



*Nick Hermanson of Story City has been utilizing drainage water recycling on his farms for several years.*

## TIMING IS EVERYTHING

### OPPORTUNITIES FOR BETTER WATER MANAGEMENT EMERGE

BY CAROL BROWN

Iowa is blessed with good soils and generally adequate rainfall for growing quality crops. However, rain doesn't always fall at the right times nor in the right amounts — too much when it's not needed and not enough when the crops could use more.

But what if water could be saved for use during the drier periods? That is the goal of drainage water recycling, an emerging practice where subsurface drainage water is captured in the spring and stored for supplemental irrigation in the summer.

Drainage water recycling has the

potential for multiple win-wins. It's one of the few edge-of-field practices that have both crop production and downstream water quality benefits. Most edge-of-field practices target either nitrogen or phosphorus reductions, but drainage water recycling reduces the loss of both nutrients. If done on a large-enough scale, drainage water recycling could also reduce downstream flooding as well as water quality concerns.

Researchers with the Transforming Drainage Project are studying drainage water recycling as part of a

five-year, eight-state project funded by the United States Department of Agriculture (USDA). Chris Hay, senior environmental scientist at the Iowa Soybean Association (ISA), is a collaborator on the project.

“Drainage water recycling has shown promise for boosting soybean and corn yields at sites in Missouri and Ohio, which have been in operation the longest,” says Hay. “But more locations and more data are needed to fully assess the feasibility, including impacts on downstream water quality and the economics of these systems.”

#### Drainage water recycling in Iowa

ISA is working with Agricultural and Biosystems Engineering professor Matt Helmers and his research group at Iowa State University (ISU) to better understand the potential of drainage water recycling in the state. Modeling from various Iowa locations has shown that most growing seasons could benefit from supplemental irrigation to maximize yield. Charles Hurburgh, landowner and fellow ISU professor, agrees.

“We usually have a mini-drought in the summer, and last year was a prime example,” says Hurburgh, whose farmland is in Calhoun County. “I'm convinced we left 30- to 40-bushels in the field because we didn't have rainfall at the right time. The presence of additional water would have had a big benefit.”

Two new drainage water recycling research projects are underway at five sites in Iowa, all of which will be monitored for crop production and water quality benefits.

One project oversees two sites near Story City, which were installed in 2014 and 2015. One site captures subsurface drainage water in a small reservoir from a field and reapplies it when needed to the same field using

sub-irrigation, where water is pumped back through the drainage lines. The other site captures subsurface drainage and surface runoff in a reservoir that can be supplemented with water pumped from a creek for a center pivot irrigation system in the adjoining field.

Another project with the Iowa Department of Agriculture and Land Stewardship (IDALS) will construct systems at two locations in Calhoun County and one in Webster County. One site will be on Hurburgh's land near Rockwell City. A storage reservoir will be installed on a low area of the farm. He and his tenant (through a crop share lease) agreed to remove this area from production, which only produces a viable crop two years out of five.

“Why pay for the inputs if I'm going to end up with only a fair crop?” he says. “It's better used this way, I think.”

The site is designed for water to be pumped from a drainage district main into the reservoir and used to irrigate an adjacent, better-drained field.

The other sites near Lake City and Dayton will each be configured differently to serve as other examples of employing drainage water recycling.

Before drainage water recycling is widely adopted in Iowa, more examples and data are necessary. These systems require a large capital investment for installation, but it has promise for real returns on the investment.

#### Positive for revenue

“This practice has potential for actual revenue by increasing crop yields,” says Hurburgh. “That's the way we're going to get the nutrient problem solved, by making something economically feasible out of the problem.”

The Natural Resources Conservation Service (NRCS) has cost share options available for these systems by combining several conservation practice standards. Transforming Drainage project members and the NRCS are formulating how drainage water recycling could be funded as a single practice. ISA and partner organizations are also exploring innovative financing solutions where multiple beneficiaries could pay for conservation practices, including drainage water recycling.

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*Drainage recycling utilizes ponds that hold water during the spring and early summer. The water is then applied to crop land during optimal times.*

