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**www.caos-project.eu**

# CAOS

## Climate Smart Agriculture on Organic Soils

CAOS
Climate Smart Agriculture on Organic Soils

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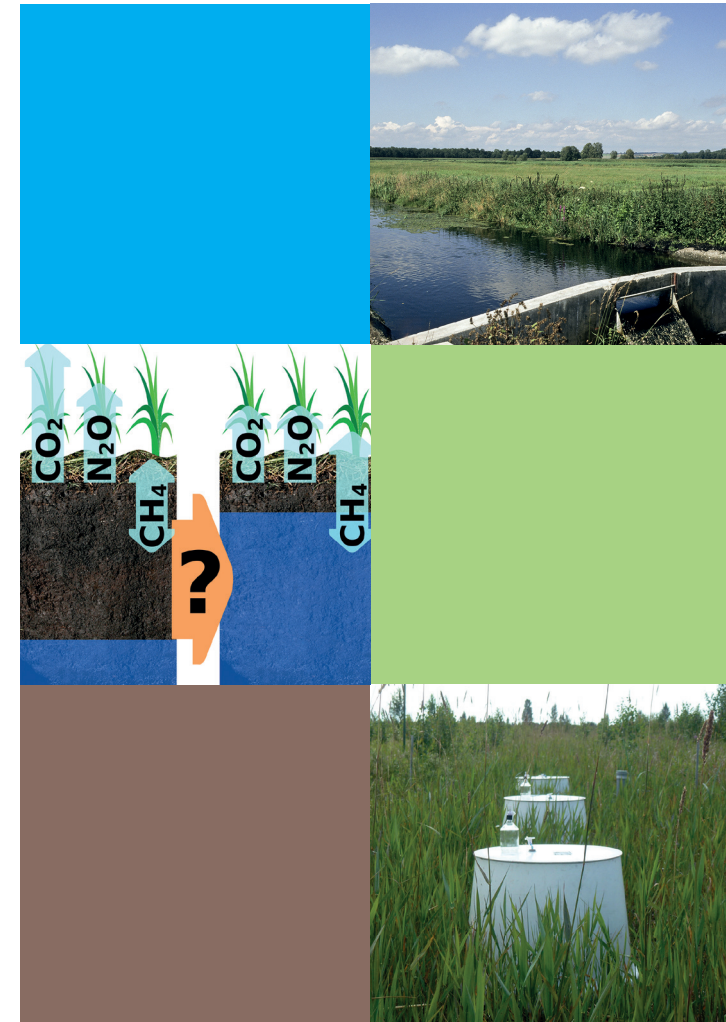
## Farmed organic soils – greenhouse gas hotspots in Europe

Peatlands store a major share of the world's soil organic carbon and are widespread in Northern and Central European countries. 80 % of Europe's peat soils have been cultivated for agricultural use in the past centuries. Drainage is a precondition for classical agricultural production on organic soils, but fosters soil degradation, land surface subsidence and peat mineralization. Therefore, managed organic soils are the largest sources of greenhouse gas (GHG) emissions (e. g. $CO_2$, $CH_4$ and $N_2O$) from agriculture and other land use sectors in peat-rich countries of Northern, Central and East Europe.

At the same time, managed organic soils offer a high adaptation potential to avoid yield losses and land abandonment while reducing greenhouse gas and nutrient emissions.

## Wet management systems – benefit from synergies

Controlled drainage and active water management are climate smart options for agricultural production on organic soils under current and future climatic conditions. We propose that wet organic soils can be used as risk insurance in dry periods while active water and soil management will improve trafficability. Peat degradation can be reduced and water availability in dry summers increased. Alternative, wetness-adapted crops with stable yield quantity and quality are needed to meet requirements for food, feed and bioenergy. If farmers and decision makers are to be convinced that wet management systems on organic soils are profitable and resilient under climate change, proof by on-farm experiments and historical evidence from success stories is required.

## Derive the knowledge – spread the news

The CAOS project aims to generate the knowledge to design climate smart agricultural systems for organic soils adapted to the diverse regional conditions of Northern and Central Europe. CAOS will provide and distribute evidence that active management aiming at a better control of groundwater levels, improved trafficability and alternative high productivity crops improves yield stability and quality as well as resilience to climate change while providing strong GHG mitigation and improved soil and water quality.

## Project tasks – from ecology to economy

- Combining historical agro-economic data with soil quality and water table observations to identify historical evidence of climate smart soil and water management.
- Field experiments with soil and water management testing different techniques of controlled drainage and subirrigation combined with greenhouse gas measurements.
- Economic analysis with focus on management options that allow the continuation of agricultural production with regard to the political context.
- Quantity and quality analysis of harvested biomass used for food, feed or energy purposes.
- Integration of process-based water dynamic and crop growth models, statistical models of greenhouse gas mitigation and water quality and economic models to synthesise results and to evaluate the adaptation potential under climate change scenarios.
- Bi-directional involvement of stakeholders and practitioners throughout the entire project to facilitate knowledge exchange across countries.

## Experimental sites
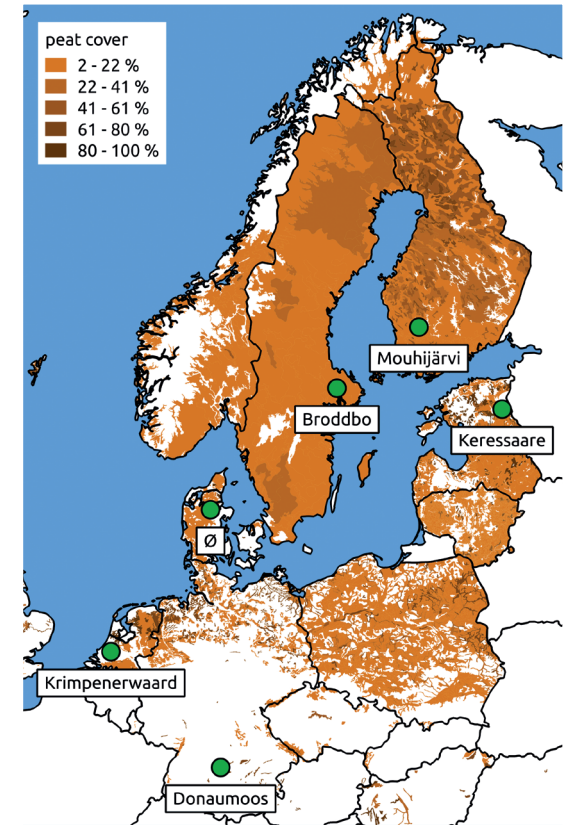


The CAOS experimental site locations in Europe. Background map: peat cover in Europe (modified from: Montanarella et al., *The distribution of peatland in Europe,* Mires and Peat 1, 2006)