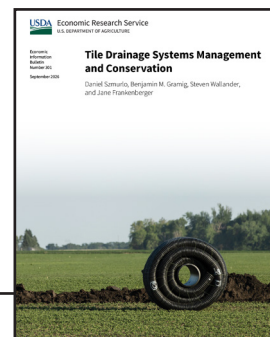




A report summary from the Economic Research Service

Tile Drainage Systems Management and Conservation

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Key Points

- U.S. farm acres with tile drainage have increased by 52 percent (approximately 18 million acres) between 1980 and 2022. Farm operators may also be intensifying their use of artificial drainage in certain States by installing new perforated pipes (known as tile lines) closer together, resulting in a higher density of tile lines in tile-drained fields.
- Average total applications of nitrogen fertilizer were 8 percent and phosphorus fertilizer 19 percent higher on tile-drained corn acreage in 2021 compared to non-tiled corn acreage, respectively.
- The application of nitrification inhibitors was approximately twice as common on tile-drained corn acreage in 2021 compared to non-tiled corn acreage.
- Tile-drained corn acreage was more likely to have fall application of nitrogen and phosphorus compared to non-tiled corn acreage in 2021.
- Cover crops were equally common on tile-drained corn acreage compared to non-tiled corn acreage in the Midwest in 2021.
- Thirteen percent of tile-drained corn acreage in 2021 had a control structure capable of managing subsurface outflows.
- Farmer use of financial assistance to install water-quality-improving drainage modification practices through the USDA's Environmental Quality Incentives Program (EQIP) remains low. Since 2010, fewer than 150 EQIP contracts per fiscal year have contained the Conservation Practice Standard for drainage water management. For fiscal years 2020–24, less than \$1 million was allocated for saturated buffers, subsurface control structures, drainage water management, constructed wetlands, phosphorus removal systems, drainage tailwater recycling, and bioreactors combined.

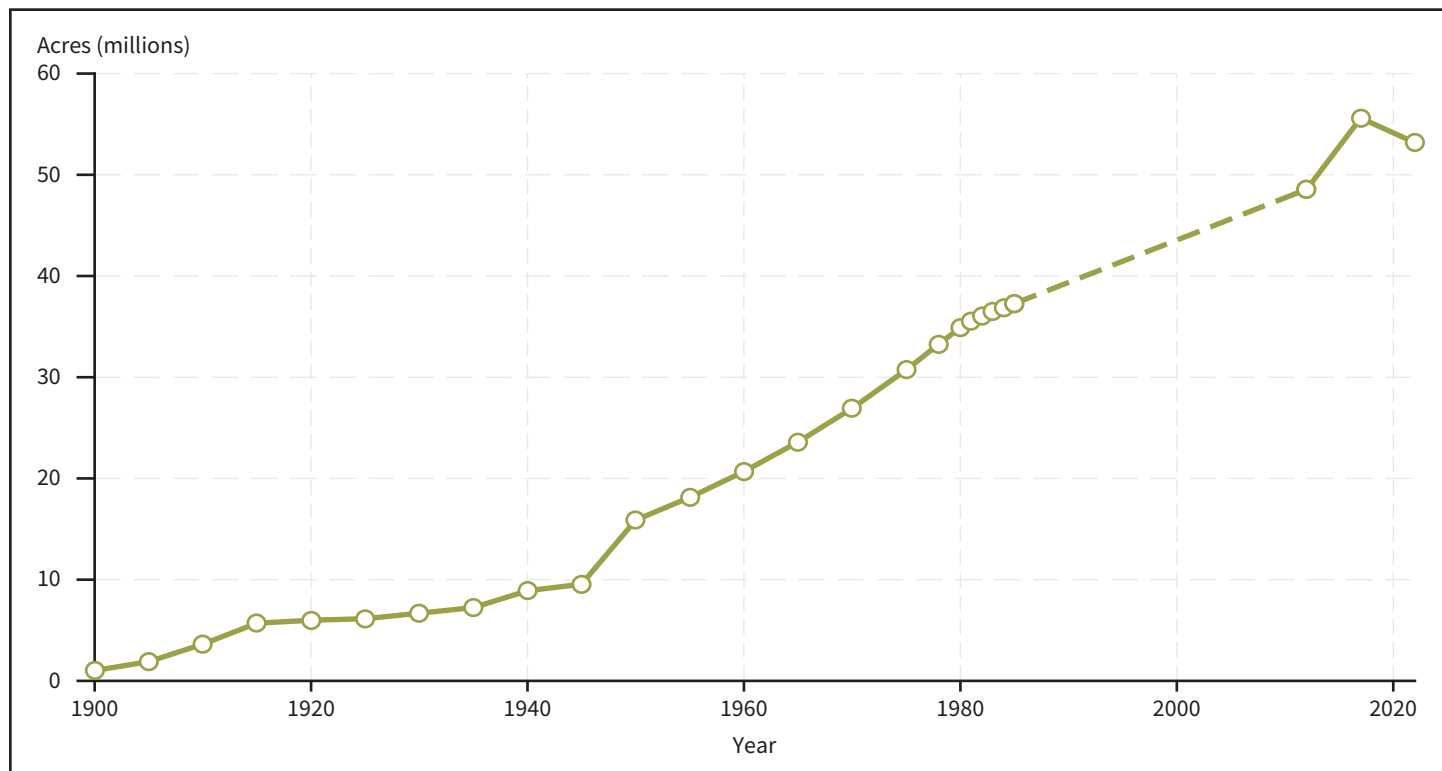
Why Does This Matter?

Subsurface drainage, or tile drainage, refers to the installation of perforated pipelines beneath agricultural land for the purpose of managing soil water conditions. By increasing water infiltration through the soil, tile drainage can help ensure timely planting and harvest operations as well as minimize crop stress from excess precipitation or water stagnation in crop fields. Additionally, tile drainage enables poorly drained soil types to achieve higher potential yields, as it allows for earlier planting and pre-planting fieldwork than would otherwise be possible.

This lengthens the effective growing season and allows for longer season cultivars to be planted. Although tile drainage systems offer numerous private benefits for the operator, they can increase the leaching of nitrogen and phosphorus (e.g., nitrate loads and dissolved reactive phosphorus) to downstream water bodies, contributing to water quality issues. Adjustments to drainage systems and the adoption of conservation and nutrient management practices can mitigate these water quality impacts.

Other Details

Tile-drained acreage over time



Note: No national data were collected between 1985 and 2012 (dashed line segment).

Source: USDA, Economic Research Service using data from the USDA, National Agricultural Statistics Service, 2012, 2017, and 2022 Censuses of Agriculture and Pavelis (1987).

The use of tile drainage systems, especially in the Midwest, has allowed the United States to be home to some of the most productive agricultural land in the world. Tiling supports tens of millions of acres of corn and soybean rotations providing grain for human consumption, livestock, and energy. Tile-drained acreage has steadily increased over the past 120 years, including a 4.6-million-acre increase (9.5 percent) from 2012 to 2022. Total tile-drained acreage amounts to just over 53 million acres—an area about the size of the State of Idaho. Southern Minnesota and other northern latitude regions of the Midwest—eastern South Dakota, eastern Wisconsin, Michigan, and Upstate New York—saw substantial increases in the proportion of cropland that is tile drained from 2012 to 2022.

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