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**Drainage Water Management Impacts on Watershed Nitrate Load, Soil Quality,
and Farm Profitability**

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Abstract Text:

Subsurface tile drainage of cropland is a major source of the nitrate load to surface water in the Mississippi River Basin. Drainage water management has the potential to reduce nitrate losses from drained fields while maintaining drainage intensity during critical periods of the crop growth cycle. We have established four paired-field on-farm research and demonstration sites to determine the impacts of drainage water management on corn and soybean yield, soil quality, hydrology, and nitrate losses in drainage waters. We are also modeling the potential impact of widespread adoption on nitrate loss at the watershed scale. Our extension efforts focus on enhanced farmer awareness and understanding of the utility of drainage water management for promoting the profitability and environmental stewardship of their farming enterprise, and enhanced agency staff and policy maker understanding of appropriate use of drainage water management to reduce negative water quality impacts of crop production.

Impact Statement:

Limiting drainage outflow in winter and midsummer can substantially reduce nitrate loss from drained fields, and raising the water table in midsummer can potentially boost crop yields. This study is helping to characterize the effectiveness of drainage water management in reducing edge-of-field nitrate loss in subsurface tile drains, and also to quantify co-benefits and costs with respect to soil quality, crop yield and fertilizer N use efficiency. This project has resulted in enhanced awareness and understanding of the utility of drainage water management for promoting the profitability and environmental stewardship of farming enterprises among farmers, drainage contractors, and agency staff.