



Organic matter loss from cultivated peat soils in Sweden

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The degradation of drained peat soils in agricultural use is an underestimated source of loss of organic matter. Oxidation (biological degradation) of agricultural peat soils causes a loss of organic matter (OM) of 11 – 22 t ha⁻¹ y⁻¹ causing a CO₂ emission of 20 – 40 t ha⁻¹ y⁻¹. Together with the associated N₂O emissions from mineralized N this totals in the EU to about 98.5 Mton CO₂ eq per year.

Peat soils are very prone to climate change and it is expected that at the end of this century these values are doubled. The degradation products pollute surface waters. Wind erosion of peat soils in arable agriculture can cause losses of 3 – 30 t ha⁻¹ y⁻¹ peat also causing air pollution (fine organic particles). Subsidence rates are 1 – 2 cm per year which leads to deteriorating drainage effect and make peat soils below sea or inland water levels prone to flooding.

Flooding agricultural peat soils is in many cases not possible without high costs, high GHG emissions and severe water pollution. Moreover sometimes cultural and historic landscapes are lost and meadow birds areas are lost. In areas where the possibility to regulate the water table is limited the mitigation options are either to increase biomass production that can be used as bioenergy to substitute some fossil fuel, try to slow down the break-down of the peat by different amendments that inhibit microbial activity, or permanent flooding. The negative effects of wind erosion can be mitigated by reducing wind speed or different ways to protect the soil by crops or fiber sheets. In a newly started project in Sweden a typical peat soil with and without amendment of foundry sand is cropped with reed canary grass, tall fescue and timothy to investigate the yield and greenhouse gas emissions from the different crops and how the sand effect the trafficability and GHG emissions.