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## Subsurface drainage pays big dividends

Mar 1, 1999 12:00 PM, Joan Olson

"GPS yield maps and precision farming have created a demand for tile drainage never before seen," says Don Sisson, executive director of the Indiana Land Improvement Contractors Association. "Farmers are checking their yields foot by foot and can see the yield differences between tilled and not tilled ground. Many farmers are finding their highest yields over the tile lines and their lowest yields halfway between the tile lines."

Yields are higher because drainage provides good agronomic conditions, mellower soil, deeper plant root zone, less compaction, more timely planting to maximize the growing season, earlier harvest, less surface soil erosion and less runoff of nutrients such as phosphorous.

Measurable payoff. Pat Feldpausch, Fowler, MI, saw a 30-bu. corn yield drop midway between his 50-ft. tile spacings in one field he farms. He decided to tile the rest of the field on 30- to 35-ft. spacings. In other fields, his yield data show that 100-ft. spacings drain just fine. The optimum distance between tile lines varies depending on soil type, topography and other factors that influence how quickly water moves through the soil.

Feldpausch has found that tile pays off in dry years as well as wet years. "We had a drought this year - only 4 in. of rain during the whole growing season. One tilled field yielded 145 bu./acre despite the drought. Another field with the same soil type that wasn't tilled yielded only 100 to 110 bu./acre," he says. One reason tile benefits crops in dry years is that lowering the water table in the spring causes plants to develop a deep and vigorous root zone.

Feldpausch rents or custom farms the majority of the land he farms, and he invests his own money to tile the ground. "It's not uncommon for even 100-ft. spaced tile to increase yields by 50% in these poorly drained fields," he claims.

Trend toward closer spacings. The interest in closer spacing between tile lines is greatest in northern states where the growing season is short and being able to plant several days earlier pays tremendous dividends. In Ontario, Canada, 35- to 40-ft. spacings between tile lines are most common, whereas in Illinois and Indiana it's common to find 100-ft. spacings. In all areas of the country, farmers are using precision farming yield data to help them determine the best drainage systems for their farms.

Indeed, precision farming's biggest payback has come from identifying needed drainage improvements, notes Don Larson, of Larson Systems, Ames, IA, a provider of precision farming mapping software and interpretation services. He knows about tiling firsthand from his family's farm in Story City, IA, where the purchase of a used, open-trencher tiling machine in 1993 gave them the highest return of any other piece of farm equipment that they have ever owned. "We achieved a 30- to 40-bu. corn yield increase by adding drainage tile," says Larson. "We started putting the tile in at 120-ft. spacings, but when our yield maps showed a yield reduction halfway between adjacent lines we went to 60-ft. spacings. Ultimately, we found 90-ft. spacings are right for our heavy gumbo soils."

For Chip Kepford, Marion, OH, the GPS yield map indicated he should spot tile rather than systematically tile every 50 ft. in one of his fields. "The map identified areas of the field that naturally drained and where it would have been hard to recoup our investment for tile," Kepford explains.

In some areas, demand for tiling has outstripped local contractors' capacity. Rather than wait a year or more to get their tiling done, some farmers have purchased their own add-on pull-behind tile plows. These plows can be mounted on a tractor or pulled behind it. They range in cost from \$2,600 to \$20,000 and are handled by manufacturers of small machinery. To assist with proper grade control, a laser system can be purchased for \$10,000 to \$20,000. A tile cart will cost \$3,000 to \$5,000. Labor, backhoe and machinery costs also need to be figured into the equation.

Parrish Farms, Millersport, OH, purchased a Johnson Drainage Plow with 6-ft. depth capability in November 1997 and has put in 170,000 ft. of tile since then. "I don't think farmers should buy this equipment and think they will save a lot of money over a contractor," says Ed Parrish. "There are a lot of costs besides the plow. A quality contractor will put the tile in as cheap or cheaper than you can yourself. For us it wasn't about saving money. It was a matter of getting the job done when there was no way to get it done otherwise."

Jerry Bulmahn is a former tiling contractor from Decatur, IN, who now farms 2,200 acres. In 1989 he purchased a tile plow with a 6-in. tile boot capable of 4-ft. depth from Farm Drainage Plows, also known as Wurdinger Tile Plow. "We have tiled 500 acres on our own farm with it. Three people can generally put in 6,000 ft. in a 10-hr. day. I'd put this plow up against any contractor's plow," says a satisfied Bulmahn. He claims that the tile plow paid for itself in the first year.

Bulmahn says the biggest problem for most farmers interested in doing their own tiling is to find a contractor to install the main

outlets. "A contractor isn't eager to come in and do the mains and not the laterals. You'll be put at the bottom of their list," says Bulmahn. He suggests that two to three farmers work together and share labor and expenses to make the investment more practical. He also recommends planting winter wheat on the ground you want to tile so you have a longer window for finishing the work.

Brent Sharp, Maynard, IA, is a farmer and a tiling contractor. He operates a mid-size Johnson Drainage Plow with a laser. "Our laser takes it right where we want it to go," says Sharp. His GPS yield monitor has shown that corn yield from tiled ground is anywhere from 30 to 100 bu. more than the corn yield from undrained ground.

Add your name to the list. "Pull-behind tile plow sales are being made to farmers in areas where contractors have been slow to expand and offer competitive pricing for pattern tiling," says contractor Roger Ellingson, Ellingson Drain-age, West Concord, MN. His 20-employee business installs 4 to 5 million ft. of tile each year. "A contractor with two employees and a trencher that installs 300,000 ft. a year can't shift gears fast enough to meet the demand for high-speed installation. Farmers don't want to wait because they see the tremendous value of tiling. If they are put on a two- or three-year waiting list, or if prices are in the \$600 to \$800/acre range, they'll look for an alternative."

A job for the experts? He and many other contractors question whether most farmers can achieve good results with a pull-behind tile plow. They question whether the engineering, depth control and grade control are adequate on these machines, which cost just a fraction of the \$200,000 to \$500,000 that contractors spend on a trencher or self-propelled tile plow. They also question whether an inexperienced operator is capable of planning an efficient system and maintaining grade.

USDA-ARS ag engineer James L. Fouss, Baton Rouge, LA, was one of the early developers of large, self-propelled tile plows and laser grade control systems now used by tiling contractors. He states, "You can't expect to install tile properly with a modified subsoiler. I'm leery of them being able to maintain proper grade as the soil changes from hard to soft across the field. The weight of the machine is not great enough to overcome the differences in soil resistance."

Contractor Ellingson agrees: "I've had instances where the farmer felt he had done a good job of installing a line himself, but when he had us probe the tile and check it for accuracy, we found areas with dips, humps or no grade at all. That means that the tile will not function at full efficiency and in 5 to 15 years the tile may silt in and plug up. The line could fail in 10 years when it should last 100 years."

Research results in the Corn Belt show that drainage improves yields substantially on poorly drained soils. Long-term studies conducted in Indiana and Ohio showed that in fields with subsurface drainage, corn yield was an average of 14 to 23 bu./acre more and 20 to 30 bu./acre more, respectively, than yield in fields without drainage. In Ohio, a 7 to 14 bu./acre soybean yield advantage was realized from subsurface drainage.

Growers of Parrish Farms, Millersport, OH, have been systematically tiling all of their owned acreage for more than 20 years. "We have many years of production records. We know that drainage pays and it pays big," says Ed Parrish. "In critical circumstances,

tiling gives a 30% return on investment and normally you can expect a 10 to 12% return every year. It's a continuing benefit."

Return on investment. Advanced Drainage Systems (ADS), in Columbus, OH, is the largest manufacturer of drainage pipe. The company's G.R.O.W. Analysis software determines annual and cumulative cash flow, return on investment, payback period and break-even production per acre for drainage tile installations. "The return on investment for a drainage system is usually more than 12% a year. The usual payback period is 7 to 10 years," says Kevin Rapp, agriculture market manager, ADS.

Using the software, a grower also can compare the return on investment for purchasing a new tract of land or improving drainage on existing land. "The return on investment for buying ground is very low. Installing drainage to improve yields on existing land is a much more productive use of investment capital," Rapp adds. This software is available to growers at no cost from their local ADS sales representative. Call 800/821-6710.

Costs vary. Tile installation costs vary tremendously across the country and even within a state.

A 1999 Indiana Land Improvement Contractor's Association price survey showed that the cost of 4-in.-dia. pipe installed ranges from \$0.45 to \$2.00/ft. According to Mike Cook, executive director of Michigan Land Improvement Association, the cost for installing 4-in. pipe on 50-ft. spacings ranges from \$300 to \$500/acre in different parts of Michigan. The cost for the same system in some parts of Iowa and Illinois could cost as much as \$800/acre.

Each job is unique and many factors go into cost calculations, including soil texture and structure, soil permeability, terrain, topography, rocks, distance to the main outlets, size of the mains, number of acres tiled, type of tiling machine and area competition. Because large, self-propelled tile plows can install 120 to 140 ft./min., twice as much tile per minute than open trenchers, contractors with tile plows are generally more competitive for large jobs such as pattern tiling entire fields.

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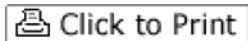


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