Drainage filters and constructed wetlands to mitigate site-specific nutrient losses

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Despite substantial efforts, the leaching of nutrients from agricultural land is still a serious and costly environmental problem in Denmark and elsewhere. The quality goals of the European Water Framework Directive (WFD) for the aquatic environment require a substantial reduction of diffuse nutrient loads from farmland in Denmark. Tile drains and ditches connect fields to receiving waters and act as subsurface highways for both soluble and particulate P and nitrogen. Hence, for a large number of recipients, drainage water nutrient loads has a major impact on water quality, however, mitigation options targeting subsurface drainage are lacking. An end-of-pipe drainage filter solution offers the benefits of a targeted measure typically applied to point sources. This calls for a shift of paradigm towards the development of new, cost-efficient technologies to mitigate site-specific nutrient losses in drainage.

A newly launched Danish research project "**SUPREME-TECH"** (2010-2015) (www.supreme-tech.dk) funded by the Danish Strategic Research Council, aims at providing the scientific basis for developing cost-effective filter technologies targeting P-retention and N-removal in agricultural subsurface drainage. The project studies different approaches of implementing the filter technologies including drainage well or drainage pipe filters as well as surface-flow and sub-surface flow constructed wetlands.