

**EFFECT OF WATER MANAGEMENT ON GREENHOUSE GAS EMISSIONS
FROM CULTIVATED ORGANIC SOILS IN SWEDEN**

Berglund Ö., Berglund K.

The purpose of this project was to investigate if the farmer by controlling the drainage intensity can mitigate the emissions of greenhouse gases (GHG) from cultivated organic soils. The experimental work was carried out in lysimeter experiments. Sampling of lysimeters was carried out at two sites, Örke and Majnegården, located in central and southern Sweden.

Örke is a very well decomposed fen peat (von Post 9-10) with a pH of around 5.7, organic matter content of 85% and a bulk density of 0.25 g/cm³. Majnegården is a carbonate rich fen peat with a very high pH (7.4-7.7). The upper layers (0-20 cm) are well decomposed (von Post 7-8), have a high bulk density (0.60 g/cm³) and low organic matter content (30%). The lower layers (30-50 cm) are almost undecomposed (von Post 1-2) with low bulk density (0.21 g/cm³) and higher organic matter content (50 %). Both sites are dominated by pasture and hay production. Örke is a very typical cultivated fen peat but Majnegården, with its high pH, is a more uncommon type.

A drilling method with minimal soil disturbance was used to collect undisturbed soil monoliths. The casings consisted of PVC pipes (29.5 cm inner diameter and 59.8 cm in length) that were lidded above and below and transported to the lysimeter site at the University where the study was carried out. The following treatments were used (four replicates of each peat type):

- A. Static water table at 40 cm depth
- B. Static water table at 80 cm depth
- C. Water table at 40 cm depth during the summer and 20 cm during the winter

The lysimeters were saturated from below with water, fertilised and sown with ryegrass (*Lolium perenne*). Meteorological monitoring was carried out. Soil moisture content and soil temperature were monitored. A static chamber method was used to weekly measure emissions of CO₂ (dark respiration), CH₄ and N₂O during the growing season. Crop growth and nutrient uptake of plants was recorded.