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## DROUGHT, NITROGEN AND WATER QUALITY?

**Mother Nature pummeled farmers across the U.S. this summer; crops wilted and collapsed, soils parched, and some streams faded to trickles.** Important N management questions faced by farmers suffering through this drought are:

- How much of my applied N is left in the soil profile this fall?
- How much of that N will remain in the soil until next spring?
- What can I do to prevent loss of the residual N from the field?
- How do I adjust my fertilizer N rates for the next crop?

**Plan now to collect samples to at least 2 to 3 feet deep in most soils, and analyze the samples for nitrate-N.** Since it is difficult to manually insert and extract a soil probe to this depth, consider collecting samples with the aid of a hydraulic or powered sampler. If samples are collected in a nominal depth increment (e.g. 6 inches), one can identify where the concentration of nitrate is in the soil profile, and use that information to determine both risks and magnitudes of loss from the root zone.

**Nitrate-N is very mobile and will move readily with the wetting front through the soil.** We typically think of sandy soils as being more conducive to nitrate leaching loss, but when clayey soils shrink and large cracks form upon drying, any nitrate adjacent to those voids can move downward readily with the first pulse of a good rain. One must consider the way water infiltrates the soil, the permeability of the soil, and the soil drainage characteristics to estimate potential nitrate leaching losses. If heavy rains fall between this fall and spring, and the soil is underlain by tile or a subsurface drainage system, then a large portion of that nitrate can be lost to streams and waterways. Information on water holding capacity, soil permeability, and other physical characteristics of your soil type(s) can be found at your local NRCS office, or on-line at their website (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>). If a silt loam soil contains 1 to 3 inches of available water per foot, and the soil is near wilting point, and 10 or more inches of rain occurs between fall and spring, then it is possible for the rainfall infiltration and wetting front to push any nitrate at least 36 to 48 inches downward in the soil profile.

**USDA ARS research in central Iowa has shown that a winter cover crop of wheat following corn can reduce tile drain nitrate-N losses by as much as 60%.** Vigorous cover crop growth can result in uptake and retention of more than 40 to 60 lbs of N/A; with N savings alone valued at more than \$15 to \$25/A. A good cover crop can serve as a "N bank", and release the plant N via soil decomposition of crop residues, after the cover crop is mechanically or chemically terminated. Besides conserving N, good cover crops can protect water quality.

Many will want to consider collecting profile nitrate-N samples in the spring near planting time or shortly thereafter, to verify the soil nitrate supply for appropriate adjustment of fertilizer rates. As always, seek the advice of your Certified Crop Adviser, agricultural consultant, or Extension specialist to make your cover crop and N management decisions.

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Abbreviations: N = nitrogen.