REPORT

ON IMPLEMENTATION OF THE PROJECT

DEMONSTRATION OF CLIMATE CHANGE MITIGATION MEASURES IN NUTRIENTS RICH DRAINED ORGANIC SOILS IN BALTIC STATES AND FINLAND

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STRATEGIES AND ACTION PLANS

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LIFE OrgBalt compiled the first regional Baltic/Finnish GHG emission factors for managed nutrient-rich organic soils (current and former peatlands), which have been made available for the customary scientific review and further verification for national GHG inventories in the hemiboreal region in Finland and the Baltic countries. While the project analysed selected CCM measures for drained organic soils in agriculture and forestry and developed spatial models and tools, it also identified remaining knowledge gaps. To bridge the remaining limitations and fill the gaps, it is essential to continue GHG measurements and model development, as well as to broaden and complete the scope of the evaluated CCM measures in the after-LIFE-project period, notably by including rewetting and restoration of peatlands that are currently considered to be among the most recommended CCM measures on drained peatlands in the EU. In addition, the developed Simulation and PPC models still include limited macroeconomic considerations and lack an assessment of all environmental impacts. For all these reasons, these models should be used carefully in CCM strategy development for the identification of gaps in climate neutrality transition policy and funding frameworks and need further optimization for broader applicability as decision-making tools.

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ABBREVIATIONS

CO2	-	carbon dioxide
CAP	-	Common agricultural policy
CCM	-	climate change mitigation
ECA	-	European Court of Auditors
EU	-	European Union
GAEC	-	good agricultural and environmental condition
GHG	-	greenhouse gas emissions
MA	-	Ministry of Agriculture of the Republic of Latvia
N2O	-	nitrous oxide
LULUCF	-	land use, land use change and forestry
LIFE OrgBalt	-	LIFE OrgBalt, LIFE18 CCM/LV/001158 "Demonstration of climate change mitigation potential of nutrient rich organic soils in Baltic States and Finland" project
UN	-	United Nations

INTRODUCTION

One of the main drivers to secure the long-term use of the LIFE OrgBalt, LIFE18 CCM/LV/001158 "Demonstration of climate change mitigation potential of nutrient rich organic soils in Baltic States and Finland" (LIFE OrgBalt) outcomes is to integrate them in relevant policies, strategies and action plans.

While the LIFE OrgBalt Project partners are engaged in the acquisition and processing of new research data, it is also necessary to take overview of the objectives and actions set out in the policy planning documents in Latvia and the Project partner countries. A broader scope is also important therefore EU-level planning documents should also be assessed, as they provide incentives to define national level targets and policies.

One of the objectives of the LIFE OrgBalt project is to improve knowledge and information on the best application of CCM measures in organic soils in Baltic States, and to develop policy tools for the implementation of these CCM measures. The development and implementation of appropriate CCM measures will make a significant contribution and create new opportunities for management of the organic soil in the Baltic region.

Organic soils that are mainly peat soils are an important source of carbon stocks and their active management (drainage; fertilizing; liming; ploughing) causes ecosystem damage and contributes to increased GHG emissions, so the public pressure for increased protection of organic soils is rising to diminish emissions that comes from these types of soils. It is essential to provide appropriate proposals for all sides - for authorities who work with CCM strategies and action plans, and practical advice for organic soil land managers in order to strike trade-offs and ensure that future management of organic soils is able to more or less benefit all parties, i.e. they retain their environmental and CCM value and are managed with appropriate practices.Interim draft report on proposals for improvement of sectoral strategies and action plans to reduce GHG emissions from organic soils is drawn to provide comprehensive and transparent information on the situation in Latvia and the project partner countries, and in the European Union (EU) as a whole. An overview of existing legislation that already foresees actions and measures for organic soils, including measures provided in the the national energy and climate plans (NECPs), measures related to national water framework directive and forests strategies will be prepared. As well as an assessment of the measures included in the Common agricultural policy (CAP) Strategic Plans of 2023-2027 for protection and renewal of organic soils will be made[1].

The preparation of the interim draft report is coordinated by Ministry of Agriculture of the Republic of Latvia (MA). Great cooperation and contribution from all Project partners were ensured as all partners are directly involved in elaboration of their national climate change mitigation targeted strategies and policies, as well as they keep track of developments of EU environment and climate action plans, strategies and reports.

At current stage interim draft report presents information about national policy planning documents and strategies relevant to organic soils in the LIFE OrgBalt partner countries and EU level policy planning documents that have been published up to the end of 2021.

[1] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-strategic-plans/observation-letters_en

1. ORGANIC SOILS IN LIFE ORGBALT PROJECT COUNTRIES

Organic soils are soils rich in organic material - plant and animal remains in various stages of decomposition, soils containing cells and tissues of organisms, and soils containing substances synthesized by organisms. Organic soils are usually formed in areas where the decomposition of organic matter is hampered by low temperatures (boreal climates) or prolonged moisture (humid climates), because wet soils have not enough oxygen to break down organic matter, leading to the accumulation of organic matter. Therefore, most of organic soils are peat soils in drained or undrained conditions.

Emissions from land use depend on the soil type. Organic soils are particularly rich in organic matter and are identified according to specific parameters (IPPC guidelines)[2].

Information and data on organic soil distribution and management in Latvia and LIFE OrgBalt project countries are already aggregated in several reports under LIFE OrgBalt project:

- "Report on current situation – applied emission factors and projections of greenhouse gas emissions from organic soils" (Report No.2019-A1|2-1) - characteristics, formation and management history in northern regions, and currently applied emission factors and projections of GHG emissions in Baltic countries and Finland.
- "Report on the identified climate change mitigation targeted management practices on organic soils" (Report No.2019-A1|3-1) - management practices of nutrient rich organic soils in boreal and temperate cool moist climate zone in Europe and approximation of potential mitigation impact and way forward.
- Report No 2020-C2/1 "Activity data for accounting and projections of GHG emissions from organic soils" aggregate information and data on organic soil distribution in the Baltic States.

[2] Organic soils are defined in Annex 3A.5, Chapter 3, Volume 4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

2. OVERALL SITUATION IN THE EU

Previous EU policies and strategies have paid minimal attention to organic soils. However, with ambitious new targets to achieve GHG emission reductions by 2030 and the ambition to achieve climate neutrality by 2050, to ensure sufficient habitat protection and biodiversity the European Commission has set a number of targets for organic soils. However, we shall take into account that different wording for "organic soils" can be used in these new EU strategies, such as carbon rich soils, peatlands, wetlands.

One of the most important EU strategies is the European Green Deal[3] presented in December 2019 – a roadmap for making the EU's economy sustainable by turning climate and environmental challenges into opportunities across all policy areas and making the transition just and inclusive for all. To ensure achievement of the European Green Deal targets in May 2020 the 'Farm to fork strategy' and the EU Biodiversity Strategy for 2030 were developed including more specific targets for carbon rich soils such as peatland and wetland, not forgetting grassland and forest soils in genereal. The turning point in the treatment of organic soils are the recently published proposal for Nature Restoration Regulation and the forthcoming EU Soil health law that still is under development. More information about EU policy documents is provided in Chapter 4 of this report.

According to data provided in EU Soil Strategy for 2030 (released in November 2021) organic soils (including peatlands) have a high carbon content of more than 20% in dry weight and cover 8% of the EU[4]. Yet restoring drained organic soils alone could significantly reduce CO2 emissions from land, which comes with numerous co-benefits, for nature, biodiversity and water protection[5].

Nowadays, however, a very large proportion of former wetlands have been drained so that organic soils at various stages of degradation are found on agricultural land, scrublands and forest. Organic soils in agricultural use currently represent only about 4.5% of the EU agricultural area but generate an important part of the total greenhouse gases. Drained peatlands in the EU emit ≈220 Mt CO2eq per year (≈5% of total EU emissions) [6], mainly from agriculture on drained peat soils.

The carbon has accumulated in the wetlands in the form of peat over thousands of years due to permanent water saturation. As a result of drainage, oxygen can enter and decompose the peat soils by oxidation and continuously release greenhouse gases to the atmosphere. Peat layers which formed over thousand of years are disappearing within a few decades. This should be taken into account when considering the use of different CCM, however rewetting could increase methane emissions, which should be avoided by proper rewetting techniques, therefore still reducing overall climate warming due to methane's short retention time in the atmosphere[7].

One of the EU key policy to foster environmently friendly practices for land use and agriculture is the Common Agricultural Policy (CAP). Recent evaluation[8] of the impact of the CAP on climate change and greenhouse gas emissions concluded that a better targeting of climate demands in the Member States' instruments is needed, for example, protection and restoration of wetlands and peatlands should be enhanced.

[3] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
[4] Calculated from data derived from the national submissions to the UNFCCC.
[5] European Commission (2021), Technical guidance handbook: Setting up and implementing result-based carbon farming mechanisms in the EU. Data are from 2016, including UK.
[6] Tanneberger F, Appulo L, Ewert S, Lakner S, Ó Brolcháin N, Peters J & Wichtmann W The Power of Nature-based Solutions: How Peatlands can Help us to Achieve Key EU Sustainability Objectives. Advanced Sustainability Systems. doi: 10.1002/adsu.202000146
[7] Günther, A., Barthelmes, A., Huth, V., Joosten, H., Jurasinski, G., Koebsch, F., & Couwenberg, J. (2020). Prompt rewetting of drained peatlands reduces climate warming despite methane emissions. Nature communications, 11(1), 1-5.
[8] https://agriculture.ec.europa.eu/news/evaluation-caps-impact-climate-change-and-greenhouse-gas-emissions-2021-06-01_en ; https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cmef/sustainability/evaluation-cap-climate-change-and-greenhouse-gas-emissions_en

In 2021, the new legislative framework for the coming CAP funding period 2023- 27 was decided. This will be one of the main policy documents that will be contributing to the ambitions of the European Green Deal[9]. CAP Strategic plans are new legislation framework that replace and unify existing approach how the support is provided for direct payments (Pillar 1) and under Rural development programs (Pillar 2). To support the development of CAP strategic plans in a way that they contribute to the transition foreseen in the Green Deal, European Commission provided recommendations for each Member State:

European Commission recommendations for LIFE OrgBalt project countries strategic plan for the Common Agricultural Policy regarding organic soils about bolstering environmental care and climate action and contributing to the environmental- and climate-related objectives of the Union[10]:

For Latvia:

Reducing greenhouse gas and ammonia emissions by supporting sustainable agricultural management as well as animal rearing techniques. To mitigate and adapt to climate change, Latvia should address primarily nutrient management, sustainable crop rotations, the protection and, if appropriate, restoration of peatlands and wetlands.

For Estonia:

Ensure adequate protection of Estonian peatlands – including through effective design of related conditionality elements and support for carbon farming. Rewetting may also be appropriate in some cases. Encourage the timely regeneration of harvested forest, in such a way as to maximize long-term carbon capture (with species which are adapted to climate change and favorable to biodiversity), within a wider context of sustainable forest management. Support not only for planting but also for advice on species selection may be appropriate.

For Lithuania:

Lithuania should devote more attention to meeting the environmental and climatic objectives. Agricultural greenhouse gas (GHG) emissions represent a significant share of total non-CO_2 greenhouse gas emissions, while the carbon sink capacity of grasslands and forests is decreasing. 'Carbon farming' approaches could be designed to incentivize, for instance, appropriate grassland management, and the rewetting and restoration of drained peatlands. The overall production of renewable energy in Lithuania, and in particular from agriculture, can be improved as it is below the EU average. On the other hand, Lithuania is one of the leaders in using forestry production for renewable energy, giving it an opportunity to contribute to the transition to a low - carbon economy in the EU.

Reducing agricultural emissions of greenhouse gases by fostering climate-friendly farming methods, with a particular focus on the livestock sector, nutrient management, peatlands and carbon-rich soils, and promoting the production of on-farm renewable energy.

For Finland:

Further investments are needed to protect wetlands, peatlands and grassland, and for manure management (particularly to reduce ammonia emissions).

Peatlands, which cover roughly a third of Finland's land area, are a major source of GHG emissions, and emissions from cropland and wetlands are increasing although slowing down in the last 10 years.

[9] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-strategic-plans_en

[10] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0846&rid=8

For land use, land-use change, and forestry (LULUCF), Finland should explore different interventions to reduce emissions, for example, through carbon farming approaches that remunerate rewetting of peatlands, or adequate and climate adapted production methods on organic soils.

Improving biodiversity, in line with the new actions of the Biodiversity Strategy, in particular the status of habitats and protected species, farmland birds and wild pollinators by enhancing the conservation of habitats, such as grasslands, peatlands and other wetlands through protective measures in line with the Prioritized Action Framework for CAP funding.

Promoting climate change mitigation: special focus should be on forests and carbon-rich soils (peatland and cropland), in order to enhance the current carbon sinks and reducing greenhouse gas emissions.

For Germany:

Foster climate change mitigation by promoting less intensive management of arable land to increase carbon sequestration and of permanent grassland for carbon storage as well as protection of carbon-rich soils through rewetting and restoration of peatlands and wetlands.

A vast portion of peatland and wetland, which covers a sizeable area in Germany, was drained in the past also for farming, which turned it into a GHG emitter instead of a carbon sink. Maintenance and restoration of peatland and wetland for their carbon sequestration potential will therefore be crucial in the future.

CAP Strategic plans are prepared based on the specific needs of each Member State, but at the same time all Member States must contribute to the nine CAP objectives, including the one regarding climate and environmental objective of protecting carbon-rich soils. All Member States will have to achieve this under the new enhanced conditionality framework by setting the standard for good agricultural and environmental condition called GAEC 2. This GAEC applies to all eligible agricultural land whatever its land use, whether arable land, permanent grassland, or permanent crops. As part of this standard, each country shall define and delineate the carbon-rich soils on agricultural land to ensure protection of wetland and peatland as they represent an important carbon store and potential sink on the planet. This standard is applicable from year 2023 however Member States may postpone it as from year 2024 or 2025 due to delay that is necessary for delineation and the establishment of the appropriate management system.

Member States should define the relevant protection requirements that will be applied to the different types of land use (arable land, permanent grassland and permanent crops). To this end, they should identify land management practices that avoid carbon release, such as low tillage, a ban on the conversion of wetland and peatland, a ban on the drainage and extraction of peatland. In any case, the requirement(s) established for the GAEC 2 should allow farmers to carry out agricultural activity suitable for qualifying the land as agricultural area.

In their CAP Strategic plans Member States may also define more ambitious management requirements on wetland and peatland, which will be set under Pillar I eco-schemes or Pillar II environmental/climate management commitments.

3. ORGANIC SOILS RELATED POLICY PLANNING DOCUMENTS IN THE LIFE ORGBALT COUNTRIES

This chapter presents information on national policy planning documents and strategies relevant to organic soils in the LIFE OrgBalt partner countries. The information has been prepared with the support and contributions of the partners.

3.1. Latvia:

❖ The main policy planning document for the forest sector is the **Forest and related sectoral guidelines 2015-2020.** Guidelines set policy goals for forest sector development. **Goals are:**

- *Latvia's forest management is sustainable and internationally recognized;*
- *Latvian forest industry products are competitive with high added value and meet customer needs;*
- *Educational and scientific potential and level of human resource skills are appropriate to the development of forest and related industries.*

❖ One of the activities to reach the first goal is *efficient and sustainable management of forests and wooded land*. Policy result defined as secure availability of forest resources now and for future generations. It can be reached via increase of forest value, including ensuring fulfilment of forest management CO_2 sequestration target and improvement of long-term contribution of forests to the global carbon cycle. One of the possible ways to improve CO_2 sequestration is through afforestation of unmanaged land.

❖ Under Latvia's **Rural Development Programme 2015-2020 (RDP 2015-2020)** productive use of unused agricultural land has been set as one of the priorities. Aim was to prevent soil erosion, improve soil management and promote carbon storage and sequestration in agriculture and forestry. Afforestation is a way of land management to improve carbon storage and sequestration increase, but at the same time agriculture production and food security should be taken into account. Therefore, support for afforestation is available only with strict conditions. RDP 2015-2020 sets out criteria for prioritization of possible territories for afforestation – afforestation is eligible on lands with low fertility, erosion risk territories, territories partly overgrown by trees and bushes and agricultural land on organic soils.

❖ The most important sources of GHG emissions from agricultural soils are organic soil management and the application of nitrogen fertilizers, therefore **Latvia`s National Energy and Climate Plan 2021–2030 set the following actions:**

- ➢ To explore and implement solutions to reduce emissions from organic soils in the agriculture sector.
- ➢ Establishing a map of the distribution of peat soils on agricultural land.

❖ In the Latvia`s **CAP Strategic Plan 2023 – 2027** the main identified weakness is lack of up-to-date spatial information on the actual distribution of organic soils in Latvia, as well as deficiency of reliable information on soil carbon stocks that hamper to identify the level of carbon rich soils on agricultural land. Based on the results of the LIFE Restore project[11], priority is given to actions to promote afforestation of organic and non-productive soils, thus reducing GHG emissions and increasing CO_2 sequestration.

The following requirements for protection of carbon-rich soils and particularly peatland on the agricultural land (GAEC 2) are planned from 2025:

- ✓ Peatlands (peat soil[12]) located on agricultural land and used for agricultural activity shall not be ploughed more frequently than once in 5 years or ploughing is prohibited at all, if it is provided for by other legislative acts, including ones on environmentally sensitive permanent grasslands.

[11] https://restore.daba.gov.lv/public/eng/activities_and_deliverables/manual_sustainable_and_responsible_after_use_of_peat_exctraction_areas/
[12] Definition of peat soil under GAEC 2 – Peat soil on agricultural land means the soil used for agricultural activity and containing a layer of peat of 40 cm or more

- ✓ It is only permitted to renovate or install new amelioration systems in areas of peatlands on agricultural land used for agricultural activity in cases where appropriate solutions are used that do not increase GHG emissions from soil (e.g. establishing filtration fields, forming ditch extensions, planting tree strips along an amelioration ditch) and all the requirements specified in legislative acts regarding the necessary documents, permits or reconciliations are fulfilled.

There is no intention to introduce any eco-scheme for organic soils. But as agri-environmental measure it is planned to support creation of wetlands providing non-remunerative investments for the creation of new wetlands on arable land with additional elements for grassland wading bird feeding areas.

❖ **Latvian National Plan for Adaptation to Climate Change until 2030** defines measures for protecting the carbon-storing functions of a forest:

- ✓ Undertake research on the conservation of existing dispersed wetlands and the creation of new ones, and promote the creation and maintenance of dispersed wetlands, especially in areas dominated by agricultural land.
- ✓ Rehabilitate and adapt forest drainage systems to avoid the negative impacts of climate change as far as possible.
- ✓ Develop science-based guidelines for forest management to enhance climate resilience.

❖ **Latvian Bioeconomy Strategy 2030sets** Action 5.4.3. Development of a long-term policy for the use of land: The type of land use and functions provided by soil are the determinant factors in the development of bioeconomy. The types of land use may be different – arable land, grassland, forest, fishery, nature protection, etc. Whereas, depending on the type of soil different functions are provided – primary production, regulation of water regimes, carbon sequestration, ensuring biological diversity and habitats, circulation of nutritional substances. To ensure efficient use of land and soil resources, the coherence between types of land use and the functions provided by soil should be taken into account in planning. Functional land use is a comparatively new framework of analysis and management which helps to plan the use of land and the management of soil based on the functions provided by soil. In order to promote the development of those bioeconomy sectors where the production is based on land resources, such land use policy should be introduced in Latvia. Policy which is based on the principles of functional land use, by specifying the proportion of the area of land necessary for production, ensuring sustainable management of land, as well as promoting balance between production and environment, including mitigation of climate change.

❖ **Strategy of Latvia for the Achievement of Climate Neutrality by 2050** is designed to support the European Union's overall climate-neutrality target by 2050 and was released alongside the National Energy and Climate Plan 2021-2030. It is designed to increase the economic competitiveness of the Latvian economy at the same time limiting and reducing climate change, as well as to ensure a safe living environment for the people of Latvia**:**

- ✓ Significant factors in the LULUCF sector in relation to GHG emissions and CO2 removals are the use of mineral fertilizers, high proportion of organic soil - drained peatlands in agriculture and forestry in the territory of Latvia, as well as forest coverage.
- ✓ Organic soils have formed in Latvia mainly in soils with high level of humidity. Upon transforming wetland containing a thick layer of organic matter into utilized agricultural area, emissions of nitrous oxide (N2O) increases. In total, the quality assessment of organic soil in points is lower than on average in the country, thus affecting the indicators of productivity. 1 ha of unused organic soil to be used in agriculture on average generates as much GHG emissions as 10 ha of mineral soil used for agricultural production.

- ✓ Research of organic soil has been conducted and results have been applied to:
  - Rise awareness of the processes taking place in organic soil, their impact on and relation to the surrounding environment is developed. The current situation, including areas of organic soil have been surveyed, information regarding soil is regularly updated.
  - Suitable choice of the type of land use for the areas of agricultural land organic soil which are not actively used for the production of agricultural products due to different reasons (for example, low qualitative value of soil, extensive resources for the renewal of amelioration systems are necessary, non-existence of access roads, configuration and location of fields) is ensured.

❖ **Guidelines for the Sustainable Use of Peat 2020-2030**:

- Differences in data from different sources make it difficult to draw correct conclusions about peat resources and land use.
- In designing the GHG compensation mechanism, the peat extraction sector should, to the extent possible, also be covered by GHG emission reduction measures implemented or financed by the sector and carried out in other land uses, including non-peat areas and historical mining areas. As the LULUCF Regulation requires each EU Member State to achieve net zero GHG emissions in all accounting categories, GHG emissions from peatlands (peat extraction, peat extraction sites) should primarily be compensated directly within the LULUCF accounting categories, where this is economically and environmentally feasible. GHG emissions from peat extraction and production of peat products could be compensated by CO2 sequestration enhancement measures such as wetland restoration, reforestation on organic soils, recultivation of exploited peat extraction sites through afforestation, planting of cranberries and blueberries, or other offsetting activities such as construction of wind power plants, etc. The most appropriate GHG-emission-reducing and landowner-preferred reclamation options should be used for recultivation.
- Action 3, Activity 12: Undertake the research needed to obtain data on the distribution and characteristics of organic soils. Implementation deadline: 2024.

3.2. Estonia:

❖ **Agriculture and Fisheries Strategy 2030 (AFS 2030; adopted by the government in April 2021)**[13]

AFS 2030 integrates the development trends of agriculture, fisheries, aquaculture, food industry, and rural and coastal areas, aiming to increase the competitiveness of these sectors, food security, sustainable rural and coastal development, good plant and animal health, improved soil conditions, food safety, and the maintenance of a clean environment and biodiversity.

Objectives for the agricultural environment are:

- ✓ Limit the negative impact of fertilizers, plant protection products, and agricultural production on the environment and on climate change.
- ✓ Maintain biodiversity and landscape diversity of agricultural land, and ensure sustained ecosystem services.

Action to achieve the objectives: Monitoring the use of plant protection products and fertilizers; implementation of digital solutions for calculating plant nutrient and humus balances; encouraging solutions based on the circular economy; improved evaluation of plant protection products; promoting organic farming and environmentally sustainable practices; investments into climate-smart technologies; supporting sustainable and diversified land use, e.g. the conversion of agricultural land with organic soils into permanent

[13] https://www.agri.ee/sites/default/files/content/arengukavad/poka-2030/poka-2030-executive-summary-2021.pdf

grassland, restoration of the natural water regime or controlled water level rise, maintenance of species-rich grasslands.

❖ **Estonian Rural Development Plan (ERDP) for 2014–2020 (updated 2022)[14] (CAP National Strategic Plan)**

The objective of the ERDP is to support Estonian rural development in a manner that is complementary to other measures of the European Union Common Agricultural Policy, cohesion policy and the European Common Fisheries Policy.

There are a total of six priorities serving as a basis for the programming of rural resources:

- ✓ Improving knowledge transfer and innovation in the agricultural and forestry sector and rural areas.
- ✓ Improving the viability of agricultural holdings and the competitiveness of all agricultural forms, promoting innovative agricultural technologies and sustainable forest management.
- ✓ Promoting the organization of food chain in agriculture, including the processing and marketing of agricultural products, animal welfare, and risk management.
- ✓ Restoring, preserving and improving agricultural and forestry ecosystems.
- ✓ Promoting resource efficiency and supporting the transition to low-CO2 emission and climate-resilient economy.
- ✓ Promoting social inclusion, poverty reduction and the rural economic development.

❖ **Code of Good Agricultural Practices (2001, updated 2020)[15]**

Code of Good Agricultural Practice is a generally accepted set of rules for agriculture, consisting of environmental requirements and recommended guidelines determined by legislation, which aim to reduce the risk of environmental pollution or degradation. The overarching goal with respect to soils is to preserve nutrient rich farmlands and protect soils as an invaluable natural resource that must be preserved and used sustainably. In addition to being used in agricultural and forestry management, soil is the primary filter in the formation of natural quality groundwater and surface water.

There is currently no direct regulation of soil protection in both EU and Estonian law. The protection of soil from agricultural pollution is indirectly regulated by Council of Europe Directive on the protection of the environment and in particular soil during the use of sewage sludge in agriculture and the EU Environmental Liability Directive, the provisions of which have been adopted in Estonia in the Environmental Liability Act.

Good agricultural practice for soils include: implementation of crop rotation suitable for the soil; providing the soil with sufficient amount of organic matter, using follow-up and intermediate crops if necessary; organizing tillage so that the soil structure is not damaged; using agricultural techniques that do not involve breaking the soil profile; regular soil sampling to monitor the soil condition and nutrient content, which is the basis for balanced fertilization. Assessing the soil condition and acting in accordance with this is a crucial part of good agricultural practice.

❖ **Estonian Forestry Development Plan until 2020 and (Forestry Development Plan 2021–2030 in progress)[16] related to The Forest Act[17]**

The Forestry Development Plan is based on the sustainable forest management concept – the management of forests ensuring the diversity, productivity, renewability, vitality and potential of their biota and enabling them to perform ecological, economic and social functions at the local, national and global level in the future. The

[14] https://www.agri.ee/en/objectives-activities/estonian-rural-development-plan-erdp-2014-2020
[15] (in Estonian) https://pta.agri.ee/media/1594/download
[16] https://www.riigiteataja.ee/aktilisa/3180/2201/1003/Eesti_%20metsanduse_arengukava.pdf
[17] https://www.riigiteataja.ee/en/eli/510022014001/consolide

main objectives of the development plan are to ensure viability of forestry, to protect the environment and diversity of forests, climate change mitigation and adaptation, and to improve the competitiveness of the forest sector.

To achieve this: Wood is to be used as a renewable natural resource in the timber industry and in energy; In order to maintain the productivity of the forest, forest renewal works are carried out in at least half of the renewal felling areas; in order to maintain the good condition of the populations of threatened and Estonian-specific species, at least 10% of the area of forest land has been put under strict protection and the representativeness of the protected forests has been improved.

For climate change mitigation, the effect of forests can be maximized with constantly high growth rates and when wood from the forest is used as a renewable raw material and a source of renewable energy. The role of the forest as a sequester of carbon dioxide from the atmosphere is approximately proportional to the increase in biomass of the stand. After reaching volume maturity, the stand moves towards an equilibrium state of the carbon cycle. Thus, the development plan promotes increasing forest growth and carbon sequestration capacity to mitigate climate change through timely forest renewal.

❖ **Resolution of the Riigikogu, General Principles of Climate Policy until 2050**[18]

The resolution declares the vision and national target for climate policy and political guidelines for the economy as a whole. Sets sectoral policy guidelines for the mitigation and adaptation of climate change in the energy and industry, transportation, agriculture, forestry and land use sectors.

- **Objectives in the agriculture sector:**
  1. Increasing and maintaining soil carbon stock.
  2. Encouraging efficient and ecological use of agricultural land.
  3. Enhancing use of plant nutrients and replacement of mineral fertilizers with organic fertilizers.
  4. Avoiding unnecessary removal of organic substances from the soil.
  5. Enhancing the production of bioenergy and prioritizing its use.
  6. Increasing the productivity of the agricultural sector and the efficiency of resource use.
  7. Fields of research and development that increase the sustainability of agriculture will be preferred.

- **Objectives in the forestry and land-use sector:**
  1. Increasing forest growth and carbon sequestration ability through productive and sustainable forest management.
  2. Increasing of the productivity of managed forest land through timely cutting of forest stands and fast renewal of forests with tree species appropriate for the habitat type.
  3. Enhancing timber use and increasing carbon stock in timber products.
  4. Preserving the current area under forest land.
  5. Preserving and increasing the carbon stock in the peat layer of mires.
  6. Avoiding further drainage of mires and restoring near-natural water regimes in drained peatlands.
  7. Preferring fields of research and development that help increase carbon sequestration and find alternative uses for timber.

❖ **Climate Change Adaptation Development Plan until 2030**[19]

The main objective of the development plan is to increase the readiness and capacity of the state, the regional and local level to adapt to the effects of climate change. The development plan sets eight subgoals:

1. Health and rescue capability

[18] https://ec.europa.eu/clima/sites/lts/lts_ee_et.pdf
[19] https://envir.ee/media/912/download

2. Land use and planning
3. Natural environment
4. Bioeconomy
5. Economy
6. Society
7. Infrastructure and buildings
8. Energy and security of supply.

Measures within subgoal 3. Natural environment: 1. Preservation of biodiversity under the changing weather conditions. 2. Prevention of invasive alien species from getting into nature, the extermination and control thereof in the changing climate. 3. Ensuring favourable conditions for natural communities and landscapes and organizing nature conservation in the changing climate. 4. Ensuring the stability, favourable conditions, functions, resources and the diversity of land ecosystems and habitats in the changing climate. 5. Monitoring of the status of surface water bodies, the structure of biota communities, external and internal load of substances caused by the changes in the temperature and the hydrological regime, and minimizing climate risks. 6. Minimization of the negative effects of climate change for achieving the good status of the marine environment and the preservation of biodiversity. 7. Provision of socio-economically important ecosystem services in a sufficient amount and with the sufficient quality, taking climate risks into consideration.

Measures within subgoal 4. Bioeconomy (agriculture and forestry): 1. Ensuring food supply in the changing climate through the development of land improvement systems, increase in the competitiveness of agriculture and through knowledge creation and transfer. 2. Ensuring the productivity and viability of forests and the diverse and effective use thereof in the changing climate.

❖ **General principles of Earth's crust policy until 2050**[20]

The use of Earth's crust is the basis for many branches of economic activity, but is often accompanied by significant environmental disruption. The general principles of Earth's crust policy are the framework strategy for the development plans and legislation related to the field, and the basis for issues related to Earth's crust in preparing the development documents and legislation related to other fields. Estonia's long-term goal in terms of Earth's crust is to ensure the science-based management and use of extractable land resources, which is directed at national economic growth and resource efficiency, is eco-friendly, and maintains human health. At the same time, it is important to reduce dependence on non-renewable resources. The development document provides a long-term vision and direction for managing the field, addressing the full potential of Earth's crust, including:

- ✓ mineral resources
- ✓ the Earth's crust as base
- ✓ the Earth's crust as a construction environment
- ✓ groundwater
- ✓ geothermal energy.

3.3. Lithuania:

❖ The Lithuanian **National Energy and Climate Action Plan**[21] 2021-2030 sets the target for decreasing emissions in agriculture by 2030 at 9% compared to 2005 and lists actions for all economic sectors in Lithuania until 2030. There are several measures dedicated to organic soils listed in the LULUCF sector:

[20] https://envir.ee/media/907/download
[21] All national energy and climate plans available online: https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en

- Restoration of wetlands in arable peatlands and protection of their "green bed" (perennial grass cover). 8,000 ha of wetlands will be restored until 2030. The preliminary effect of the measure until 2030 – approx. 500 kt CO_2 eq.
- Cultivation of herbaceous plants (grassland) in organic soils and the promotion of sustainable use thereof. 8,000 ha of cropland will be converted to grassland until 2030. The preliminary effect of the measure until 2030 – approx. 700 kt CO_2 eq.
- Protection of organic soils. A natural water level inhibiting GHG emission will be restored and/or maintained in a 1000 ha area of organic soil (measure is dedicated to degraded/exploited peatlands). The preliminary effect of the measure until 2030 – nearly additional 200 kt CO_2 eq.

All measures are preliminary – planned to be implemented in the period of 2021-2030.
National Energy and Climate Action Plan is the most thorough document, defining climate change mitigation measures in organic soils, with preliminary projected effects until 2030.
Lithuania's National Energy and Climate Action Plan is being reviewed and updated policies and measures as well as projected effects of those measures will be available later this year (2022).

❖ **CAP Strategic Plan for 2023-2027**[22]. Significant attention is paid for climate change mitigation and environment protection measures – 29 per cent of total financial aid during the 2023 – 2027 period. Both pillars, direct payments and investment aid pillar, include financial aid planned for climate change mitigation and environment protection actions. Priority needs, identified in the strategic plan, related to climate change and environment are as follow: reduction of GHG emissions, halt of soil erosion, biodiversity protection, landscape protection; with related overall national aim of adaptation to climate change and conservation of natural resources.

Peatland related actions to reduce GHG emissions and mitigate climate change in the strategic plan are included under two priorities: use of technologies to reduce GHG emissions from soils and enhance soil carbon stocks; reduce GHG emissions from drained wetlands and peatlands. Specific actions included in the strategic plan are conversion of organic soils in cropland to perennial grassland, extensive management of wetlands. Practices defined in the strategy and supported financially have several specific limitations: new drainage systems and , exploitation (extraction) of peat is not allowed in agricultural land organic soils. Measure of extensive management of wetlands will be applicable from 2024, after detailed maps of wetland and peatland areas in Lithuania will be prepared (preparation of such map is included in the Strategic plan).

❖ **National Climate Change Management Policy Strategy**, Strategy adopted in 2012, sets the short term (2020 (passed)), midterm (2030 and 2040) and long term (2050) goals for climate change mitigation altogether with interinstitutional action plan to monitor the achievement of those goals. Vision of Lithuanian Climate Change Management Policy is to achieve climate (net GHG emissions) neutrality until 2050.

Organic carbon loss from soil due to degradation (including inappropriate farming practices reducing soil fertility and organic compounds) is recognized as an important issue in the strategy, targeting to reduce the risk of soil degradation (erosion) and carbon stock reduction. One of the goals in agriculture sector include increase of soil resistance to climate change via implementing a continuous monitoring system to monitor soil condition and improve farming methods ensuring reduction in useful soil loss and developing farmers' skills and increasing awareness and motivation to adapt to climate change.

❖ **Order of the Minister of Environment on the approval of a plan for the purpose to use explored peat extraction sites and other quarries**[23]. Adopted in 1996, revised in 2016. Order of the Minister defines

[22] Link: https://zum.lrv.lt/lt/lietuvos-zemes-ukio-ir-kaimo-pletros-2023-2027-m-strateginis-planas-1
[23] Link: https://www.e-tar.lt/portal/lt/legalAct/TAR.680900B513E0/asr

rules for recultivation of exploited quarries (including peat extraction sites), several options for recultivation are allowed: conversion to agricultural land, forest land, water bodies or wetlands (peatlands). Option to recultivate exploited quarries to wetlands (peatlands) requires that at least 0.5 meter of peat is left at the bottom to start revegetation of peatland, while the main measure is to restore natural hydrological regime.

❖ **Comprehensive Plan of the Territory of the Republic of Lithuania**. Plan was adopted in 2021, sets vision for country's development until 2050 and development solutions until 2030, taking into account UN Sustainable development goals. Long-term spatial development vision integrates social, economic and environmental needs. Priority areas for development include agriculture and forestry activities based on bioeconomy principles, sustainable use of soil and measures for soil regeneration. Requirements for use of soils: fertility enhancement, increase in soil carbon stocks, increase in manure production and application to soils, reduce soil erosion, restore soil bioactivity. Comprehensive Plan also provides plan to improve soil monitoring programme and promote agricultural studies related to soil, ensuring sufficient well-educated specialists working in agricultural areas. Comprehensive Plan defines land management priorities in each region, according to its natural conditions, economic and social needs, taking into account all sustainable development requirements and ensuring compliance to commitments under various international environment protection agreements. Areas with priority for peatland protection and restoration are distinguished in the plan altogether with other priority areas.

❖ Measures for **economy recovery and resilience "Naujos kartos Lietuva"** (in lithuanian). Plan was adopted in 2021 and covers various financial measures, including ones related to green transformation. Green transformation covers measures applicable to ensure sustainable development, climate change mitigation and protection of environment, compatible with the goals set in EU Green Deal. One of the investments for Green transformation is dedicated for organic soils specifically: "enhancement of GHG removal potential". The aim of the measure is to reduce GHG emissions from drained degraded peatlands via rewetting and revegetation (with typical peatland vegetation). Measure should cover approx. 8 thous. Ha of degraded exploited peatlands and in long term (30 years after rewetting and revegetation takes place) may result in reduction of GHG emissions approx. 2.5 million tonnes of CO_2 eq. Measure will not only be financed under CAP Strategic Plan for 2023 – 2027 schemes, but participating farmers/areas may be included in carbon farming activities (extensive agriculture activities, I.e. paludiculture) and generate carbon credits to sell in the carbon market.

❖ The **Lithuanian progress strategy 'Lithuania 2030'** mentions that Lithuania is renowned for its rich nature and it must be important for Lithuanians to preserve and develop natural heritage and to use resources wisely. Growth of economy is based on green development, taking into account social and ecological responsibility, ensuring clean and safe environment for future generations. Responsible use of resources and minimized impact for the environment should be ensured both locally and globally; green economy with green technologies is promoted. Envoronmental (nature sciences) education is listed as one of the indicators of progress in the Strategy. Strategy is currently being updated and long term strategy "Lithuania 2050", based on currently available one, will be prepared next year.

❖ **The National Strategy for Sustainable Development** was adopted in 2003 and set the development goals until 2020. Further implementation of the strategy with the main goals is still relevant and works under the UN "Agenda 2030". The National Strategy for Sustainable Development examines the possibilities of afforestation of more fertile soils in the LULUCF sector, identifies the need to use economic and administrative measures to ensure successful recultivation of used up quarries and peat bogs and maintenance of abandoned old farm buildings and provides for the possibility of creating conditions for landscape protection, management, use and planning by drawing up a national landscape management plan. In addition to this, slowing down soil erosion processes is mentioned as one of the main aims.

❖ **National Agreement on Forests**[24] (in preparation). National agreement on Forests will set the development guidelines for all forestry related sectors: forest management, afforestation/reforestation, harvested wood products, bioenergy (in terms of biomass use). CO-creation process is still taking place, different interest groups have finalized their own suggestions for the agreement text according to themes (I.e. economic development, biodiversity, climate change, forest management policy, etc.), which are being overviewed and combined by the ministry of Environment. The need to protect organic and especially wet organic soils, protect and enhance soil carbon stocks in those soils, ensuring stability of such forest stands, is clearly indicated in suggestions of various interest groups. Vision of the future forests of Lithuania states that "lots of attention is paid to the formation and development of climate-resilient, sustainable and productive forests. Strengthening the role of forests in the fight against climate change takes into account the protection of biodiversity, increasing carbon sequestration in forests, including mature and aging stands, and harvested wood products." Actual measures for protection of wet organic soils, restoration of degraded peatlands and carbon stock enhancement in organic soils will be developed at further stages of the agreement, possibly while developing new forestry strategy of Lithuania.

❖ **National law on soil protection**[25] (draft, inactive). Initiative defines soil quality parameters, ensure soil monitoring scheme, management limitations and protection requirements, such as requirement to increase soil fertility, ensure that only best practices available are applied, forbids exploitation of natural wetlands and land use change there, etc. Initiative also includes description of organic soils and their management limitations. Draft version was prepared, but not adopted by the government.

3.4. Finland:

❖ Finland's **Rural Development Programme 2015-2020**[26] contained only a couple of measures targeted specifically to peat soils.

- ✓ Landowners can get support for the investment of controlled drainage and after that an annual compensation. The sum for the investment is 40% of the total investment and the annual support is 70 €/ha with a basic controlled drainage system and 250 €/ha if an irrigation system is in place.
- ✓ There is also an environmental payment for permanent grassland on organic soils.

❖ The new proposal of the **CAP Strategic Plan**[27] specifies the agricultural support and rural development measures to be implemented in Finland in 2023–2027 and the conditions applicable to the measures included these support schemes. The main tasks of Finland's CAP Strategic Plan are to ensure active food production, promote climate and environment smart agriculture, and strengthen the viability of a countryside that is capable of renewing itself. The proposal for CAP strategic plan has slightly more measures targeted to peat soils than the current strategy. GAEC 2 aims at reducing the clearance of peat soils to agricultural use. It limits the use of cleared parcels so that they can only be used as permanent grasslands that are not in favour of farmers because the grass sward cannot be renewed. Switching from annual cultivation to permanent grasslands on peat soils will be subsidized. A new measure enables peatland rewetting so that it is removed from cultivation.

❖ **The National Energy and Climate Strategy**[28] outlines the actions that will enable Finland to attain the targets specified in the Government Programme and adopted in the EU for 2030, and to systematically set the

[24] Documents available: https://nacionalinismiskususitarimas.lt/nacionalinis-misku-susitarimas/
[25] Link (in lithuanian): https://e-seimas.lrs.lt/portal/legalAct/lt/TAP/5b4f3ea02b4411e79f4996496b137f39
[26] Link: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/rdp-factsheet-finland-mainland_en.pdf
[27] Link: https://mmm.fi/en/-/government-approves-finland-s-cap-strategic-plan-proposal-submitted-to-european-commission
[28] Link: https://tem.fi/en/energy-and-climate-strategy

course for achieving an 80−95 per cent reduction in greenhouse gas emissions by 2050. The strategy mentions that the most effective measures aiming to reduce greenhouse gas emissions from agriculture in Finland are related with organic soils. In the sector-specific plan for agriculture, there is a particular emphasis on measures to reduce emissions from organic soils, as well as on measures aiming to replace fossil fuels used in agriculture by biogas. In the case of forests, the strategy does not mention organic soils.

❖ The **Medium-term Climate Change Policy Plan**[29] is based on the Climate Change Act that came into force in 2015. The plan is drawn up during each electoral term, and it includes an action programme to reduce emissions in the effort-sharing sector. The plan covers the agricultural emissions included in the effort sharing sector and thus the role of peat soils is minor in the planned policies. The plan will be updated in 2022 to meet the EU obligations for 2030 and the Government's target to achieve carbon neutrality by 2035.

❖ **Finland's National Climate Change Adaptation Plan 2022** was published in 2014 replacing the National Adaptation Strategy from 2005. Many sectors have climate change adaptation plans and actions, the water sector being the most advanced[30]. Peat soils do not have a role in that.

❖ **Finnish Bioeconomy Strategy**[31] aims to develop value added while maintaining ecological sustainability, social justice and the resilience of renewable resources and strengthen the broad-based knowledge of the bioeconomy. It does not have peatland-related specific targets but it mentions the goals to elucidate the effects of carbon compensations on the sustainable production of biomass and to develop monitoring of the origin and sustainability of biomass.

❖ **Government resolution on the sustainable and responsible use and conservation of mires and peatlands**[32] (in Finnish) gave general guidelines for peatland use.

❖ **Climate programme for Finnish agriculture**[33] supports the objective of the Finnish Government to achieve a carbon neutral Finland by 2035. It focuses on what happens from the field onwards, with the main emphasis on reducing emissions from the consumption of food. The programme mentions measures concerning the land use sector but is mainly a descriptive document giving information on the GHG emissions and their mitigation.

❖ **Finland's National Forest Strategy**[34], adopted by the Government in February 2015 and updated in 2019, specifies the main objectives for forest-based business and activities until 2025.

❖ **Law on afforestation of marginal land**[35] aims to increase afforestation and carbon sinks by supporting afforestation and to reduce greenhouse gas emissions from afforested sites without compromising biodiversity. Afforestation on both mineral and peat soils can be supported by this incentive.

❖ **Climate plan for the land use sector**[36] is in preparation and will be finalized in 2022. It will define the measures to strengthen the net sink of the land use sector by 3 Mt CO_2 equivalent and measures targeted to peat soils are well represented in the draft.

❖ **Finland's Climate Act**[37] proposal was approved by the Government on 3 March, 2022. The Act has been reformed to make sure that Finland's carbon neutrality target for 2035 and other international and EU

[29] Link: https://ym.fi/en/medium-term-climate-change-policy-plan
[30] European Commission. Commission Staff Working Document – Adaptation preparedness scoreboard Country fiches. SWD(2018) 460 final.
[31] Link: https://julkaisut.valtioneuvosto.fi/handle/10024/163967
[32] Link: https://mmm.fi/en/nature-and-climate/mires-and-peatlands
[33] Link: https://mmm.fi/documents/1410837/1867349/Climate_programme_agriculture_WEB_03072015.pdf/1a6f135c-068c-48aa-ad00-787562628314/Climate_programme_agriculture_WEB_03072015.pdf?t=1447151697000
[34] Link: https://mmm.fi/en/nfs
[35] Link: https://finlex.fi/fi/laki/ajantasa/2020/20201114?search%5Btype%5D=pika&search%5Bpika%5D=metsitys
[36] Link: https://mmm.fi/en/climate-plan-for-the-land-use-sector
[37] Link: https://valtioneuvosto.fi/en/-//1410903/new-climate-change-act-to-be-submitted-to-parliament-carbon-neutrality-target-2035-included-in-the-act-emission-reduction-targets-for-coming-decades-as-well

climate objectives will be reached. In addition to the carbon neutrality target, the Act sets emission reduction targets for 2030, 2040 and 2050. The Act lays down provisions on climate policy plans, and the reform will extend the scope of the Act to the land use sector. A climate plan for LULUCF will be prepared by every other government A target to strengthen carbon sinks will also be included in the Act (not numeric).

3.5. Germany:

❖ **German Climate Law[38]:** With the amendment of the Climate Protection Act (Bundes-Klimaschutzgesetz), the German parliament has tightened the climate protection targets and anchored the goal of greenhouse gas neutrality by 2045. Emissions are to be reduced by 65 percent by 2030 compared to 1990. For the first time, the law also includes specific targets for the LULUCF sector which also incorporate peatland emissions. The amendment came into force on 31 August 2021.

❖ **Climate protection plan 2050** (Klimaschutzplan 2050): In November 2016 the German government adopted the Climate Protection Plan 2050. Germany's long-term goal is to become largely carbon-neutral by the year 2050. In doing so, the German government is aligning itself with the goal of the Paris Agreement that greenhouse gas neutrality should be achieved worldwide in the second half of this century. Furthermore, with this goal, Germany is living up to its special responsibility as the leading industrial nation and economically strongest member state of the EU.

❖ **Climate strategies and climate laws, peatland plans and strategies of peatland rich federal states**. Several German states have adopted state climate laws or strategies.

❖ **Federal states Fachstrategie Paludikultur MV:** In Mecklenburg-Western Pomerania (MV), a multidisciplinary working group developed a strategy especially for implementing paludiculture in 2016/17 (LM M-V 2017). In the process, conceptual guidelines for the management of future land use options on peatland sites were developed. On the basis of existing legal and planning regulations, scenarios for paludiculture. The strategy has been adopted by the state parliament.

❖ **National Peatland Strategy by BMUV.** In addition to the protection of intact peatlands, the restoration and sustainable management of previously drained peatland soils are therefore a central theme of the National Peatland Protection Strategy

❖ **Target Agreement between the federal and the states governments** (Bund-Länder-Zielvereinbarung): With the target agreement between the Federal Government and the States on climate protection through peatland soil conservation, the responsible federal and state ministries have agreed on a common framework for ambitious peatland soil conservation. By 2030, annual GHG emissions from peatland soils are to be reduced by 5 million tonnes of CO2 equivalents. Until recently, about 53 million tonnes of CO2 emissions originated from drained peat soils, which corresponds to 6.7 per cent of total German greenhouse gas emissions.

❖ **Action programme nature climate solutions** (ANK, Aktionsprogramm Natürlicher Klimaschutz): As stated in the coalition agreement, the action programme "Nature Climate Solutions" is intended to make a substantial contribution to achieving the German Government's goals of climate protection, the protection of biodiversity and the prevention of the consequences of the climate crisis. Nature climate solutions encompasses measures for the direct protection, strengthening and restoring natural ecosystems. A strong focus is put on peatland measures, the programme is financed with 4 billion € in period 2022-26 out of the federal climate and energy fund. **National Biodiversity Strategy** (outdated from 2007, "Bundesprogramm Biologische Vielfalt"). The National Biodiversity Strategy is an instrument for implementing the goals at

[38] Link: https://www.bundesregierung.de/breg-de/themen/klimaschutz/klimaschutzgesetz-2021-1913672

federal level and is funded by the BMU via the Federal Agency for Nature Conservation (BfN). One is the "Bundesprogramm Biologische Vielfalt", which promotes projects of national importance, in particular biodiversity hotspots and the conservation of habitats for species for which Germany bears a special responsibility. The hotspots identified in a study by the BfN include, in some cases peatlands. The project "Schatz an der Küste" (treasure on the coast), for example enables the maintenance of peatlands and the adaptation and testing of paludiculture harvesting techniques in region of the Baltic coastline with its lagoons and heath landscape (Hotspot 29).

❖ **Peat replacement strategy.** Peat is currently the most important substrate raw material in horticulture. Against the background of climate and protection of peatlands, this use should be avoided and peat should be replaced by sustainable raw materials. In order to determine the current state, identify fields of action, support transformation processes and develop recommendations for further development, the interdisciplinary forum "Sustainable peat substitutes from renewable raw materials for horticulture" at the Lower Saxony Ministry of Agriculture was founded in 2015.

❖ **Pilot and demonstration sites for paludiculture** funded for 10 years by BMUV and BMEL in different programmes. The Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) is funding four pilot projects on peatland soil protection in the important large peatland regions of Germany. The aim is to identify solutions for reducing greenhouse gas emissions from managed peatland soils and to gain knowledge for climate protection. The BMUV is funding the testing of new forms of management on agriculturally used rewetted peat soils with a total of 48 million euros over a period of ten years (2021 to 2031).

❖ **CAP 2014-2020 funding period**: Moorschonende Stauhaltung in Brandenburg. Since 2016, this agri-environmental and climate measure of the federal state of Brandenburg has been supporting farms that commit themselves to year-round high waterlogging (10-30 cm max. below ground level, proven by a fixed marking of the waterlogging height on the structure (e.g., bolt, pin, rail)) in pastures on peat soils. The contracts have a duration of 5 years. The aim is to reduce GHG emissions from peatlands and to preserve peat substance or reduce the loss of peat. Land relevance: Between 2016 and 2019, 830 ha were included in a subsidy in Brandenburg (statement by service providers in May 2019).

❖ **CAP Strategic plan 2023-2027**[39] foresees the following measures for peatland management:

1st pillar – Conditionality – Law on the Implementation of Conditionality Applicable under the Common Agricultural Policy[40] Standards for good agricultural and environmental condition (GAEC) - These comprise ten new minium GAEC standards from which the first three focus on the preservation and increase of Carbon storage in agricultural soils. For organic soils and peatlands there are:

- GAEC 1 "Preservation of permanent Grassland",
- GAEC 2 "Minimum protection of wetlands and peatlands" – applicable in the previous elaboration and adaptation in the peatland-rich federal states. The Federal states are obliged (§11) to designate the area according to the best available data basis. Within the designated area it applies that no changes are allowed on agricultural organic soils and peatland by: 1) an intervention in the soil profile with heavy construction machinery; 2) a ploughing deeper than 30 cm or; 3) an up- and over-sanding.

[39] BMEL, 2022: CAP-Strategic Plan for the Federal Republic of Germany, Bundes ministerium für Ernährung und Landwirtschaft, 1799 p. URL: https://www.bmel.de/SharedDocs/Downloads/DE/_Landwirtschaft/EU-Agrarpolitik-Foerderung/gap-strategieplan.pdf?__blob=publicationFile&v=2

[40] Bundesrat, 2021: Regulation on the implementation of the conditionality Agricultural Policy Conditionality (CAP Conditionalities Regulation - CAPCondR) [Verordnung zur Durchführung der im Rahmen der Gemeinsamen Agrarpolitik geltenden Konditionalität (GAP-Konditionalitäten - Verordnung – GAPKondV), in German], 49 p. URL: https://www.bundesrat.de/SharedDocs/drucksachen/2021/0801-0900/817-21.pdf;jsessionid=BCD35C2E0AF3221F418FBD4926897955.1_cid391?__blob=publicationFile&v=1

- GEAC 3 "Ban on burning stubble fields".

§12 "Cultivation of paludiculture" regulates that the site adapted wet use inside the designated area is eligible for direct payments. Even though currently possible paludiculture crops are not further specified.

The CAP strategic plan does not include a 1st pillar - ECO-Schemes specifically for peatland management

2nd pillar - The EU Commission's legislative proposals[41] offer the Member States, or the federal states in Germany, the possibility to use the 2nd pillar also in the CAP funding period after 2022 for the promotion of peatland protection on agricultural land. This includes Interventions under Art. 13 Consultation, Art. 65 Environmental, climate and other management obligations, Art. 68 Investments, Art. 71 Cooperation, Art. 72 Knowledge exchange and information.

The design so far lacks the urgent needed reference to water management on agriculturally drained organic soils and peatland. Thus, the largest single point source of GHG in the land use sector in Germany continues to be insufficiently taken into account.
Therefore, the Federal Ministry of Food and Agriculture (BMEL) worked out an overarching strategic CAP-Strategic Plan for the Federal Republic of Germany with possible interventions for the new funding period in cooperation with the federal states. In this context, new attention is being paid to the greenhouse gas emissions from drainage-based use of organic soils and peatlands. In a status analysis as well as in a needs analysis, climate-smart peatland use with the consequence of adapting water management was identified as a significant factor for climate change mitigation in agriculture. Accordingly, programming at the level of the Federal states for the funding period from 2023 onwards must take this into account[42]. Unfortunately, negotiations to date between the Federal Ministries of Agriculture (BMEL) and Environmental Protection (BMUV) have only produced inadequate results. There is an urgent need for further action here.

3.6. Current relevance of organic soils in project partner countries` policy documents

There are various levels of ambition in each partner countries national policy documents looking at organic soils. But there is a consensus about the negative effect they have on climate change, therefore the need to find the most sustainable solutions to lessen the harm done environmentally, at the same time keeping the economical and social components in mind.

There are national planning documents that most countries have in common, such as:

- The National Energy and Climate Plan,
- The Plan for Climate Change Adaptation by 2030,
- Strategies for Climate Neutrality by 2050,
- Forest guidelines, development plan, Afforestation LawRural Development Programme 2015-2020 (2022),
- Bioeconomy Strategy,
- CAP Strategic plans 2023 – 2027,

[41] Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013

[42] HIRSCHELMANN, S., RASCHKE, I., STÜBER, M., WICHMANN, S. & PETERS, S. 2020a: Instrumente für klimaverträgliche Moorbodennutzung: Moorschutz in der Gemeinsamen Agrarpolitik. [Instruments for climate-friendly peatland use: Peatland protection in the Common Agricultural Policy. In German]. Berichte über Landwirtschaft Band 98/3, The Federal Ministry for food and agriculture (BMEL), 33 p. DOI: https://doi.org/10.12767/buel.v98i3.320

- Strategies for green transformation, sustainable development,
- Strategies and guidelines for Peat use, replacement.

National policy planning documents set objetives and also provide several actions to reach these objectives.

The main objectives are:

- Reduction of GHG emissions to become climate neutral by 2050,
- Carbon neutrality target for 2035,
- Restore Europe's forests, soils, wetlands and peatlands to make our environment more resilient to climate change,
- Protection of organic soils and improved management to promote carbon storage and sequestration in agriculture and forestry,
- To reduce the risk of soil degradation and carbon stock reduction,
- Development of a long-term policy for the use of land,
- To develop value added while maintaining ecological sustainability,
- Sustainable development, responsible use of resources and minimize impact for the environment,
- To develop farmers' skills and motivate to adapt to climate change,
- To set development guidelines for all forestry related sectors.

The main actions and measures for organic soils included in national policy planning documents are:

- Explore and implement solutions to reduce emissions from organic soils,
- Research of organic soils to obtain data on the distribution and characteristics of organic soils,
- Establishing a map of the distribution of peatlands on agricultural land,
- Restoration of wetlands in arable peatlands, ban on exploitation of natural wetlands,
- Cultivation of grasslands in organic soils,
- Protection of organic soils with restored/maintained natural water level,
- Investments for controlled drainage,
- Implementation of sustainable soil management practices to protect soil fertility, reduce soil erosion and eliminate anthropogenic emissions from organic soils,
- Action programs to reduce emissions in the effort-sharing sector,
- A climate plan for LULUCF,
- Agriculture and forestry activities based on bioeconomy principles, sustainable use of soil and measures for soil regeneration,
- Afforestation of organic soils, non-productive soils, thus reducing GHG emissions and increasing CO2 sequestration,
- Develop science-based guidelines for sustainable forest management to enhance climate resilience,
- Green economy with green technologies is promoted.

Organic soil related measures planned in the new CAP 2023-2027 (in all or some of the project countries):

- Protection of peatlands and wetlands on the agricultural area (GAEC 2),
- Compensation for land conversion to grassland or permanent crops on organic soils,
- Rewetting and prohibition to make new drainage systems,
- Extensive management of wetlands,
- Cultivation of paludiculture,
- Investments for the creation of new wetlands on arable land,
- Promote use of technologies to reduce GHG from soil.

However, there are countries paying more attention to some parts of organic soil management than others. It should also be taken into account how thorough each countries description of organic soil involvement in policy documents is. Some of the countries have simply indicated documents containing actions related to organic soils for CCM, (without further elaboration) some explained in more details. For example, Germany has an extensive amount of documents and actions on peatland management, including conceptual guidelines for implementing paludiculture and a peat replacement strategy. Lithuania has set concrete measures for wetland restoration on peatlands for agricultural use, as well as limiting some financial benefits to sites that install new drainage systems or exploit (extract) peat. Finland and Latvia have included measures for restoration of peatlands in their CAP Strategic Plans, as well as other peat management practices. Estonia has a rather scarce amount of policy documents involving the topic of organic soils, however, there are documents focusing on CO2 sequestration and preservation of forest carbon stock, which could be applied to organic soils.

There are a few common concepts that all countries agree on in their national policy documents, - carbon stocks (directly related to management of organic soils) need to be preserved and increased - and organic soils are one of the largest source of GHG emissions.

4. EU LEVEL POLICY PLANNING DOCUMENTS

This chapter presents information regarding EU policy planning documents and strategies relevant to organic soils.

In recent yearsEuropean Commission has issued several strategies to reach the ambitious climate and environmental targets and to deal with the challenges the Union faces.

NAME OF THE DOCUMENT	MAIN TARGET OF THE DOCUMENT RELATED TO ORGANIC SOILS
The European Forest Strategy	Forests are an integral part in climate adaptation and mitigation, therefore taking care of forest soil is particularly important as there is a strong interaction between trees and the soil on which they grow on. Trees need to obtain all the necessary nutrients from soil, therefore soil properties and its ecosystem need to be protected. Adaptive forest restoration and ecosystem-based management approaches to strengthen the resilience of EU forests are needed to combat climate change and biodiversity loss. In the face of climate change, forests will also change, very few forests will not be strongly affected by climate change or will not need immediate management action to reduce their vulnerability, therefore robust approaches to risk reduction in the context of significant uncertainty about the future is needed. There is already a strong awareness of climate change and its possible impacts on forests amongst forest managers and owners across Europe and this awareness needs to be translated into sufficient and tangible adaptation actions and resilience-enhancing forest management practices.
The European Green Deal	The European Green Deal will improve the well-being and health of citizens and future generations by providing: fresh air, clean water, healthy soil and biodiversity; renovated, energy efficient buildings; healthy and affordable food; more public transport; cleaner energy and cutting-edge clean technological innovation; longer lasting products that can be repaired, recycled and re-used; future-proof jobs and skills training for the transition; globally competitive and resilient industry. The European Green Deal is a roadmap for Europe with one of main objectives to reach a climate neautrality by year 2050 and it is a package of policy initiatives that aim to generate action from the Member States to achieve this goal. It calls for restoring nature and enabling biodiversity to thrive again offers a quick and cheap solution to absorb and store carbon. The Commission proposes therefore to **restore Europe's forests, soils, wetlands and peatlands.** This will increase absorption of CO2 and will make our environment more resilient to climate change. To reach above mentioned, several EU legislative proposals and strategies are developed.
EU Biodiversity Strategy for 2030	It is one of the European Green Deal related strategies addressing that it is essential **to step up efforts to protect soil fertility, reduce soil erosion and increase soil organic matter**. This should be done by adopting sustainable soil management practices, including as part of the CAP. Significant progress is also needed on identifying contaminated soil sites, restoring degraded soils, defining the conditions for their good ecological status, introducing restoration objectives, and improving the monitoring of soil quality. Nature regulates the climate, and nature-based solutions, such as **protecting and restoring wetlands, peatlands and coastal ecosystems, or sustainably managing marine areas, forests, grasslands and agricultural soils, will be essential for**

	emission reduction and climate adaptation. Planting trees and deploying green infrastructure will help us to cool urban areas and mitigate the impact of natural disasters. As part of this focus on strict protection, it will be crucial to define, map, monitor and strictly protect all the EU's remaining primary and old-growth forests. It will also be important to advocate for the same globally and ensure that EU actions do not result in deforestation in other regions of the world. Primary and old-growth forests are the richest forest ecosystems that remove carbon from the atmosphere, while storing significant carbon stocks. **Significant areas of other carbon-rich ecosystems, such as peatlands, grasslands, wetlands, mangroves and seagrass meadows should also be strictly protected**, taking into account projected shifts in vegetation zones.
EU Soil Strategy for 2030	Targeted and continued **sustainable soil management practices can significantly help in achieving climate neutrality by eliminating the anthropogenic emissions from organic soils** and by increasing the carbon stocked in mineral soils. <u>Actions</u> For soils to help meet the climate neutrality objective and contribute to climate adaptation, the **Commission will**, in line with the Fit for 55 package, **propose actions for organic soils**: Based on the results of the impact assessment, consider **proposing legally binding objectives in the context of the Nature Restoration Law, to limit drainage of wetlands and organic soils and to restore managed and drained peatlands, in order to maintain and increase soil carbon stocks,** minimize flooding and drought risks, and enhance biodiversity, taking into account the implications of these objectives for future carbon farming initiatives and agricultural and forestry production systems. Furthermore, the **EU is committed to the protection of wetlands and peatlands in line with the provisions of the CAP strategic plan regulation**.
EU carbon farming initiative	The concept of carbon farming has been introduced by the updated Bioeconomy Strategy in 2018, with the objective of implementing specific projects that aim at increasing soil and biomass carbon sequestration amongst others. Later, at the end of 2021, EC came out with the Communication on Sustainable Carbon Cycles where the carbon farming business model was introduced. It encourages the agriculture and forestry sectors to deliver more on climate action and calls for the necessary incentives at land manager level. Sustainable land management will be critical in achieving the EU's 2050 climate neutrality goal, as it should increase the amount of carbon captured and stored in soil and plants. The most effective examples of carbon farming practices: • Afforestation and reforestation in respect of ecological principles favorable to biodiversity and enhanced sustainable forest management including biodiversity-friendly practices and adaptation of forests to climate change: the planting of new trees, the restoration of degraded forests remove CO2 from the atmosphere over many decades and possibly centuries, at the same time providing ecosystem services and enhancement of biodiversity. • Agroforestry and other forms of mixed farming has an important role in carbon sequestration, combining significant mitigation effects with co-benefits for ecosystems and biodiversity, • Use of catch crops, cover crops and conservation tillage: protecting soils, and enhancing soil organic carbon on degraded arable land;

	• Targeted **conversion for example of cropland to fallow or set-aside areas to permanent grassland**; • **Restoration of peatlands and wetlands**: raising the water table of drained peatlands or wetlands not only restores the hydrological balance of soils but also reduces oxidation of the existing carbon stock and increases the potential for carbon sequestration[43]. The Commission expects all land manager to have access to verified emission and removal data by 2028 in order to sucessfuly carry out carbon farming initiative. Expected EU regulated market for climate action in land sector by 2030[44]. These following key actions will be undertaken by the Commission to upscale carbon farming up to 2030: • An expert group will be created involving Member States and various stakeholders to establish best practises of carbon farming and on monitoring, verification and reporting. • Carry out a study to assess the potential to apply the polluter-pays principle to emissions from agricultural activities, Provide a digital carbon navigator template and guidelines on common pathways for the quantitative calculation of GHG emissions and removals for agricultural land managers.

This section of report reviewed EU level policy planning documents that have been published up to the end of 2021, however it must be noted that more legislative proposals and publications are in development stage and should be considered further during this project, specifically for policy makers.

The Nature Restoration Law proposal was published on June of 2022 and with that legally binding restoration plans on forests, wetlands and other sea- and landscapes were proposed. If passed, this proposal will require Member States to develop national plans to restore at least 20% of EU land and sea by 2030, and repair all ecosystems in need of restoration by 2050. Proposed restoration targets include rewetting and restoring drained peatlands under agricultural use and in peat extraction sites and overall increase of biodiversity and stock of organic carbon in forest ecosystems.

In order to achieve one of EU's goal for climate change mitigation, which is cutting GHG emissions by at least 55% below 1990 levels by 2030 and achieve climate neutrality by 2050, the Fit For 55 package was proposed in 2021. One of its components is the **revision of the land use, land use change and forestry (LULUCF) regulation**. Some of the main changes that are expected to be implemented are to increase LULUCF carbon removals to 310 million tonnes of CO2 equivalent (CO2e) by 2030. For the post-2025 period, the Commission would set individual targets for each Member State.

EU Soil Strategy for 2030 introduced the proposal of **Soil Health Law**, a legally binding framework for harmonized soil target setting, monitoring and reporting, which would specify the conditions for a healthy soil, determine options for monitoring soil and lay out rules conducive to sustainable soil use and restoration. It is expected to be announced in 2023 and would protect soils on the same legal basis as air and water.

[43] There is a balance between CO2 removals and CH4 emissions which is closely linked to the water table that needs to be regulated
[44] Communication from the Commission to the European Parliament and the Council on Sustainable Carbon Cycles, link: https://ec.europa.eu/clima/system/files/2021-12/com_2021_800_en_0.pdf

5. Conclusions and summary for policy makers

1. To set up effective CCM measures it requires a sound evidence base, relevant data set, it takes time and may require adequate advice and possibly financial support. Therefore, to choose the most effective and appropriate measures policy makers must work in close collaboration with scientists to be informed about the latest findings, measurements and scientific evidence.
2. There are possible conflicts and contradictions among different policy objectives, therefore broader approach and vision is needed. One-side approach can create imbalance between climate impact, environmental and biodiversity needs, administrative possibilities and economic feasibility.
3. Integrated approach is a key for EU and national policies where policy goals complement each other. Such integrated approach should aim at achieving synergies by combining different environmental and climate targets also taking into account the regional and pedo-climatic specificities.
4. Regular meetings among representatives of responsible ministries from all project countries are very important in order to be informed about the project potential and its outcomes. To share/exchange information and findings on climate change mitigation potential, measures and support in order to move towards climate neutrality in an economically viable way. To enable them to incorporate CCM measures in relevant policy documents.
5. In the process of policy planning it is important to actively involve key stakeholders, land and forest managers to facilitate better understanding and implementation of climate friendly management methods for organic soils. Different simulation tools for implementation of CCM measure are helpful to assess possible impact of new management practices.
6. The public funding under the CAP and other EU programs such as LIFE can reduce doubts and risks for land and forest managers in the implementation of CCM measures, as well as to cover additional costs related to monitoring and reporting, or to finance pilot and research projects that improve the effectiveness of CCM measures and its benefits to climate change mitigation and meet targets under the LULUCF Regulation.