatures (https://greifswaldmoor.de/files/dokumente/Infopapiere_Briefings/202211_Fact%20sheet_GMCUR_Methan_English.pdf; https://www.wetlands.org/publication/wetlands-and-methane-technical-report/; Prompt rewetting of drained peatlands reduces climate warming despite methane emissions | Nature Communications).

3.5.2 Direct and proxy measurements

To assess results, either direct or proxy measurements of GHG emissions reductions must be done. Direct measurements, such as measuring soil carbon fluxes, are often too expensive or difficult to conduct regularly, so most schemes make use of proxy measurements. However, some farm-level measurements are likely to be needed. Involving farmers in the measurement process increases awareness and knowledge about their land. However, certain measurements, such as taking soil samples and measuring water levels, require more

expertise and special equipment, thus capacity building and technical support may be necessary to ensure accurate data collection.

Default tier 1 Emissions Factor (EF) are provided by IPCC, though when country-specific data is available, it is recommended to use higher tier EFs based on robust scientific data to reduce the uncertainties.

Indicators intended for use in a remuneration carbon farming scheme should be tested as early as possible. This testing should demonstrate that the chosen indicator can produce consistent results over time and should determine to what degree the indicator can be influenced by factors outside of the farmer's control. Testing should also be conducted to validate proxy indicators by comparing them with the results of direct measurements.

In peatland rewetting schemes, some proxy measurements that are often used include:

- Water table depth e.g., centimetres below the surface;
- Vegetation e.g., the status and abundance of certain peatland-specific species;
- Subsidence (mainly in tropical settings);
- Land use category e.g., cropland, grazing land, grassland, fallow land, forest land, wetland.

3.5.3 Measuring co-benefits

In some schemes, delivery of co-benefits may be an important objective, and scheme administrators must decide whether or not to extend result-based payments to the achievement of those co-benefits. Potential co-benefits of peatland rewetting and paludiculture include biodiversity conservation, increased water holding capacity and stability of soil, reduced soil erosion, job creation, nutrient retention, water quality improvements, recreational value, and flood and drought mitigation. Recognizing and measuring co-benefits can command higher prices for carbon credits and increase demand. The co-benefits can be bundled or layered to make them easier to monetize. Bundling refers to grouping multiple ecosystem services together into a package that is sold as a single credit. Layering allows for payments for several distinct ecosystem services which are sold separately. MoorFutures® has produced a report which includes detailed descriptions of the criteria and methods used to qualify multiple ecosystem services within MoorFutures® credits and guidance on how to transfer these criteria and methods to other regions within and outside Germany (https://www.bfn.de/publikationen/bfn-schriften/bfn-schriften-407-moorfuturesr-integration-additional-ecosystem). Of course, the measurement of co-benefits increases project costs.

The use of a farm audit tool may allow some co-benefits to be measured relatively easily, as they can use the same input data to calculate various sustainability indicators.

Section 4: Existing schemes and EC recommendations

4.1 MoorFutures®

MoorFutures® was developed to provide a flexible instrument for financing peatland rewetting in specific regions in Germany. It is headed and supported by a steering group of scientists and stakeholders. MoorFutures® produces carbon certificates that are based closely on the Verified Carbon Standard and the Kyoto Protocol and follow internationally recognized environmental standards. Credits are produced through peatland rewetting projects, and all documentation, including location, project area, ownership, and usage conditions, is publicly accessible for every project.

MoorFutures® projects make use of scientifically recognized and externally validated methodologies for assessing their project outcomes. They use modelling to create an outlook of how the project results will appear over a timeline of at least 30 years combined with ex-post verification. Reductions estimates are conservative to avoid accounting for emissions reductions that perhaps did not occur. MoorFutures® considers activity leakage, market leakage, and environmental leakage, in order to confirm that no carbon leakage is caused by their projects.

MoorFutures® projects are monitored periodically for the entire project duration, and the resulting reports are available for verification. Project documents are validated independently, and project reports are verified by an independent regional scientific institution.

Around 30% of credits are retained by MoorFutures® as a buffer against unforeseen events. Emissions reductions are guaranteed to be permanent over a period of 100 years through legal, planning, and contractual instruments.

MoorFutures® promotes its credits to any individual or entity that wishes to improve its environmental performance. They are not transferrable, and one MoorFutures® credit equals 1 tonne of CO_2 eq. Those interested in purchasing MoorFutures® can select a project of their choice, and once the credit has been purchased, it is “shut down” in the register and the buyer receives a certificate. The income from the forward selling of MoorFutures® finances project planning, approval procedures, compensation for land users, implementation, and monitoring.

4.2 UK Peatland Code

The UK Peatland Code is a funding mechanism for peatland restoration managed by the International Union for Conservation of Nature (IUCN) UK Peatland Programme. The Peatland Code is a voluntary certification for UK peatland projects who wish to sell credits on the voluntary carbon market and assure buyers that the emissions reductions are quantifiable, real, additional, and permanent.

The Peatland Code, designed to attract private purchasers looking to improve their company’s corporate social responsibility, outlines a series of best practice requirements. These

requirements include standardized methods for assessment of GHG reductions and independent verification of the results. Projects under the Peatland Code are monitored regularly for the duration of the project, which is a minimum of 30 years. GHG assessment is based on scientific research done in the UK and published articles (Evans et al., 2021). Changes in the sites are conducted based on monitoring plans, which include water level measurements at the site. Peat depth and vegetation are assessed and documented.

Funding received from credits sold under the Peatland Code depends on the state of the peatlands prior to restoration, the length of the management agreement, and the project size. Co-benefits are also factored in, such as water quality, biodiversity, and water flow management, making the credits more attractive to buyers. Projects under the Peatland Code can also acquire funding from other sources, such as public, simultaneously.

Credits can be bought through the UK Land Carbon Registry, which directly funds projects across the UK. The Peatland Code Registry shows all projects and available carbon units to potential buyers. Each Peatland Carbon Unit (PCU) represents a specific quantity of GHG emissions that have been avoided, with two types of credits available:

- A Pending Issuance Unit (PIU), which is essentially a "promise to deliver" a PCU in the future. PIUs are not guaranteed and cannot be used until they are verified and converted to PCUs. PIUs allow the purchasing company to plan for its future emissions.
- A PCU is the equivalent of one verified tonne of CO_2e emissions from a Peatland Code-certified project and can be used immediately to report against a company's emissions.

Peatland Code projects are checked by an independent verification body five years after restoration and every ten years after. If the peatland is in good condition, a proportion of the PIUs are converted to PCUs.

When a buyer has selected the carbon units they would like to purchase, they agree on a price with the project developer, which varies based on funding, capital costs, other costs, and risk management. Additionally, the Peatland Code maintains a risk buffer of 15% of their PIUs, which are held in reserve and can be drawn upon if the project fails to deliver the expected benefits.

4.3 Recommendations from the EC's technical guidance handbook

In the EC's "Technical Guidance Handbook: Setting up and implementing result-based carbon farming mechanisms in the EU", detailed guidance is given on many aspects of establishing a result-based carbon farming scheme, mostly with a focus on carbon markets (https://op.europa.eu/en/publication-detail/-/publication/10acfd66-a740-11eb-9585-01aa75ed71a1/language-en).

First, to make a peatland restoration project viable, a peat layer of at least 50 cm and ditches or drainage pipes should be present. This can be determined using soil maps, agricultural statistics, landscape models, and/or satellite and drone imagery for the area of interest. Relevant authorities should be involved as early as possible. Project administrators should also determine the profitability of the land in question, including any CAP payments that the

landholders are entitled to. Simple economic models can be used to determine the total carbon financing necessary to ensure that the restoration project would be fully funded.

To determine potential GHG emissions reductions, nationally relevant emissions factors that are published in a trustworthy peer-reviewed journal and fulfil minimum criteria requirements (e.g. the IPCC Wetlands Supplement data quality requirements) for the chosen areas can be applied. The additionality of the project must also be confirmed. Additionality, in many cases, can be determined by assessing the profitability of the area in the absence of climate finance but with access to CAP Pillar 1 payments. Permanence must also be guaranteed, and the EC suggests doing this using long-term land contracts, using land deeds actively, and other legal measures as needed.

Project indicators should be established early on, and may include GHG emissions, water table levels, and/or the presence and abundance of certain types of vegetation. In the event that a scheme is developed within the Rural Development Program or through CAP, indicators can be devised in cooperation with local authorities.

For monitoring, the EC recognizes that it is not possible for continuous on-site monitoring to be done, but that emission factors are already well correlated to water table, land use, soil type, and vegetation. Most schemes rely on baseline data from surveys and trials in areas with similar climatic settings while monitoring all indicators. Most existing schemes use modelled data, reference data, and spot checks, obtained from local researchers, inventory operations, and other projects. All MRV data obtained during the scheme should be made public and verification should be conducted by a third-party expert. Emission and removal factors must be established early in the project and for each land category and peatland state within each land category. Emission factors can be determined using reference data or proxies and then supplemented through direct measurements in the project areas.

A well-developed indirect technique to monitor GHG emissions in peatland restoration and rewetting projects is the Greenhouse Gas Emissions Site Type (GEST). The GEST method, originally developed for the lowlands of central Europe, must be calibrated for other biogeographical and climatic zones. To use vegetation as a proxy for GHG fluxes, the relationship between vegetation, water table, and fluxes must be calibrated for each distinct climatic and phytogeographical region based on high-quality field data.

Scheme governance should consist of a secretariat and a technical advisory committee comprised of experts, researchers, and a stakeholder or steering group. This group could include investors, farmers, authorities, and interest organizations. The technical advisory committee should support and guide the formulation of the practices, rules, and standards for baselines, risk buffers, MRV, additionality, insurance pricing, and the sale of credits.

It is suggested that carbon farming schemes can make use of carbon markets for finance and also seek additional funding sources. For most farmers, an upfront payment is critical for ensuring their participation in the scheme, and thus some sort of hybrid scheme might be considered. Both ex-ante and ex-post payments or crediting can be contemplated, however, it is only advisable to use ex-ante credits if tied to low-interest upfront loans in which credits constitute payback.

In terms of selling carbon credits, the EC recommends using GHG benefits as their basis, accounting for both CO_2 and CH_4. If one or more co-benefits can be quantified, they can also be monetized through bundling or layering. Peatland credit markets are still in the early stages of development, and the credits are not currently accepted in compliance markets under EU legislation and United Nations Framework Convention on Climate Change (UNFCCC) rules. It is advised that scheme owners are responsible for marketing and selling the credits on behalf of the landowners. The EC suggests a restriction on the sale and trade of units and that constraints be in place against certain types of buyers by sector, industry, or geography. Conditions could be set as well, for instance, to prevent companies with unabated emissions from owned, leased, or other peatland areas within their supply chain from obtaining credits. The EC proposes first targeting local buyers with businesses in the area related to peatlands or rural landscapes, including those in the tourism, timber, food, or outdoor equipment industries.

When a scheme is operational, it should be evaluated regularly, separately from the established MRV system, to look at the scheme's efficiency, impacts, effectiveness, sustainability, practical feasibility, and equity. The EC also advises exploring alignment options between peatland restoration and rewetting and CAP to ensure that schemes can be adopted, upscaled, and enhanced. Some options to be explored include:

- the potential phasing out of CAP direct payments for drained peatlands so that there is coherence between agricultural, climate, and peatland policies.
- a guarantee that rewetted peatlands, including those used for paludiculture, are eligible under the CAP NSP. Result-based CAP payment schemes could also be established to promote mitigation activities, such as peatland rewetting, using attractive incentives.

5. Concluding words

In conclusion, remuneration schemes for paludiculture and carbon farming represent a pivotal shift towards sustainable agricultural practices. By incentivising the rewetting of peatlands and the adoption of paludiculture, these schemes not only mitigate greenhouse gas emissions but also promote biodiversity, water security, and climate resilience. Effective implementation of these schemes requires streamlined bureaucratic processes, robust support for farmers, and involvement of private sector, ensuring that the transition to sustainable practices is both feasible and economically viable. There is an increasing attention from the society on peatlands across Europe and subsequently a growing demand for carbon credits could be expected in the future. This will attract new players on the market as it influences prices positively und makes transactions profitable. As EU-wide regulation expected from the EU Carbon Removal Certification Framework (CRCF) is not yet in place a high level of dynamics and uncertainty in the market currently. This hampers some stakeholders from getting engaged in such activities and opens up the risk for greenwashing within projects, which are not reaching the advertised claims. As we move forward, these uncertainties and risk will hopefully vanish and such initiatives will play a crucial role in achieving our environmental goals and fostering a more sustainable future for agriculture. There is also growing interest and some experience in Europe that demonstrate significant

price premiums for credits from peatland rewetting not only focussing on carbon but also taking biodiversity or water services into account, which could create additional remuneration schemes for restoring peatlands by farmers, land owners and other stakeholders. An upscaling of such measures is urgently needed to fulfil commitments and obligations of multilateral agreements and European regulations in future.

Section 5: Baltic country specific guidance

5.1 Estonia

Agriculture support schemes for paludiculture in Estonia

Below is a brief overview of what the European Union's Common Agricultural Policy (CAP) Strategic Plans Regulation (EU) 2021/2115 says about paludiculture and what is applied for paludiculture in the Estonian CAP Strategy Plan and relevant support schemes.

Article 4 of the Strategic Plans Regulation states that agricultural activities shall be defined in the Strategic Plans in a way that includes paludiculture. However, sub-chapter 4.1.1 "Agricultural activities" of the Estonian Strategy Plan does not mention paludiculture. This leads to uncertainty as to whether future paludiculture will receive the CAP direct payments. However, following options are provided:

I Basic income support[2]. Amongst agricultural activities also paludiculture is determined. However, there is no further specific information provided. Rates of support: up to 130 euros per hectare and year.

II Protection and management of wetland and peatland areas under Good Agricultural and Environmental Condition (GAEC) 2 standard [3].

Wetland - wet habitat types (coastal meadows, floodplain meadows, marshy meadows, bluegrass beds and tall herbaceous vegetation) located on agricultural land and in protected areas. Based on criteria provided, ploughing and rotary tillage on peatlands under GAEC 2 is allowed once during 3-year period. Also, drainage of undrained areas is not allowed but reconstruction of underground drainage systems is allowed in case when GHG emissions do not increase and if it is necessary to maintain drainage in areas with mineral soils.

However, paludiculture as a term is not explicitly mentioned in GAEC 2 and is only included in the broadest sense of paludiculture (any sustainable use of functioning wetlands). Estonia has decided to implement it from 2024 onwards, justifying the decision because of the need for additional peatland inventories. Rates of support: 40-50 euros per ha y.

III As an agri-environmental measure, there is a soil protection measure (KK4)[4], which supports the conversion of arable land on peatland into permanent grassland and the maintenance of the land as grassland, but it does not support the raising of water levels (also it does not prohibit rewetting the area). Land managers are paid 70 euros per ha yr.

[2] Otsetoetuste saamise üldised nõuded, põhisissetuleku toetus, ümberjaotav toetus ja noore põllumajandustootja toetus https://www.riigiteataja.ee/akt/129122022008?leiaKehtiv

[3] Maa heas põllumajandus- ja keskkonnaseisundis hoidmise nõuded ning kohustuslikud majandamisnõuded https://www.riigiteataja.ee/akt/110052024010?leiaKehtiv

[4] Perioodi 2023–2027 turvas- ja erodeeritud mulla kaitse toetus https://www.riigiteataja.ee/akt/129122022053

IV The development of paludiculture can also be supported under the investment aid as described in the Estonian Strategic Plan. The latter does not include a specific measure for paludiculture investment, but the measure for investment in drainage management (INVEST(73-74) - 1.9.1) does in principle allow it. The word "paludiculture" is not used in the description of the measure, but "two-way water regime regulation activities (drainage device and water level raising)" is a priority for support. Also, it is stated that one can apply these funds for designing a wetland. Therefore, it is possible to consider paludiculture as an environmental measure for drainage management, in which case it should also be eligible under the support for environmental investment for drainage facilities (KK3). Presently specific legislative act is in development process[5].

To sum up, although the new EU regulation on the CAP SP allows support for paludiculture, the Estonian Strategic Plan has not clearly made use of this possibility, but relevant provision is provided in specific legislative acts (as described above under option I) or there are possibilities, which are not directly addressing paludiculture although criteria set in legislative acts are supportive for paludiculture activities (as described above under option II to IV). Whether or not paludiculture will gain momentum in the new period will depend largely on the interpretation of the wording of the scheme and subsequent actions in nature by the Agricultural Paying Agency (PRIA). In addition, Estonian Climate Law is in development and one of potential measures described in current process is development of paludiculture, covering each year additional 1000 ha starting from 2026.

Voluntary Carbon Market in Estonia as an option for peatland rewetting and paludiculture

There have been inquiries to state offices, Forest Management Centre (RMK) and ELF on possibilities to provide funding for rewetting peatlands and subsequent carbon credit potential. Thus far, there have been no contracts made as there is no regulations in place, which allow state land managers to act. Currently MoEnvir/MoClima is developing Good Practice Guidelines for voluntary carbon market and first version for public consultation was expected in autumn 2023 but the process has been continuously postponed. Also, MoEnvir/MoClima is aiming to clarify how this kind of action could be incorporated into GHG reporting to avoid double accounting.

Thus, at present time there is no systems in place which addresses paludiculture development or relevant actions in Estonia via voluntary carbon market. Existing voluntary carbon credit projects in the AFOLU sector in Estonia include:

I. The eAgronom Sustainable Farming in Central and Eastern Europe Project is an Agricultural Land Management (ALM) carbon offset project across Europe. The Project focuses on increasing the soil organic carbon in annual cropping systems. The Project seeks to drive the

[5] Perioodi 2023–2027 maaparandussüsteemi ajakohastamise, keskkonnakaitserajatise ehitamise ja eratee arendamise investeeringutoetus https://eelnoud.valitsus.ee/main#4aklziH9

adoption of regenerative agricultural practices to promote carbon sequestration and reduce and remove GHG emissions (https://www.eagronom.com/). Currently under validation by Verra, selling carbon credits is organised also via South Pole (https://www.southpole.com/)or directly with companies.

II. Single.Earth: with the main goal to develop scalable business models that support nature preservation mostly through forest protection (https://www.single.earth/our-approach)

III. Arbonics afforestation project one: The Project seeks to develop an Afforestation, Reforestation and Revegetation (ARR) carbon offset project across Latvia, Estonia and Finland. (https://www.arbonics.com/). Currently under validation by Verra.

Based on feedback from eAgronom and SingleEarth in spring 2023, they have currently no plans on peatland rewetting or paludiculture. However, options II and III could be applicable for wet (paludified) forests.

Other options for paludiculture in agricultural lands

There is an option to start up pilot projects aiming to develop paludiculture using private donors or EU or national environmental programs (e.g. LIFE, Horizon, Estonian Environmental Investment Centre (KIK)) but the challenge is to maintain the outcomes and support after project-based actions and funding comes to the end. Also, there is a need for long term monitoring and applied research which allows to assess environmental impacts (e.g. carbon fluxes, biodiversity, productivity) as well as options for management. No relevant long-term programs are known at this moment.

5.2 Latvia

According to historical maps of the distribution of organic soils in Latvia, organic soils account for 7% of agricultural land. Organic soils are distributed in small, scattered patches across Latvia and occur on 48% of farms. The total distribution of GHG emissions from agricultural soils in 2021 (%) was: 34% N fertilisers, 26% organic soils, 13% post-harvest residues, 10% N from leaching processes (indirect N2O emissions). Ministry of Climate and Energy indicate that within the LULUCF sector - GHG emissions from wetlands comprise (2021 data) 1550 kt CO2 eq of which:

91% GHG from soil (peat extraction)

6% GHG from soil (restored and flooded areas)

2% GHG from soil in areas converted to other wetlands

1% GHG from living and non-living biomass in areas adjacent to wetlands.

Ministry of Agriculture and associated Land Sector (including Forestry) and Agriculture Working Group working on plan to decrease GHG. The measures currently included in the

scenarios provide a theoretical basis for achieving the climate objectives of the LULUCF sector, but their implementation is not anchored in land management plans and development programmes. Reforestation of organic soils on agricultural land is a prerequisite for achieving the 2030 and 2050 climate targets. Measures included in the draft LULUCF target scenario (2023-2050):

(1) Measures related to the agricultural sector include:

a. 80,000 ha of rewetting - natural afforestation of rewetted organic soils on agricultural land.

b. Targeted afforestation of organic soils on agricultural land of 80 000 ha. With the notion that this volume needs to be substantially increased.

(2) Measures related to the peat sector within the LULUCF target scenario (2030-2050):

a. Rewetting of 12 000 ha - targeted afforestation of rewetted organic soils in peat extraction sites.

The assumptions on economic constraints included in the draft LULUCF target scenario imply a reduction of the total arable land area to 1336 thousand ha. The calculations assume that, due to targeted afforestation of organic soils and rewetting followed by natural afforestation, the grassland area will decrease to 780 000 ha.

In the peatland areas, renaturalisation and gradual afforestation of about 12 000 ha of developed peat fields is planned, creating low-value forest stands with waterlogged organic soils. The hydrological regime of about 50% of the former and existing peat fields after rewetting will be suitable for the development of forest stands, unless limited by other factors.

Ministry of Climate and Energy is working on the updated project of National Energy and Climate Plan. This plan (The National Energy and Climate Plan) is a long-term energy and climate policy planning document that sets out the basic principles, objectives and courses of action for Latvia's national energy and climate policy for the period up to 2030. The National Climate and Energy Plan is currently being drafted, which also includes the LULUCF sector and emission reductions therein.

National Energy and Climate Plan 2021-2030 (updated version) includes terms as restoring the hydrological regime (defined as natural afforestation of waterlogged organic soils on agricultural land). The action foresees the cessation of economic activities, including the closure of drainage systems, on agricultural land with organic soils of ~80,000 ha within 10 years from 2024. These areas are then naturally reforested, creating conditions characteristic of the swamp forest (e.g., alder carr) type. Under this proposed action, restoration of the hydrological regime and afforestation of agricultural lands with organic soils should be carried out initially and is assumed most appropriate for areas of economically less valuable grassland with organic soils, where the moisture regime has recovered (deteriorated drainage systems), where restoring the drainage system is too expensive or technically and administratively difficult. It is noted that successful establishment of forest ecosystems may require temporary

drainage systems to improve the moisture regime in young stands that are not yet capable of effectively regulating the moisture regime. Another solution for localised improvement of the moisture regime is the creation of a network of deep ditches (up to 30 cm deep) to drain excess water from shallow depressions and artificial barriers to prevent negative impacts on runoff. It is, however, stated that temporary drainage systems and deep ditches can significantly improve growth, but the effect of these solutions has not yet been assessed in Latvia.

In its current form, plan assumes that the emission reduction effect is permanent and is due to wood products and substitution effects in the energy sector. Afforestation is not planned in biologically valuable grasslands and specially protected areas. The creation of deciduous forests with naturally moist organic soil would increase the area of biologically valuable habitats - alder coppice - severalfold in the future.

The final version of the National Energy and Climate Plan is due to be submitted to the European Commission by June 2024. Currently there is an ongoing heat debate on activities and targets to compromise all included parties (LPRC is one of these parties). Crucially, the rewetting is included in the models now. The next meeting of the working group will be on 14 February, where we will discuss sectoral proposals to reduce emissions in the LULUCF sector. Over the last weeks there is an uprise of agriculture sector protests which possibly might influence some parts of the National Energy and Climate Plan.

Article 43 of the Climate Law (https://tapportals.mk.gov.lv/legal_acts/7987de45-93fd-45e3-ac4c-948251c622d9#) refers to a voluntary scheme for carbon sequestration, but this scheme is linked to the carbon offset scheme and is not directly applicable to carbon certification and carbon sequestration through the rewetting of organic soils. Voluntary carbon markets are not mentioned in the current text. After bilateral discussions with the Ministry of Climate and Energy and the Ministry of Agriculture, it is clear that Latvia has no plans to create its own carbon certification regarding organic soils and rewetting as originally planned

5.3 Lithuania

The area of land suitable for paludiculture is around 263 000 ha of the country's territory, 78% of which is organic soils used for agriculture. These are mainly Lithuanian peatlands, which have no conservation status and are heavily affected by drainage, and are dominated by the following land uses: arable land, perennial grassland and pastures, and grassland up to 5 years old.

Peatlands suitable for peat farming are particularly abundant in central and south-western parts of Lithuania, where peatlands have been drained very intensively due to intensive farming. Small mosaic landscape dominates in eastern Lithuania, where drainage affected also majority even of such small patchy peatlands.

Lithuanian Strategic plan

The Strategic Plan for Agricultural and Rural Development of Lithuania 2023-2027 (hereafter referred to as the Strategic Plan) aims at the sustainable development of Lithuania's agriculture and food sector by increasing the sector's added value and competitiveness, by supporting the incomes of viable farms (especially small and medium-sized farms), by promoting a change of generations, and by creating a vibrant countryside that is attractive to farming, business and environment, as well as by contributing to the realisation of the environmental and climate objectives.

Pillar 2, which covers direct support, schemes benefiting the climate, environment and animal welfare (eco-schemes) and sectoral programmes, with €3.02 billion in EU funding and around €2.8 million in national funding;

Pillar II, for investment, cooperation, environmental, climate protection and other rural development measures, with €977.5 million of EU funding and €273.7 million of national funding.

Strategic plan involves 10 eco-schemes, out of which 3 eco-schemes are related to wetlands in general, targeting the reduction of GHG, preservation of biodiversity and safeguarding the soil:

- conversion of arable peatlands into grasslands:
- complex grassland and wetlands maintenance programme
- extensive wetland management

Under the investment measures there is one measure: Non-productive investments related to the restoration and conservation of biodiversity, habitats, landscapes (removal of woody and /or grassy vegetation, installation of fences in pastures, installation of small ponds).

However, none of these measures foresee the restoration of hydrological regime. In most cases it is prohibited to change the hydrological regime (but no restoration), prohibition to plough including application of non-tillage technologies, depending on the measure different timing for the works are setup.

GAEC 2 in Lithuania is postponed to 2025. However, even in the case of entering in the force of this GAEC, there are several major problems:

- delineation of peatlands, which is causing a lot of troubles; currently MoA sets the target for 30 000 ha of arable peatlands (ploughed peatlands), where GAEC 2 should be applied.

- non -tillage technology is allowed in GAEC2. in Lithuania non-tillage means “no upside down” - is it not allowed to use the plough, however, the tines are allowed to be used, which penetrate up to 30 cm in the soil. This is almost as the ploughing, causing a lot of disturbance to the peaty soil and emissions.

Lithuanian National Energy and Climate Plan sets 2 targets for peatlands: Restoration of abandoned peatlands, or peatlands in the forest land - 8000 ha (responsible MoE); and restoration of 8000 ha in agricultural lands (responsible MoA), which is the same as the target in RRF measure.

Carbon credits or any payment for the carbon sequestration or reduction is still not well explored. NGOs are working on the adaption of MooFutures standard, while there are players from finance and banking sector, Agri-food Lithuania, already paying for non-tillage and reimbursing the farmers.

Abbreviation Glossary

AECM – Agri-Environmental and Climate Schemes

CAP – Common Agricultural Policy

CAP NSP – Common Agricultural Policy National Strategic Plan

CDM – Clean Development Mechanism

CFCR – EU Carbon Removals and Carbon Farming Certification

CH_4 – Methane

CO_2 – Carbon dioxide

CO_2-eq – Carbon dioxide equivalent

EAFRD – European Agricultural Fund for Rural Development

EC – European Commission

EF – Emissions factor

EU ETS – European Union Emissions Trading System

FLAG – Forest Land and Agriculture Guidance (SBTi)

GAEC 2 – Good Agricultural and Environmental Condition 2 from the European Union's Common Agricultural Policy

GEST – Greenhouse Gas Emission Site Type

GHG – Greenhouse gas

GWP – Global warming potential

IPCC – Intergovernmental Panel on Climate Change

IUCN – International Union for Conservation of Nature

MRV – Measurement, reporting, and verification

NIR – National Inventory Report

PCU – Peatland Carbon Unit (UK Peatland Code)

PIU – Pending Issuance Unit (UK Peatland Code)

SBTi – Science Based Targets Initiative

UNFCCC – United Nations Framework Convention on Climate Change

VCS – Verified Carbon Standard (Verra)

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