High levels of nitrate-nitrogen in ground and surface waters is a public health concern and can have negative impacts on aquatic ecosystems. Strategies and systems to minimize the loss of nitrate-nitrogen from agricultural production systems to ground and surface waters while maintaining food production are urgently needed. Because every agricultural field system is different, there is not a one-size-fits-all solution to effectively prevent nitrate-nitrogen from leaving a field. Rather, it is often necessary to “stack” several conservation practices to minimize nitrate-nitrogen exports. A common and natural strategy to remove nitrate-nitrogen from water is through denitrification. Denitrification is a process where microorganisms reduce nitrogen in a series of steps to produce harmless gaseous molecular nitrogen. The denitrification process requires oxygen-free conditions and the presence of an electron donor, such as carbon-rich organic matter.

The Managing Denitrification in Agronomic Systems Community was formed in 2011 to coordinate and share research and increase collaboration among researchers, policymakers, agency employees (local, state, and federal), extension personnel, NGOs, industry, and educators to develop solutions to the nitrate-nitrogen exports from agricultural systems. These activities include investigating, developing, evaluating, and transferring best management practices for managed denitrification. These practices represent ways to conserve nutrients or remove nitrate-nitrogen from ground or surface water.

Managing denitrification in agronomic systems is an active area of research, and a number of projects demonstrating the practices are being implemented by Community members. Some of the practices being investigated are:

- **Denitrification bioreactors**, where the drain water is routed through a trench filled with wood chips or other carbon-rich material (Fig. 1). Microorganisms colonizing the wood chips remove nitrate through denitrification. Studies have shown nitrate-nitrogen removal rates of 80% or more under optimal conditions. Bioreactors are typically located near field edges so little or no land needs to be taken out of production, and the wood chips last 10 to 20 years with little maintenance. These systems have also been used to treat some waste streams such as excess water from hothouse production of tomatoes (Fig. 2).

- **Denitrification walls or trenches**, where moving groundwater is intercepted by a trench filled with carbon-rich material. As the water flows through the trench, nitrate-nitrogen is removed through denitrification.

### Activities for 2014

Our planned activities in 2014 include producing and publishing a Q&A document on the design, installation, and performance of denitrification bioreactors and expanding our collaborations with other communities such as the NCERA217 Drainage Design and Management Practices to Improve Water Quality Community.

We will hold an oral and a poster session at the 2014 Annual Meeting in Long Beach, CA. The theme of these sessions will be new discoveries on the use of bioreactors, wetlands, managed drainage, or other systems that remove nitrate-nitrogen through denitrification to reduce nitrate exports from agricultural fields. The goal is to summarize both completed and ongoing work on managing denitrification in these sessions, followed by a facilitated discussion period and business meeting to allow for extensive interaction of the Community.

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