

## SOILS

# Soil Fertility Management After Drought

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**Due to extreme** drought conditions experienced in the Southern Great Plains in 2011, several crop failures occurred. As we prepare for fertilizer

application this spring, two important questions come to mind: what happened to fertilizer I applied last year and do we need to fertilize or not? If no winter crops were grown, most of the fertilizer you applied last spring may still be available for the 2012 growing season. There are no shortcuts to estimate residual fertilizer except to test the soil, which is an easy task that may save fertilizer dollars.

Collecting a proper soil sample is very important. The best way to get a sample is to use a soil probe and use proper methods for sample collection. Collect composite soil samples representing different areas of your field to get a representative sample from each area. To do this, collect a minimum of 15 random cores for each sample, mix them together and take a subsample. If residual nitrogen is expected, it is better to collect samples from 6 to 12 inches in addition to the routine 0- to 6-inch soil sample. Separate 0- to 6-inch and 6- to 12-inch samples during collection and



*To evaluate residual fertilizer, a soil test must be performed. The best collection method is to use a soil probe and obtain at least 15 random cores.*

get them analyzed separately using a soil testing lab.

A routine soil test from most labs will evaluate pH, nitrogen, phosphorus, potassium, calcium, manganese and sodium. You can also get additional tests run to know the amount of sulfur and micronutrients like zinc, boron, iron, manganese and copper. For this article, let's focus on nitrogen, phosphorus and potassium fertilizers since these are the most commonly deficient essential nutrients for plants.

Nitrogen (N) is a mobile nutrient; the amount of residual N depends on the source of fertilizer, soil pH, temperature, wind speed, soil moisture and timing of rainfall related to fertilizer application. Urea is a popular N source, but prone to volatilization (vaporization of the chemical) losses if broadcast on the soil surface. Ammonium nitrate has less volatilization loss, but getting ammonium nitrate is more difficult due to safety and hazard restrictions. ►

Phosphorus (P) and potassium (K) are immobile nutrients, meaning movement in the soil is minimal. Due to crop failure, much of P and K applied in 2011 will still be available for the 2012 growing season. Deficiencies of immobile nutrients, like P and K, reduce the potential yield of a field by a percent sufficiency factor. For example, if one nutrient is sufficient at 80 percent, then 80 percent of potential yield may be reached if all other

factors are sufficient. If both P and K are deficient, the percent of maximum yield will be a product of their sufficiency levels. If the soil test shows 80 percent sufficient P and 70 percent sufficient K, then the combined effect on the expected yield will be 56 percent ( $0.80 \times 0.70 \times 100$ ).

### Practical considerations

Depending on soil test results:

- If P and K levels are low, correct

them before applying N fertilizer.

- If P and K levels are moderate and you are seeking moderate yields, apply a medium amount of N fertilizer.
- If P and K levels are moderate and you are seeking higher yields, correct P and K deficiencies before you apply higher levels of N.

Don't throw your money away without first testing your soil. This is especially critical when recovering from drought. ■