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Soil Testing More Important Than Ever for Efficient Fertilizer Use

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Meeting the Challenge:
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Don't guess, soil test. That may be a worn-out phrase, but it has taken on new meaning in the past year as commodity and fertilizer prices have fluctuated wildly. Soil testing is more important than ever because of changes in crop and fertilizer prices. Over the last two years the cost of soil sampling and analysis has increased little, while fertilizer prices have increased twofold to fourfold.

The information from soil tests is more valuable than ever. For more accurate fertilizer recommendations and increased efficiency, producers need two things: 1. better soil samples and soil sample information; and 2. better soil test calibration relationships that reflect both crop response and profit response.

The goal of soil testing is to provide an accurate assessment of the soil's fertility status that can be used to make fertilizer recommendations. With the increasing awareness of fertilizer effects on environmental quality, soil tests can also be used to determine where fertilizers or manure should not be applied.

Guidelines for soil sampling are explained in NebGuide G1740 (http://www.ianrpubs.unl.edu/sendIt/g1740.pdf). Extension Circular EC154 provides details on different methods of grid and management zone sampling (http://www.ianrpubs.unl.edu/sendIt/ec154.pdf). Soils should be sampled every three to four years for pH, organic matter, phosphorus, potassium and zinc. Soils should be sampled for residual nitrate to a 3- or 4-foot depth before corn, wheat, sunflower and sugar beets and to a 30-inch depth for dry beans and millet. Original soil-test guidelines suggested doing a good job of sampling, then following your fertilization plan for four years before sampling again. The advantage of sampling yearly is to spot outliers from long-term trends that may show you have a bad sample.

Today, producers are soil sampling two different ways: 1. Traditional, whole-field management; and 2. precision management approaches. Currently, most soil sampling is done on a whole field basis, taking 10 to 20 cores from areas of 20 to 50 acres each year. Because of soil variability, producers should actually sample smaller areas. Soil sampling instructions 30 years ago suggested sampling different areas of the field to determine variability. Knowing variability in pH and phosphorus can provide information

for variable rate fertilizer application that may not save fertilizer costs, but allows the farmer to put the right amount in the right place. Farmers can still average soil test levels from those smaller areas and apply an average fertilizer rate, but at least they would know the degree of variability in their fields. Precision approaches (grid or zone sampling) provide that additional detail, but it is more expensive.

An important factor to consider for fertilizer efficiency is properly crediting other nutrient sources, such as legumes, manure, and irrigation water. The cost to collect and analyze water samples for nitrate, or manure samples for nutrient content, has increased little. The value of the nutrients these resources contain has gone up substantially. Until retail fertilizer prices drop to match the recent downturn in grain prices, the importance of accurate soil sampling information cannot be overemphasized. It is critical that investments of this size be made with the best information possible, based on careful soil testing after accounting for all sources of nutrients.

Another problem with accurate fertilizer recommendations is differing philosophies of soil test interpretation. Research by the University of Nebraska (Soil Testing Lab Comparison Study) highlighted the problem. The science of soil analysis is not in question. The way different commercial laboratories interpret how much fertilizer to apply at a given soil test level, compared to what original soil test calibration recommended, is still being debated. The most recent data from Nebraska (Nebraska Soil Fertility Project) confirms our earlier correlation and calibration recommendations for N, P and K. A web site that allows producers to input any laboratory's analysis and obtain University fertilizer recommendations is at http://soiltest.unl.edu.

Soil sampling has always been an important management tool to help producers determine nutrient status and need. The basic principles of what constitutes a good soil sample have not changed, but the economic importance is even greater today in terms of using it as a risk management tool to maintain your soil's productivity while still making a profit.