The impacts of using peatlands for agriculture and possible uses in the future

Jyrki Jauhiainen, LUKE

JustFood Living Lab – Vision workshop

Time: Thursday 9.11. 2023, 9.30 – 15:30

Location: Laitalan lomat, Laitalantie 85, Karhunpää

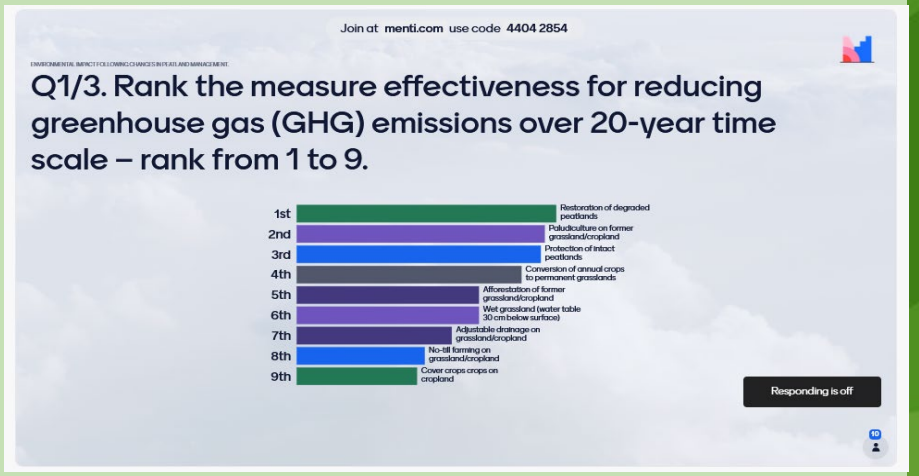
Introduction

- The drained peatlands used for agriculture and forestry affect greenhouse gas emissions to the atmosphere, runoff into the waterways, and biodiversity.

- The JustFood and LifeOrgBalt projects organised a focus group discussion with researchers/scientists to explore their expert opinions on the environmental impacts of peatlands used in agriculture and possible uses in the future concerning
  - greenhouse gas emissions
  - water quality
  - biodiversity

The environmental impacts of using peatlands for agriculture and possible measures

- The researchers/scientists were asked to evaluate the listed 9 measures based on their impacts after 20 years.
- Measures:
  - Protection of intact peatlands
  - Restoration of degraded peatlands
  - Paludiculture on former grassland/cropland
  - Afforestation of former grassland/cropland
  - Conversion of annual crops to permanent grasslands
  - No-till farming on grassland/cropland
  - Cover crops on cropland
  - Wet grassland (water table 30 cm below surface)
  - Adjustable drainage on grassland/cropland



Results: Which measures reduce greenhouse gas emissions the most/least in 20 years?

(most effective at the top, least effective at the bottom)

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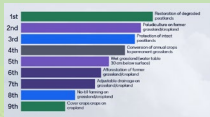
Order of measures:

1. Restoration of degraded peatlands
2. Paludiculture on former grassland/cropland
3. Protection of intact peatlands
4. Conversion of annual crops to permanent grasslands
5. Wet grassland (water table 30 cm below surface)
6. Afforestation of former grassland/cropland
7. Adjustable drainage on grassland/cropland
8. No-till farming on grassland/cropland
9. Cover crops on cropland

Reasons:

- Preservation in the storage of peat carbon and the capacity of vegetation to sequester carbon are important:
  - Fewer/avoided soil disturbance activities and rewetted peat soil will result in less emissions
  - Permanent vegetation cover is beneficial for carbon input into the soil
- Fertilization impact on N2O emissions
- Some other considerations in determining the order of measures:
  - Costs and realistic implementation possibilities of each measure
  - Available land area where the measure can be applied



Results: Which measures are the best/weakest in terms of water quality in 20 years?

(Best at the top, weakest at the bottom)

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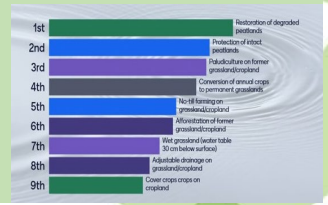
Order of measures:

1. Restoration of degraded peatlands
2. Protection of intact peatlands
3. Paludiculture on former grassland/cropland
4. Conversion of annual crops to permanent grasslands
5. No-till farming on grassland/cropland
6. Afforestation of former grassland/cropland
7. Wet grassland (water table 30 cm below surface)
8. Adjustable drainage on grassland/cropland
9. Cover crops on cropland

Reasons:

- Limited changes in the water level in the soil profile will have less negative impact on water quality
  - -> In general, wet soil conditions are good because water table is close to surface /at surface
- Fewer/no soil disturbance activities will have less negative impact on water quality
  - -> Long-lasting vegetation cover is beneficial
- Fertilization
  - -> impact on nutrient leaching?



Results: Which measures are the best for biodiversity in 20 years? (Best at the top, weakest at the bottom)

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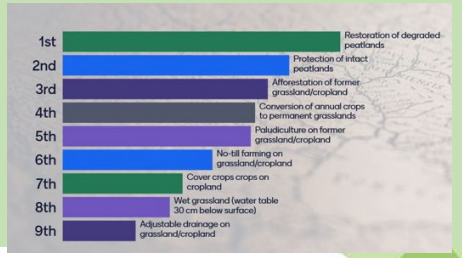
Order of measures:

1. Restoration of degraded peatlands
2. Protection of intact peatlands
3. Afforestation of former grassland/cropland
4. Conversion of annual crops to permanent grasslands
5. Paludiculture on former grassland/cropland
6. No-till farming on grassland/cropland
7. Cover crops on cropland
8. Wet grassland (water table 30 cm below surface)
9. Adjustable drainage on grassland/cropland

Reasons:

- Long-lasting vegetation cover and its potential for biomass accumulation are beneficial
  - -> less management activities
  - -> long rotation in planting or no disturbances
- Measures solely related to water level adjustments and cultivation of annual crops are the weakest in ranking



Concluding remarks

- The most effective/best measures for the three questions were: restoration of degraded peatlands, protection of intact peatlands, and paludiculture on former grassland/cropland.
    - These measures have in common:
        - Fewer/avoided soil disturbances
        - Wet soil conditions and limited changes in water level
        - Permanent vegetation cover
- On the other hand, the reasoning for cover crops and adjustable drainage was more diverse and scattered because less information is available on the effectiveness of these measures.

OrgBalt
LIFE project

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LIFE OrgBalt

Public Private Cooperation model: an economic analysis of climate change mitigation costs and benefits

LIFE OrgBalt, LIFE18 CCM/LV/001158

EU LIFE Programme project
"Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland"

A tool for assessing climate change mitigation measures

- A support tool from the LIFE OrgBalt project for the **assessment of the costs and impacts** of climate change mitigation (CCM) measures.

For each of the CCM measures:

- Assess the **economic return** (based on GHG emission reductions)
- Assess the **financial return** of investments due to the CCM measures
- Determine **the optimal amount of public funding** for the CCM measures that give a positive economic return for land owners/managers because of the costs incurred due to the implementation of the measures
- Based on the results from the model simulations, this tool will assist in the decision making of stakeholders in conjunction with the **measures from the EU Common Agricultural Policy (CAP)**

TARGET AUDIENCE

- Land owners / managers
- Farmers' and foresters' associations
- Rural support services, rural consultants
- Ministries of Agriculture/Environment and Regional Development

Public Private Cooperation (PPC) model

Methodology

- The model calculates the benefits of land use scenarios for the following five different periods: 5 years, 10 years, 25 years, 50 years, 100 years, according to a defined set of indicators
- The model is developed in English and Latvian

User Friendly Format

The PPC model is developed using MS Excel (with a user-friendly interface)

Examples of indicators produced by the model

- Average investment costs (EUR): the total amount of money spent for the investment.
- Financial Internal Rate of Return (%): the financial profitability of project investments.
- Reduction of GHG emissions (tonnes / year): the total reduction of GHG emissions in tons obtained as a result of the implementation of the CCM measure.
- Financing gap rate (%): the need for public funding.

OrgBalt LIFE project

EU LIFE Programme project "Demonstration of climate change mitigation potential of nutrients rich organic soils in Baltic States and Finland"

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Feedback on the PPC model provided by farmers and local community members in Nurmes

1. In the model, it would be good to have an evaluation of the long-term suitability of the different measures in using peatlands for agriculture. This refers to the sustainability of using peatlands in agriculture for future generation of farmers.
2. It's important to have the ability to compare the effects of different land uses and measures side by side. For example, what are the trade-offs between greenhouse gas emissions and water quality or biodiversity.
3. The background data should be based on researched knowledge that is applicable to local conditions.
4. The model should be available in the Finnish language.

Artificial intelligence (DeepAI) artwork on Finnish agricultural peatland