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## Updated GHG emission factors for Irish peatlands: a review

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Peatlands are unique ecosystems and despite covering only 3% of our planet, they store twice as much carbon as global forest cover. Healthy, fully functioning peatlands are the most effective natural carbon store and therefore it is important to keep them wet. When disturbed, peatlands release greenhouse gases into the atmosphere and lose carbon via surface runoff. Since peatlands cover around 20% of the land area in the Republic of Ireland, their drainage status and condition are of particular significance to reduce national emissions from the Land Use, Land Use Change and Forestry (LULUCF) sector.

Ireland is obligated to report anthropogenic emissions from organic soils in annual National Inventory Reports (NIR) under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol requirements. Ireland's National GHG inventories comply with the methodology described in the Intergovernmental Panel on Climate Change (IPCC) Guidelines and the Wetlands Supplement 2013. The latest provided globally applicable 'default' emission factors (EFs) for calculating emissions and removals from drained and rewetted organic soils. However, the default EFs were based on field data often collected from geographical areas climatically and ecologically dissimilar to Ireland. Moreover, these EFs were limited by data availability and the level to which they could be disaggregated. In our work, we developed further stratification of peatlands land use categories based on peatlands characteristics and management in Ireland.

Here we review GHG emissions studies within Ireland and for the first time derived country-specific emission factors (EFs). We combined emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and fluvial losses (DOC, POC, DIC) into a new national database encompassing main land-use categories and types of organic soils in Ireland. We estimated total emissions from Irish peatlands at the national level (excluding horticulture and combustion) and identified the large uncertainties are associated with the estimated value. This new peatland emissions database will assist future NIR reporting and help calibrate widely used indirect land-use emission factor proxies that are currently based on data from continental European sites to more regionally appropriate estimates.