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When It Rains, Tiles Drain

After two years of dry soils, we finally have gotten into a spell of rainy weather. It's been more than enough in some places, and has led to water logged soils that have been hard on crops or getting in a sprayer or drill. Some fields take a lot longer to dry out and some have ponded areas that hardly drain at all. We aren't far from full-season soybean planting either. Its years like this one where farmers consider installing tile drainage. Ironically, tiles are best installed in the dry periods, like we've had plenty of the past two years, in preparation for wet springs like this one.

Tile drainage is nothing new. Some forms of them have been around for hundreds of years, but field wide tile drains in the heavy clay flood plains of Southeast Kansas and Southwest Missouri are now becoming more common. ("Tile" here means subsurface plastic perforated pipe.) Field wide tile drainage have long covered certain areas of Minnesota, Iowa, Illinois, Missouri, and the rest of the Corn Belt, but they were less common here largely due to economics. This however is starting to change.

Advantages: Tile drainage is likely to improve a crop field if the field has a poor drainage class with a low slope and heavy clay soils. In this area, this class of hydrology is likely to be within the river flood plains but there can be smaller areas nearly anywhere. Only around 5% of our total agricultural land is likely to benefit from tile drainage. While this is our most productive soils, this productiveness is highly variable from year to year and hard to work with during rainy years, often delaying timely field operations. Properly drained fields have added benefits such as minimizing soil compaction, better plant growth, less variability within the field, and consistency across the field. Despite being a few feet below the soil surface, tile drain increase water infiltration a small amount as well, which decreases surface erosion.

Disadvantages: The main disadvantage of tile drainage is, of course, the cost. A complete tile drainage system can cost \$1,000 or more per acre. It takes a lot of improved yield over time to compensate for the cost. Really the benefits of tile drainage aren't so much financial as they are practical. The idea of not dealing with inconsistent poorly drained soil effecting timely planting, spraying, and harvest. Many farmers around here don't tile the whole field either and concentrate efforts on the troubled areas in an effort to save money. Not really a disadvantage, but an important concern when installing tiles is that our fields are already crisscrossed with gas and electrical lines that can be dangerous to hit with a tile plow.

Maintenance: Tile drains can last a long time if installed correctly, 30 years or more, and they don't take much management. Although, even properly installed tiles could need occasional cleanouts. This is usually at the outlet ditch as the buildup of sediment can lead to blocking the

whole tile. The tile outlet covers need occasionally cleaned out as well, and without them, rodents will build homes inside the tiles. An actively managed system will have an outlet slide that changes the water table by manually moving it up and down. The water table can be left higher during the winter and during a drier summer to keep water in the profile. This can only be done with the flattest (less than 0.5% slope) fields.

Irrigation with tile drains: Tile drains can be back fed water and used as subsurface irrigation, making them work two jobs. It is less effective than a closely spaced true subsurface irrigation system but the tile system, if the field is flat enough, can flow water into the root zone via a higher water table. This requires a more complex system design and is sometimes (though not always) why you see a pit pond on the lower edge of a crop field.

Tile drains in the environment: Environmentally, tile drains are a mixed bag and are regulated in some states. This is unlikely to happen here anytime soon because we likely won't ever have enough to cause much concern. Tile drains do increase nitrate leeching from the soil with water movement. However, they also reduce surface runoff, therefore sediment and phosphorus losses are reduced. In the soggy northern states, tile drains have been used to drain ecologically important wetlands, but the few wetlands we have around here are already protected or used for waterfowl gaming. In fact, it's possible to create a constructed wetland, as using the low volume but more continuous water from a tile drain can fit well into a wetland system. Despite the lower risks of harm, any environmental impact of capital improvements needs to be considered.

If you are interested in tiles for your operation, visit transformingdrainage.org to view different models and video presentations or contact James Coover, Crop Production Agent, at jcoover@ksu.edu, or (620) 724-8233.

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