Soil structure determines how much water a field can hold, said a University of Nebraska–Lincoln specialist.

Water quickly percolates through coarse, sandy soil, while fine soils, like clay, retain more water, said Dean Yonts, Extension Irrigation Engineer at the Panhandle Research and Extension Center in Scottsbluff. Water is held around particles as a thin film so more, fine particles present more surface area and thus the ability to hold more water. Irrigators should know the soil properties of their fields and plan their irrigation with that in mind.

County soil surveys and the U.S. Department of Agriculture's Natural Resource Conservation Service online soil maps will help producers get started with a wealth of information. The NRCS soil surveys at "http://usda.soils.gov" http://usda.soils.gov gears its information to irrigators with reminders of possible concerns. Yonts advised producers to go to that site and try to understand how soil structure will affect yields. Will the slope of a field cause problems with runoff if using low-pressure systems?

Yonts said that gravity has less to do with water movement in the soil than capillary action, particularly in fine soils. Gravity pulls water downward, but because water moves from wet soil to dry soil, horizontal movement is nearly as prevalent as vertical.

The more surface tension holding water to soil particles, the more difficult it is for plants to withdraw water. Because of that capillary attraction, 30 to 40 percent of soil water is not available, Yonts said. Only about half the water that is available to the plant is readily available, he said. Beyond that, plants suffer stress. Ideally, the crop will only need to use half of that available water.

Irrigators should think about whether their soils can hold the water they're applying. Water that runs off or percolates beyond the plants' ability to use it is wasted, Yonts said, and so is the money it costs to pump that extra water.

Sometimes runoff is unavoidable because a rain follows immediately after irrigation. However, he advised producers to check the weather forecast and consider delaying irrigation if rain is forecast. In eastern and central Nebraska, where the potential for rain is high, producers should try to maintain some capacity to store rainwater.

"In Scottsbluff, I don't make that recommendation because the odds of getting rainfall are so small," Yonts said. "In the middle of the season, if I don't see any rain in the forecast and I fill the profile, the crop will consume an inch of water in four days."

Timing irrigation with rainfall and paying attention to the soil retention potential of a given field can make irrigating more efficacious and economical, while maintaining top yields.