Elaboration of country specific emission factors from organic soils in Latvia according to LIFE REstore project results

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The GHG inventory improvement targets of the LIFE REstore project

- Elaboration of $\text{CO}_2$, $\text{CH}_4$ and $\text{N}_2\text{O}$ for peat extraction sites in raised and transitional bogs for different land use practices.
- Elaboration of activity data for calculation of GHG emissions from managed wetlands.
- Evaluation of potential impact of management approach and land use changes on GHG emissions in former peat extraction sites.

- The applied methodology is fully compliant with the methodologies used in similar studies in Estonia.
GHG emission from managed wetlands in the National GHG inventory of Latvia

GHG emissions due to use of peat in horticulture  GHG emissions from soil
Land use types in details, each represented by 3-4 plots

- Peat extraction site.
- Partially extracted peatland, poorly developed vegetation.
- Partially extracted peatland, covered by bushes and herbaceous plants.
- Perennial grassland (pasture).
- Cropland (cereals and sown grasses).
- Cropland (legumes).
- Plantations of blackberries.
- Plantations of cranberries.
- At least 20 years old pine or spruce stands.
- At least 20 years old birch stands.
- Natural raised bog.
- Natural transitional bog.
Location of sampling sites
Contribution of LIFE REstore to improvement of activity data – managed of organic soils

- Peat extraction field
- Rewetted peatland
- Flooded area
- Settlements
- Forest land
- Cropland and grassland
Example of land uses in extracted peatland
Management of peatlands and GHG emissions

CH₄  \quad CO₂

DOC

CH₄  \quad CO₂

DOC
Field sampling equipment
Data verification and quality control procedures

\[ f(x) = 1056.99 \, x + 522.21 \]
\[ R^2 = 0.81 \]

\[ f(x) = 766.33 \, x + 515.04 \]
\[ R^2 = 0.99 \]
Collection of litter samples in forest lands
CO$_2$ soil fluxes

Soil erosion

CO2-C, tonnas ha-1 gada

Kūdras ieguve
Kūdras ieguve pātraukta, bez vegetācijas
Kūdras ieguve pātraukta, ar vegetācijas
Arsmēze – labība
Arsmēze – dārzi
Mežs – priede
Mežs – bērzs
Augstais purvs
Pārejas purvs
Krūmmelnes
Dzērvenes
Seasonal dynamics of CO$_2$-C emissions
Groundwater level in different land use and vegetation type categories

Average ± min , max
Groundwater level dynamics in the intact raised and transitional bogs
CO₂ net ecosystem exchange
LIFE Restore and IPCC CH$_4$ emission factors

![Graph showing kg CH$_4$-C ha$^{-1}$ yr$^{-1}$ for different land uses.](image-url)
N$_2$O emissions in LULUCF sector

The diagram shows the N$_2$O emissions in tons CO$_2$ eq. ha$^{-1}$ yr$^{-1}$ for different land use categories.

- **Forest land** has the highest emissions, around 1.3 tons CO$_2$ eq. ha$^{-1}$ yr$^{-1}$.
- **Abandoned peat field without vegetation** has negligible emissions, close to zero.
- **Overgrown peat extraction field** shows emissions slightly above zero.
- **Rewetted peatland** also has minimal emissions.
- **Peat extraction field** shows a slight increase in emissions compared to forest land.

The data is compared to IPCC 2014 and LIFE REstore models.
The most efficient end use of extracted peatlands (removals in living biomass not included)
Impact of implementation of LIFE REstore results on GHG emissions in wetlands

GHG emissions, kt CO2 eq.

- GHG emissions now
- GHG emissions after implementation on LIFE REstore results

Impact of LIFE REstore results on GHG emissions in LULUCF sector in Latvia

IPCC 2014 | LIFE REstore

GHG emissions, tonnes CO2 eq.

-20 000
-15 000
-10 000
-5 000
0
5 000
10 000
15 000
20 000

Conclusions

- Actual GHG emissions from the most of the land use categories are about twice less than the emission estimates according to IPCC 2014.
- The most efficient management strategies is afforestation, blueberry and cranberry production (where possible).
- GHG emission reduction due to rewetting may be considerably overestimated, however further studies are necessary to evaluate impact of groundwater level and site fertility.
- Next step is elaboration of GHG emission factors for nutrient-rich organic soils (LIFE OrgBalt project)
More information:

- Cranberry plantation on former peat extraction sites
- Blueberry plantation on former peat extraction sites
- ≥20 years old forest stand
- Cropland on former peat extraction site
- Perennial grassland on former peat extraction sites
- Area covered with herbs and dwarf shrubs
- Area not covered with vegetation

GHG emission reduction, tons CO2 eq. ha⁻¹ yr⁻¹

GHG mitigation potential in 30 year period