

LESS WATER FOR GROWING

Water availability and water management are more hotly debated in the High Plains than global warming is throughout the rest of the U.S.

Corn growers who irrigate are being demonized for aquifers not recharging and rivers running dry. The controversy is not going to dissipate any time soon, and the best bets are that in the not-too-distant future, most farmers who irrigate in the High Plains will be extremely limited in water they can apply per growing season limited to less water than has been previously used to grow a top-yield corn crop.

"Look at the saturated thickness of the Ogallala aquifer. The depth of the water is getting deeper and the saturated thickness is getting thinner; therefore, water is more expensive to pump and there is less water available," says Daniel Davidson in providing a nutshell explanation. The Ogallala aquifer stretches across Nebraska, western Kansas, eastern Colorado and the panhandles of Oklahoma and Texas. Davidson is a Ph.D. agronomist who gives agronomic advice to DTN subscribers.

What were until the 1990s mainly local decisions about water use have become more state, federal and court decisions.

There is no dispute that irrigation is the largest user of ground water in the U.S. It accounts for about 65 percent of water pumped each day, and in Nebraska it accounts for more than 90 percent of the groundwater use.

The current debate in the Plains states is about how to incentivize farmers to retire wells or limit the amount of water they pump. Additionally, federal Environmental Quality Incentive Program (EQIP) money for cost-share retrofitting of pivot irrigation systems to be more water efficient has been available under different state criteria.

IMPROVE PIVOT EFFICIENCY

"There are 50,000 pivots in the state of Nebraska. I sometimes call them the Nebraska state tree," says Jim Kostal, T-L Irrigation marketing manager.

"A substantial number of those systems are 25 to 35 years old," he

says. Pivot irrigation construction really boomed in the state in the 70s.

No one knows what percentage of those old pivots need scrapped or upgraded. This is an opportunity for irrigation companies, crop consultants and farm managers to work hand-in-hand to monitor pivot irrigation efficiency and to recommend immediate changes.

"In my agronomist days, we talked about how many inches of water the crop needed. We never talked to the grower about the sprinkler type," says Aaron Sausser, who today is a sprinkler application specialist with Lindsay Corporation.

"Many more people are recognizing that the strength of the sprinkler package is every bit as important as the pivot itself in terms of getting the right amount of water to the ground for growing the crop and to minimize inefficient use of water through evaporation or runoff," Kostal says.

Regulated low-pressure pivot systems are necessary today for delivering water efficiently, Sausser says. Replacement of old pivots isn't always necessary because older systems can be modified. "Most old pivots do not have a lot of holes in the pipe because they were designed for impact sprinklers, which have a wide throw pattern. That is why double-goosenecks are used to add more sprinklers without much welding," he says.

"The irrigation efficiency comes from spreading the footprint of the water," Sausser explains. This can be achieved with a drop nozzle and new types of sprinkler heads spaced closer together by alternately placing them ahead of and behind the pipe.

With low-pressure units, appropriate water delivery in the spans closest to the pump has to be addressed with sprinklers specific for that use. "The lower your water volume and pressure, the more you have the likelihood of over watering in those first few spans," Sausser says.

CORN

Many pivot irrigation systems need upgrading.

■ By Rich Keller, editor

Kostal notes, "You use to talk about applying 1,000 to 1,200 gallons per minute, now you talk 800 gallons a minute, and in some cases, we've seen exceptional corn crops grown in western Kansas under systems delivering 400 or 500 gallons per minute. As the gallons have gone down, the efficiency of the sprinkler system has gone up. High-bushel corn crops can be grown with far less water than what was used before."

CHANGES NEEDED NOW

Kostal and Sauser agree that evaluating the sprinkler equipment on every pivot in the Plains is the most important first step to water management efficiency and growing a corn crop with less water.

"If we can keep the sprinkler droplet size most like rain drops, that is very beneficial," Sauser says. Impact sprinklers have extremely limited use in an age of water cutbacks, even though Sauser estimates that as many as 30 percent to 40 percent of pivot systems in Nebraska are still equipped with such sprinklers.

Texas and Oklahoma residents definitely don't appreciate Nebraska farmers "pulling water out of the same aquifer and shooting it up in the air wasting it," Sauser notes.

Agronomist Davidson says, "Upwards of 50 percent of their water in the

southern High Plains has already been pumped out of the aquifer."

"Agriculture is going to be a third priority after people and industry, and growers are going to have to adjust," Davidson predicts.

The first adjustment has occurred as surface irrigation, the least efficient form of irrigation, has been replaced in most areas. "Compared to surface irrigation, a grower can reduce water use by about a third using pivot irrigation," Davidson says.

Nebraska corn growers must continue switching to no-till and conservation tillage. "If you have 10 inches of moisture in the soil, why stir it and lose three inches of it? A grower needs to take advantage of water that is there in the spring and supplement it," he says.

"There already is talk about limiting the amount of water that can be applied to an acre to something like 10 or 12 inches compared to 18 inches, which would normally be pumped through a pivot for raising corn," Davidson says.

He says a corn crop can be raised on 10 to 15 inches of water (soil moisture and irrigation water combined), but it will be a much lower yield. The economics

could still pencil out because of lower pumping costs and the higher market outlook for corn. Alternative lower-water-use crops probably still wouldn't result in a higher return.

Those few more inches of water to grow corn aren't going to be legally available at some point, and there also aren't any other proven low-volume irrigation methods for the High Plains.

Help to grow corn with less water will come with genetically engineered drought-tolerant corn, but such corn isn't expected on the market for seven to 10 years.

The answer for High Plains corn growers today is to make changes to their existing pivots or evaluate installing high-efficiency new ones. **AG**

