BALTIC COMPASS

Baltic Sea Agriculture as a Pilot of Sustainability

Controlled drainage

- a SCIEN drainage technology

Controlled drainage can be used as a tool to reduce the outlet of nutrients from agricultural fields to the aquatic environment.

This presentation describes how controlled drainage works.

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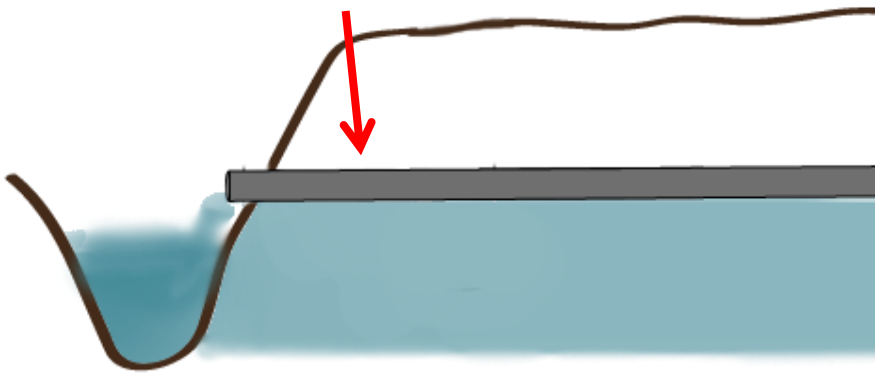
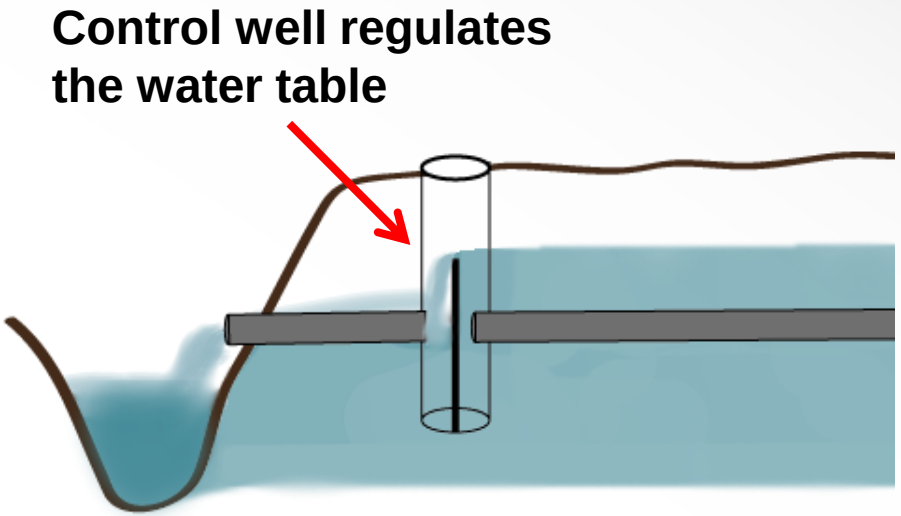
Traditional drainage



Controlled drainage



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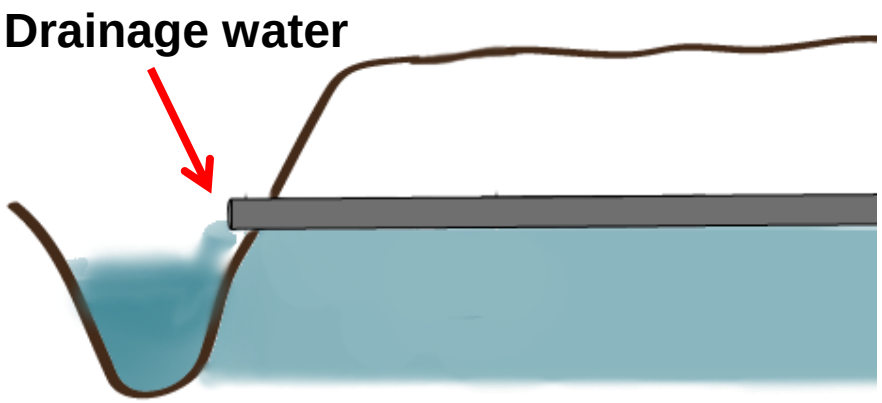

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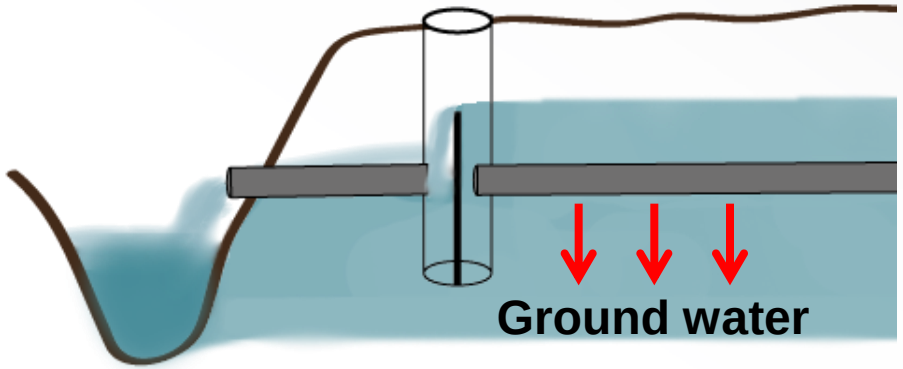

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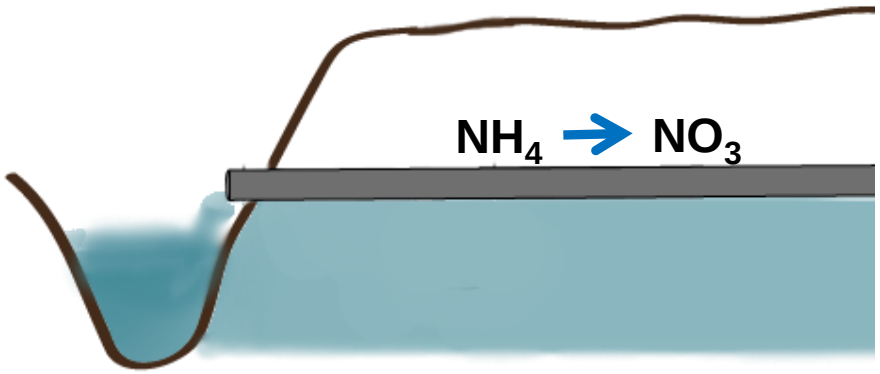

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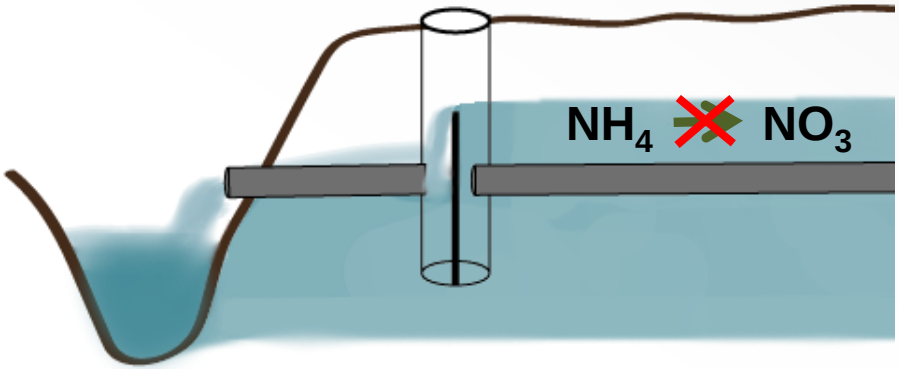

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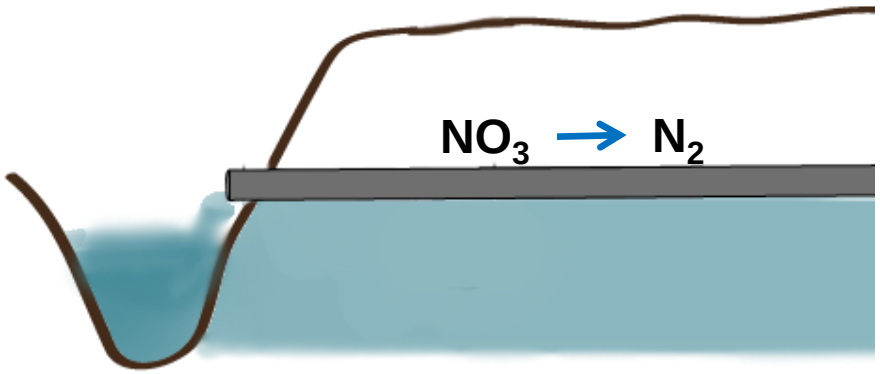

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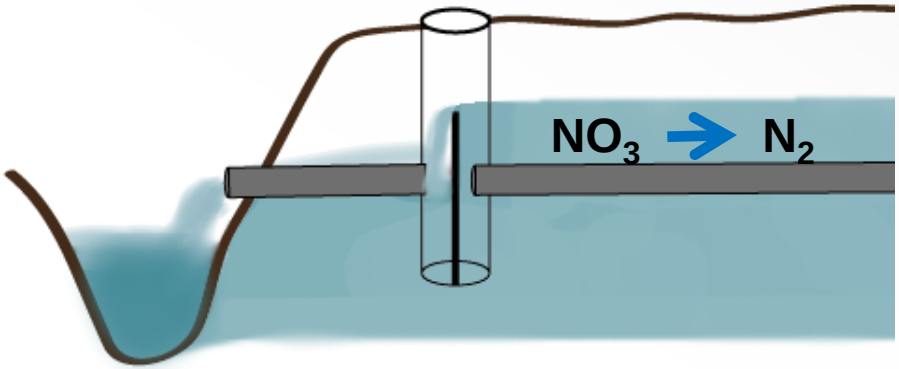

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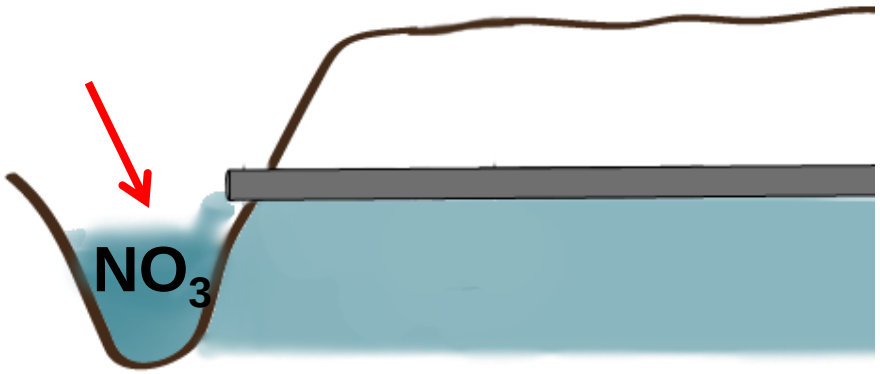
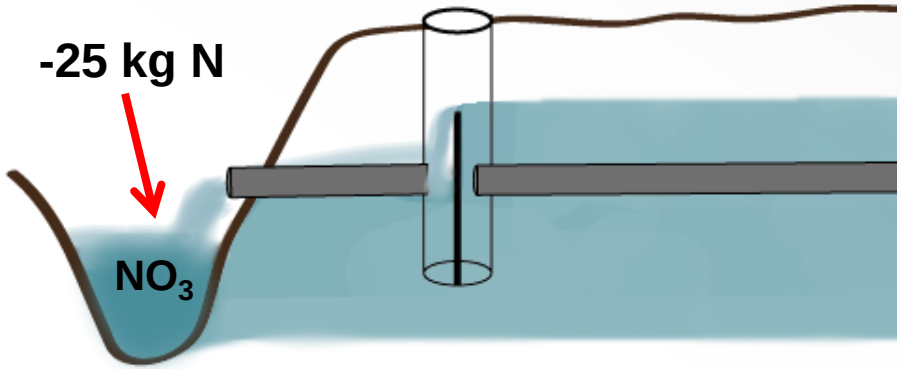


Controlled drainage



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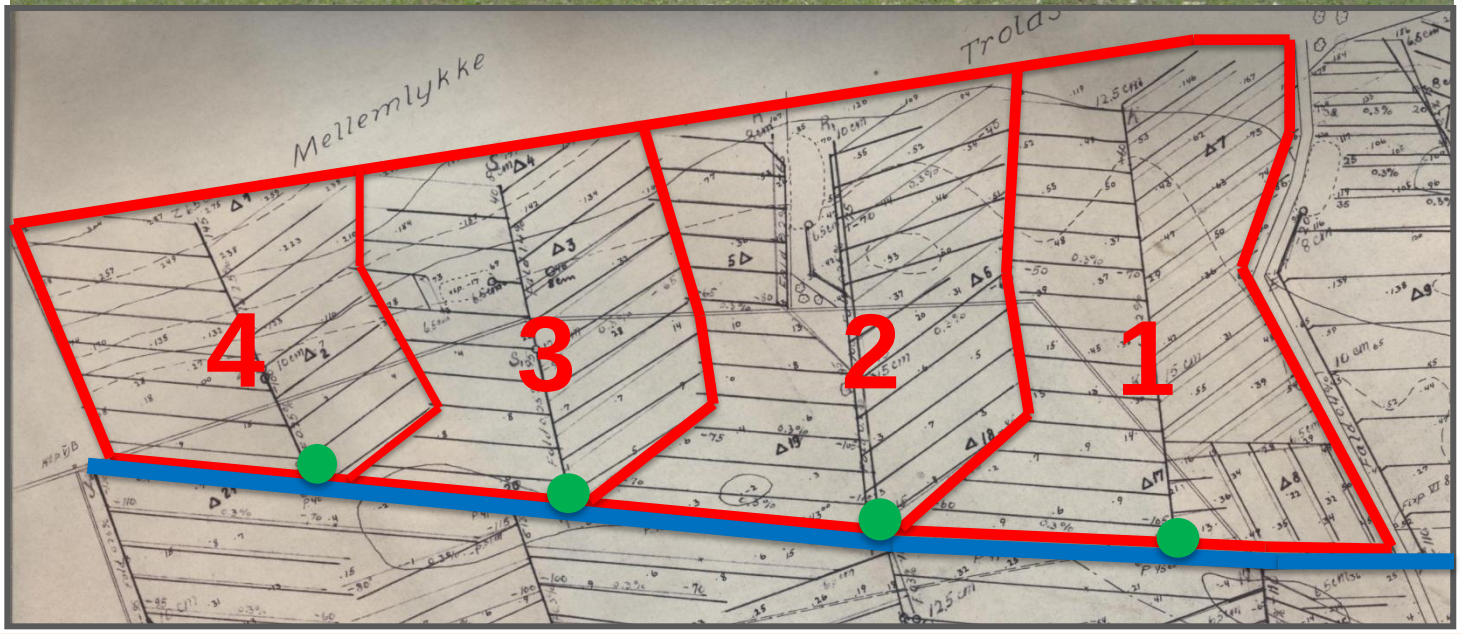
Controlled drainage demonstration site

Suitable areas for controlled drainage are

- ✓ **Flat (slope less than 0,5 %)**
- ✓ **Systematically drained with subsurface tile drains**
- ✓ **Medium to high level of N in the drainage water.**



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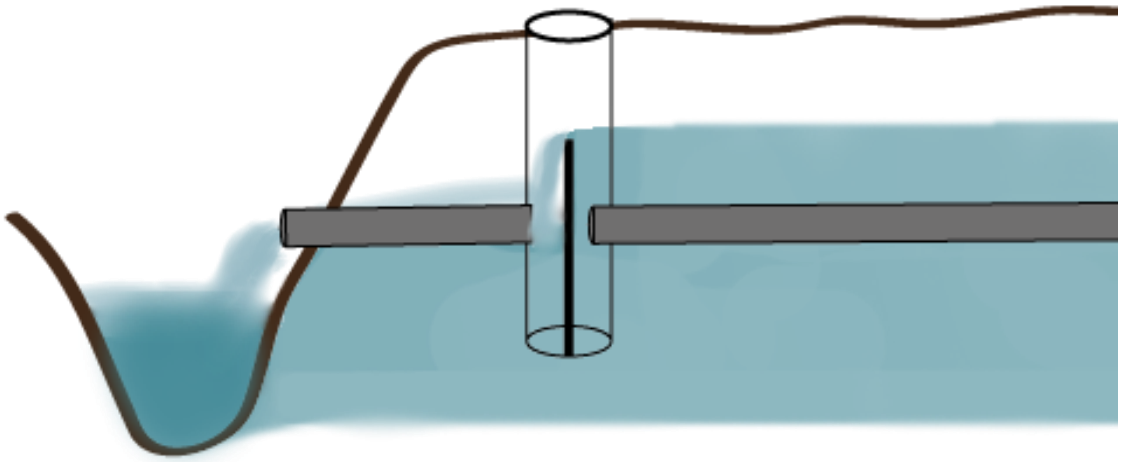
Controlled drainage demonstration site

Part-financed by the European Union (European Regional Development Fund and European Neighbourhood and Partnership Instrument)

Impacts from controlled drainage

- ✓ Less drainage water is let out to streams and lakes
- ✓ More ground water is formed
- ✓ Less nutrients are lost from agricultural soils
- ✓ Outlets of nutriens with drainage water are reduced



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SCIEN drainage

Controlled drainage is one of several so-called SCIEN drainage technologies.

SCIEN is an acronym for Sustainable, Controlled, Intelligent, Environmental friendly and Nutrient loss mitigating, and the acronym itself associates to science. SCIEN drainage combines conventional and controlled drainage with innovative technologies to ensure a maximum recirculation of plant nutrients. It transforms the drainage concept from merely being a way to get rid of excess water into being a concept for intelligent managing of the water turnover for field crop production.

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SCIEN drainage…

Develops the drainage concept from merely being a way to get rid of excess water into being a concept for intelligent managing of the water turnover for field crop production, with a minimum of plant nutrient loss, but also includes other possible incomes and beneficiary side effects. One example of this is growing algae on the plant nutrients in the drain water as a substrate for biogas production, thus enabling recirculation of plant nutrients while at the same time enabling production of renewable energy. A similar example could be constructed wetlands, a specific type being the two stage ditch drainage system, where green vegetation similarly could be harvested and used for recirculation of plant nutrients, possibly via biogas production.

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SCIEN drainage…

Another SCIEN drainage technology is on/off drainage system, whereby drain pipes can be closed at several places in the field in the winter time or during other periods without traffic in the field when drainage is actually not needed. This will prevent loss of N and P for most of the year and allow for increased nitrification, and possibly higher yields due to better water availability for the crop. More shallow placed drain pipes can help to reduce water and nutrient discharge.

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SCIEN drainage…

- **Relevant technologies that in parallel projects are being researched for their ability to catch plant nutrients, such as possibly the BalticSea2020 project "Mitigation measures to reduce phosphorus leakage from arable land, ditch dams and ditch filters", as well as other relevant projects (for instance "SUPREMETECH" and "Drain filter technologies for optimised nutrient reduction").**
- **Alternative measures, aiming at similar effects, such as spreading gypsum on the fields.**

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WIN-WIN TECHNOLOGIES FOR NUTRIENT MANAGEMENT

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