

Conservation of peat soils in agricultural use by infiltration of ditch water via submerged drains: results of a case study in the western peat soil area of The Netherlands

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About 8% of all soils in The Netherlands are peat soils which almost all drained with ditches and mainly in agricultural use as permanent pasture for dairy farming. The largest part of the peat meadow area is situated in the densely populated western provinces South- and North-Holland and Utrecht and is called the Green Heart and is valued as a historic open landscape. Conservation of these peat soils by raising water levels and converting the peat meadow areas mainly in very extensive grasslands or wet nature proved to be a very costly and slow process due to the strong opposition of farmers and many others who value the open cultural historic landscape and meadow birds.

The use of submerged drains seems to be a promising solution acceptable for dairy farmers and effective in diminishing peat oxidation and so the associated subsidence and CO₂ emissions. Oxidation of peat soils strongly depends on the depth of groundwater levels in dry periods. In dry periods the groundwater level can be 30 to 50 cm lower than the ditchwater level, which is 30 – 60 cm below soil surface. Infiltration of ditchwater via submerged drain can raise the groundwater level up to the ditchwater level and diminish the oxidation and associated subsidence and CO₂ emissions with at least 50%. Since 2003 several pilots with submerged drains are started to check this theoretical reduction and to answer questions raised about water usage and water quality and grass yields and trafficability etcetera. In our presentation we focus on the results of a pilot in South-Holland concerning the hydrological aspects, however, include results from the other pilots to consider the long term aspects such as the reduction of subsidence.

The use of submerged drains proves to be promising to reduce peat oxidation and so subsidence and CO₂ emissions with at least 50%. Grass yields are more or less equal in parcels with versus parcels without submerged drains. Trafficability in wet periods is better and trampling less by the draining effect of submerged drains. This reduces losses of grass yield by trampling and increases the length of the grazing season. The use of submerged drains causes a higher water usage, however, raising ditchwater levels to derive the same peat soil conservation would require a higher amount of inlet water. The impact on ditchwater quality is in most cases positive, however, sometimes slightly negative. For the dairy farmer submerged drains are economically in the short term not effective, however in the longer term increasingly positive. For the society as a whole the use of submerged drains is a very cost effective way to reduce CO₂ emissions and subsidence of peat soils in agricultural use.