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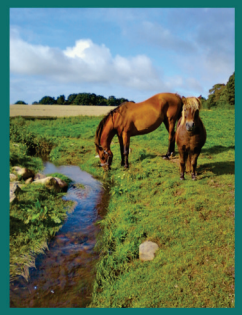
G E U S

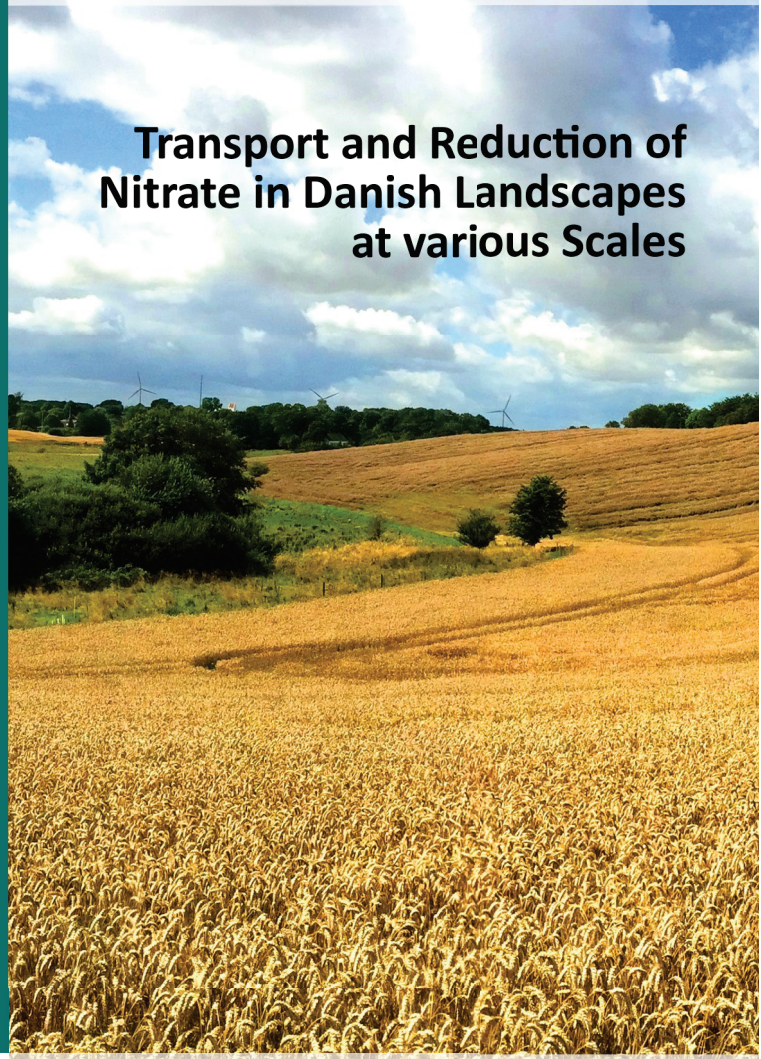


Innovation Fund Denmark
RESEARCH, TECHNOLOGY & GROWTH

TReNDS has recieced foundings from Innovation Fund Denmark

TReNDS

Transport and Reduction of Nitrate in Danish Landscapes at various Scales



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Towards a new spatially differentiated approach for a more cost-effective nitrogen management

Project background

Nitrate leaching from agriculture is a major water resources problem in Denmark causing eutrophication and at worst hypoxia in surface water systems and exceedance of drinking water quality standards in groundwater aquifers. Many action plans have been implemented since the 1980ties. These plans have been effective, but further abatements are required to comply with the EU Water Framework Directive.

Historically, regulation of nitrogen has been uniform, applying same restriction all over. This approach is not cost-effective. To achieve a further decrease in N-load new innovative and spatially differentiated regulation is needed, where N-mitigation measures are focussed towards areas with low natural reduction of nitrate. This approach is novel and will potentially have large socio-economic impact.

Optimal utilization of the natural variation in nitrate reduction, however, requires knowledge on small-scale nitrate removal. This is currently not existing and difficult to estimate with adequate certainty due to fundamental knowledge gaps related to the effect of tile drains, the subsurface geochemistry and N-removal in riparian lowlands.

Expexted outcomes

TReNDS will develop new methodologies and tools within the following topics:

Redox interface

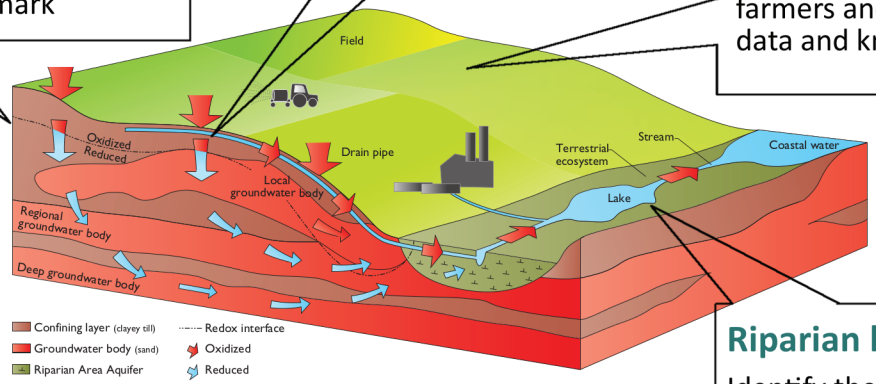
Develop a probe to locate depth to the redox interface on local scale and establish a methodology to produce an improved high-resolution national map for Denmark

Drains

Improve detection of drain pipe location and quantify their effects on flow dynamics and nitrate transport in the soil-groundwater zone

Water management

Develop concepts for a new water mangement practice involving farmers and utilising local scale data and knowledge



Integrated modelling

Integrate local-scale drain dynamics and riparian lowland processes in large-scale catchment models required for practical use at regional and national scale water management

Riparian lowlands

Identify the hydro-biogeochemical processes controlling nitrogen transformation in riparian lowlands and quantify their impacts on nitrate fluxes to surface waters at local scale

Study areas

TReNDS will conduct field work in two geologically different catchments; Norsminde catchment (100 km2) located in a clayey till landscape and Holtum catchment (126 km2) located on a sandy outwash plain. The field work is focussing on the riparian lowlands, mapping of drains and on testing the redox probe.