Drained peat soils in Poland – Multiple benefits from rewetting

Policy brief of the PRINCESS project, April 2025

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Estimated vs. reported greenhouse gas emissions from drained peatlands

In Poland, peatlands are found in all regions of the country and ca. 85% of them are drained for agriculture or forestry (Fig. 1).

The reported GHG emissions from drained peatland soil amounted to 4.8 Mt CO_{2e} in 2022 in the LULUCF sector and 3.1 Mt in the effort sharing sector as N_2O (UNFCCC 2024). However, LULUCF data seem largely understated. Expert estimations using recent IPCC emission factors suggest much larger figure of 34.7 Mt CO_{2e}(Kotowski 2021). This is almost equal to the officially reported sink of LULUCF sector -35.6 Mt CO_{2e}.

In reality, peatlands contribute to nearly half of emissions from agricultural sector in Poland.

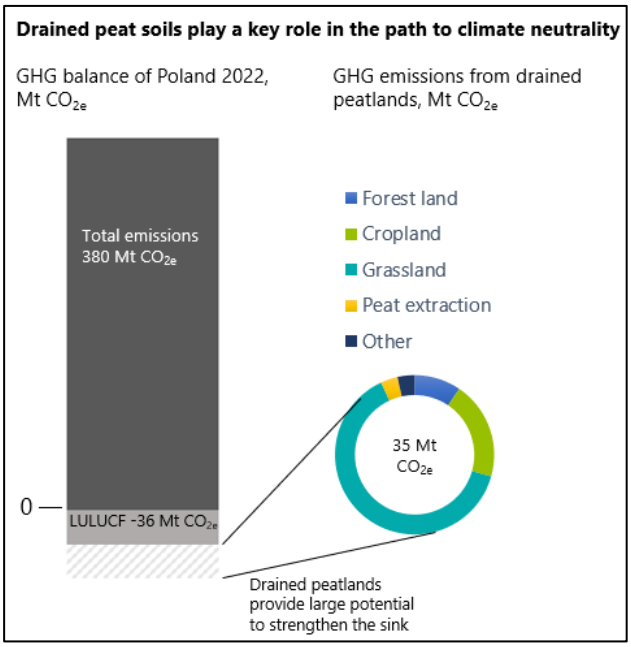

Figure 2. Reported total GHG emissions and estimated emissions of drained peatlands in the land use (LULUCF) sector of Poland in 2022. Source: UNFCCC for total emissions and Kotowski 2021 for peatland emissions.

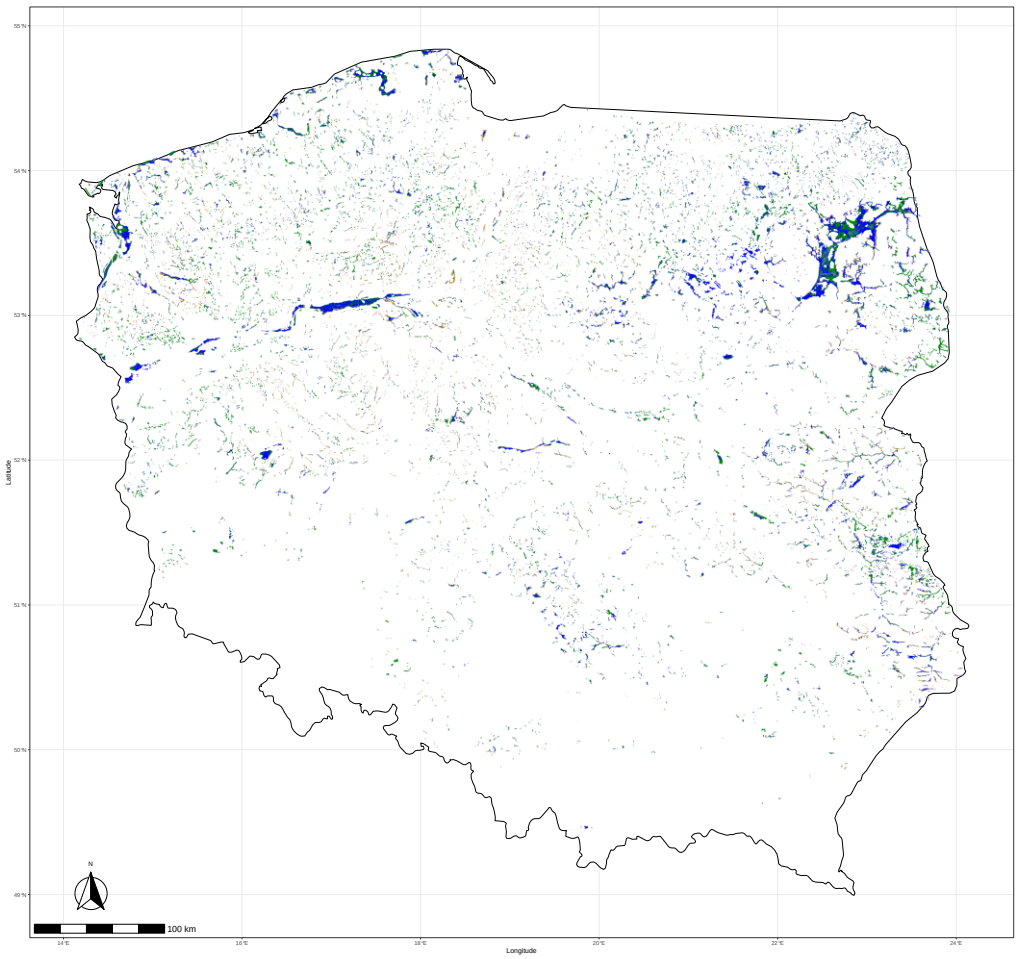

Figure 1. Distribution of peatlands in Poland (Based on data from the Global Peatland Database / Greifswald Mire Centre (2024)

The GHG estimates in the greenhouse gas inventory should be revised

The reported emissions from peatlands are largely underestimated in Poland. Based on the most recent soil data and emission factors (Kotowski 2021) the LULUCF sector would be a net source of emissions as the emissions from soils amount to 34.5 Mt instead of the reported 4.8 Mt CO_{2e}.

The largest discrepancy between the GHG inventory and recent estimate of emissions from drained peatlands results from unrealistically low emission factors. Emission factors based on recent science are several fold compared to those used for the reporting in Poland suggesting that there is need to update the the emission factors in the GHG inventory (Fig. 3).

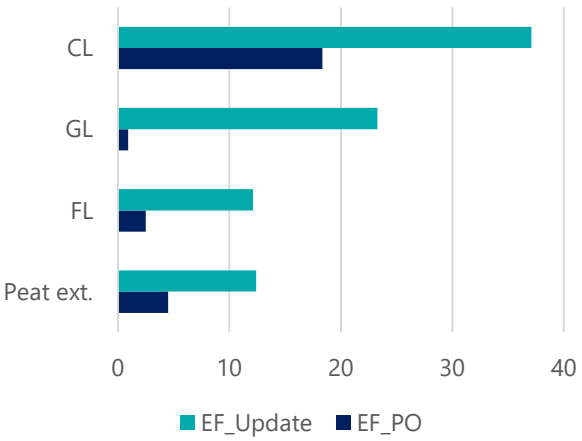

Figure 3. Comparison of emission factors (t CO_{2e}/ha/year) for drained peat soils in the GHG inventory of Poland (EF_PO) and estimates based on recent research (EF_Update; Kotowski 2021). CL=cropland, GL=grassland, FL=forest land, Peat ext.=peat extraction.

What is rewetting?

In rewetting, water flow out from a drained area is restricted. The ground water level rises and enables restoring the wetland functions of the ecosystem. Emissions of carbon dioxide (CO_2) and nitrous oxide (N_2O) decrease and the increase in methane (CH_4) emissions is usually moderate.

The effects of rewetting were calculated assuming an instant change from the current average emissions of each land use type to estimated emissions after rewetting (Kotowski 2021).

Rewetting can strengthen the carbon sink remarkably

If all drained peatlands were rewetted the emission mitigation would amount up to 21 Mt CO_{2e} (Fig. 4). It is thus of utmost importance to proceed with rewetting activities.

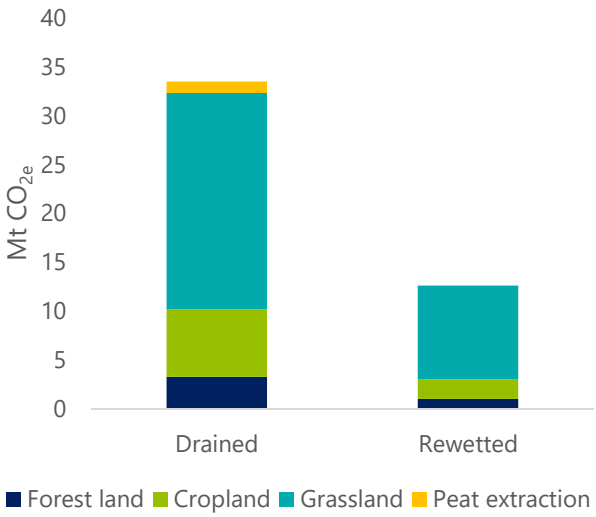

Figure 4. By rewetting all drained peatlands, their total emissions from soil would reduce to <13 Mt CO_{2e} (Kotowski 2021).

The additional benefits from rewetting drained peatlands would be:

- Flood, drought and fire prevention
- Less nutrient pollution in watercourses
- New business opportunities from paludiculture
- Feeding sites for migrating birds->less damages to fields
- Improved status of protected areas currently surrounded by drained areas
- Improved sustainability of food production and consumption.

References

Kotowski (2021). Oszacowanie emisji gazów cieplarnianych z użytkowaniagle b organicznych w Polsce oraz potencjału ich redukcji. Fundacja WWF Polska.

UNFCCC 2024. https://unfccc.int/ghg-inventories-annex-i-parties/2024

This policy brief was produced in the project Peatland Rewetting In Nitrogen-Contaminated Environments: Synergies and trade-offs between biodiversity, climate, water quality & Society (PRINCESS) funded by the Biodiversa partnership of the EU and National Science Centre of Poland.

Contact:
Wiktor Kotowski
University of Warsaw and Wetland Conservation Centre
w.kotowski@uw.edu.pl

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