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Saturated buffer zones as novel drainage mitigation measure in Denmark

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Vegetated buffer strips have been introduced in some European countries since the 1980s to mitigate the deterioration of watercourses by surface runoff from intensively managed agricultural land. However, the effectiveness was proven to be less for the retention of dissolved nutrients than expected, as agricultural drainage water was directly charging streams via tile drainage pipes. Therefore, a new drainage mitigation measures was introduced in Denmark to lower the nutrient load of freshwater and eventually marine systems, called saturated buffer zone (SBZ). Drainage pipes are disconnected at the sloping field margin and to the riparian zone by diverting drainage water to a buried, lateral distribution pipe running parallel to the stream. Results of a 2-year monitoring study unravel a high performance of the investigated SBZ as nitrate and phosphate removal efficiency was as high as 87% and 76 %, respectively. However, these high efficiencies must still be interpreted with caution since subsurface water flows was rather heterogenous varying by two orders of magnitude within the investigated transects. None the less, SBZs are a promising mitigation measure for removing nutrients from farmland.