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Management

By Mike Wilson

The soil managers:

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New day for drainage

CONTROLLED SUBSURFACE DRAINAGE MAY BE THE NEXT BIG MANAGEMENT TOOL TO BOOST YIELD AND REIN IN RUNAWAY NITRATES

Doug Mills can control the amount of rain his crops get each growing season.

Well, sort of.

Mills is one of a handful of Corn Belt farmers tinkering with controlled drainage, an underground system that allows farmers to open and close subsurface blocks or gates attached to tile lines, causing water to be held in the water table or flow out, depending on crop moisture needs.

The five-state project, sponsored by the Agricultural Drainage Management Coalition, or ADMC, has long-term potential to boost yield through better water management, and simultaneously curb nitrates that escape into rivers and pollute the nation's water supplies.

Mills says controlled drainage can provide a "double return" on investment by draining away excess water in wet

years, or conserving every last gallon possible to get through dry growing seasons. He estimates a yield kick of 4 to 10 bushels an acre, especially during dry growing seasons, when moisture conservation is at a premium.

"Water management will either give or take away 50 bushels of corn per acre; it's that important," says Mills, who farms 4,700 acres of corn and beans with his father, brother and cousin near Crawfordsville, Ind.

Cleaner water

Drainage is a proven management tool on more than 60 million U.S. crop acres today, but many fields have clay tiles that are more than 100 years old, and most do not uniformly drain the fields.

Drainage helps grain production, but it works against drinking water quality. Most of the Midwest gets its drinking water from waterways fed by runoff and subsurface drainage. In recent years farmers grew more corn acres, responding

to greater world demand for feed and ethanol uses. That led to more nitrogen applications and greater concerns about hypoxic waters such as the dead zone in the Gulf of Mexico.

Controlled drainage helps hold water in the soil longer, allowing more of the nitrogen to be used by soil microbes and growing crops, so that less is lost from the field. According to ADMC project results, controlled drainage reduces nitrate flow out of tile lines 40% to 60%.



While drainage systems are designed to get excess water off fields quickly to reduce crop loss, "adding managed system controls allows the farmer to reduce the rate of water loss during drier periods of the growing season," says Harold Reetz, ADMC executive director. "Being able to adjust the water table to different levels during the year gives the farmer one more management component to help improve yields, increase efficiency and become more environmentally responsible."

That's good news as farmers become more proactive in environmental issues. "We're being accused of being hard on the environment, and that we're losing too much nitrogen down the tiles," says Mills. "This helps show we are trying to solve some of the problems we have."

Management tool

Some of the farms in the project use satellite-controlled water control structures, resulting in a truly managed and remotely monitored water table (results are posted online at www.admcoalition.com). The next step in the project is to see if in-ground stops, triggered by water pressure, can also improve water management.

Many pilot project farmers decide for themselves when to raise or lower the drainage blocks. They generally lower



Photo: Mike Wilson

"In 2008 we were talking about as much as 100-bushel-to-the-acre difference between well-drained and poorly drained soils," says Doug Mills, Crawfordsville, Ind.

the gates in spring to allow soils to dry, then raise them in summer if weather turns dry.


"Part of the management trick is trying to figure out what level you want those blocks at, at any given time," Mills says. "We're trying to determine the optimum level of water available

at each stage of crop growth. You don't want the water table too high because you want the roots to dig for moisture, and you want the tile to drain the water. But when you get periods like this year when rain shuts off the first of August, you want to be able to hold water in to stretch moisture supplies another couple weeks."

Mills believes technology has helped farmers learn the true benefits of drainage.

"Yield map advances have exploded the drainage industry," he says. "When yield monitors came on line, you were actually able to see the yield you were losing. In most fields you can tell right where the tiles are, just based on yields coming through the monitors. What you thought was just a 2-acre mud hole was really a 10-acre mud hole, and that area was probably half the yield of the whole field."

Subsurface-controlled drainage won't work everywhere, but Mills believes it can be a tool to help farmers save nutrients if future regulations or nutrient trading comes into play.

"The government may come in and force — or entice — farmers to lower nitrates, one way or another," he predicts. "It will be basically controlling the amount of nitrates leaving your tile, either through lower N rates, less fall application or cover crops for example." 



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