

NETAFIM DRIP IRRIGATION SUCCESS STORY

CORN

CONSERVING WATER AND FERTILIZER WHILE BOOSTING YIELDS

Season after season, the hot sun and prairie winds of western Kansas dried up much of the water that flowed over Mark Eitel's corn, soybean and wheat fields. The evaporation atop the dusty ground in the arid High Plains has been even more critical given the depletion of the Ogallala Aquifer. Irrigation wells and pumps have sucked air as they lose pumping capacity, and farmers face stringent water restrictions.

Given the dwindling groundwater, the Eitel family of Dighton, Kansas, decided to try something different: subsurface drip irrigation. It paid off. They're reaping higher yields while using significantly less water and nitrogen, Mark Eitel said. In 1996, on a 150-acre field that his great-grandfather homesteaded a century earlier, the Eitels pioneered one of the first subsurface drip irrigation (SDI) systems in Lane County.

"We wanted to see if there was another way to do it besides the flood irrigation," he said. "A lot of our wells are starting to produce less water, and we wanted to figure out a way to do something that was a little less labor intensive while also more economical -- and that would conserve water more." They now drip irrigate about 800 acres with surprising results, including stabilization of their water table, per testing by the state and their irrigation company, Netafim, the world leader in SDI technology.

Subsurface drip irrigation and holistic management for soil health on his no-till farm enable him to use 15 to 25 percent less water -- along with less nitrogen, labor and energy, Eitel said. "By being able to put the water under the ground where it's never exposed to the sun and the wind, you have a lot less evaporation," he said. His corn yields have increased from 180 bushels an acre, on average, to 210 to 220 bushels. "And we used 25 to 35 percent less nitrogen to do that," Eitel said, explaining that he "spoonfeeds" the nutrient through driplines.

Rather than applying his load of expensive N above ground all at once, he uses a nurse tank and variable-rate pump to inject small amounts as needed, timing it before his plants are hurting. "It's much more efficient with almost zero loss of your fertilizer through that system. You've got the timing. You've got the placement. And you've got the ability to put on less if you don't need it," Eitel said.

"When I do put it on, it goes right to the root zone. I'm not putting liquid on top of the ground and then waiting for it to sink down into the crop, which is when you lose some of it to environmental factors."

Because he doesn't till, he buries his driplines only 12 inches deep. When his corn plants are about a foot tall, he applies 30 pounds of N per acre as their first application.

He doesn't fertilize his soybeans, yet with SDI his improved yields run anywhere from 45 to 70 bushels an acre, Eitel said.

"The drip irrigation has a lot of variables - how big the tape is, what the spacing on the tape is, how far apart it's buried in the ground and how deep," Eitel said.

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CORN

AN "AHA" MOMENT

In the first field that Eitel and his father targeted, a road slices through the middle, creating uneven elevation and making flood irrigation difficult. There were trials and errors there and on another 57-acre field where they first installed SDI. Mark Eitel's "aha moment" came four years after they installed their first system. When drought set in, he said, SDI proved its superiority over flood irrigation.

"The first year of severe drought, the subsurface drip irrigation yielded about 25 percent more yield with 25 percent less fertilizer," he said. That spring, they had applied 200 pounds of N per acre on the flood-irrigated field. With 100-percent no till and no tearing down of furrows each year, Eitel had already been retaining more moisture than other farmers using conventional tillage.

In July 2000, the drought took hold with mere spritzes of rain for the next six weeks. Temperatures soared to 100 degrees or higher for days on end. Searing winds reached 30 to 40 miles per hour, blowing powdery dirt. Corn stressed as it went from vegetative to reproductive stages in the cracked earth.

He anticipated a poor yield on not only his flood-irrigated fields but those with drip irrigation. So Eitel cut back on his in-season N application for his drip-irrigated corn, from 200 pounds to about 150. "At that point, we really didn't realize how effective the drip irrigation was for the fertilizer and we were still under the idea of one pound of nitrogen for one bushel of corn."

Then came the unexpected. "At the end of the year, the corn that was on the flood irrigation was bad -- only 160 to 170 bushels per acre with 200 pounds of nitrogen that we put on there. But the subsurface drip irrigation where we put on less fertilizer ended up making about 205 bushels per acre.

"That was the eye-opener. That's when we realized, 'Okay, this is working. We really don't need to put down that much fertilizer. When we're putting it through the drip tape, we can use less.'" With the drought that year, nobody in his area came close to the Eitel yields. "The immediate neighbors' crops burned up," he said.

The Eitels decided to install more SDI. As he and spouse Mary Eitel gradually expanded, they offset up to two-thirds of the more expensive installation costs with EQIP funds and other incentive programs. They hedged their bet by installing two center-pivot sprinklers with drop nozzles on 250 acres; they work well but not as efficiently as SDI, he said.

LESS FERTILIZER, BETTER YIELDS

Where he has SDI, Eitel applies only 150 pounds of N per acre during the growing season to achieve his yield average of 210 to 220 bushels per acre. His best results yet came one year with decent rain, when he applied 147 pounds during the season yet harvested a 265-bushel-per-acre corn crop.

Because his driplines are underground, rain doesn't wash away his mobile nutrients. With all the weather disasters that can hit western Kansas, Eitel keeps input costs low to manage risk. With fewer inputs, he credits his better yields to SDI coupled with his holistic system, which includes not only no tilling, but also rotations and planting corn into soybean stubble. New roots easily follow old root tracks. For combining, he uses a chopping head that leaves a mulch-like layer of stover, which keeps water in the ground. He harvests corn wet (28-32 percent) for a nearby feedlot.

"Subsurface drip irrigation can work in any situation, but it's different in every situation," Eitel said. "One system that works for one guy might not be the best for another guy. You have to tune it for your conditions." In hot, dry western Kansas, he said, it's been key to his success.

For range farmers who can invest and want to conserve resources, it's imperative they consider SDI, he said. With their system, Mark and Mary Eitel feel they're doing their part for future generations. "You're spending less money, using less water and producing the same amount of crop; I feel that's the best way to preserve the Ogallala Aquifer," Mark Eitel said.

"We've been here since the 1890s and we plan on being here for a long time, so I'm not just planning on getting mine next week and then moving on. I'm trying to make sure that what I have here lasts a long time."



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