

## **The economic return to soil test information**

Submitted by: David Kehler, County Extension Director/Agriculture Agent

After harvest in the fall is an excellent time for soil sampling and testing. This year, with low grain prices, many producers may be looking for places to cut costs. However, cutting back on soil testing could result in lowering profits.

Having accurate soil test information is critical to making the right decisions regarding fertilizer input. Fertilizer cost has remained steady while grain prices have dropped this fall. Therefore, making good use of fertilizer input becomes critical to maximize profits.

Previous research by former K-State agricultural economists Terry Kastens and Kevin Dhuyvetter simulated 10,000 observations from farm production fields to evaluate the economic value of accurate soil test information. Each field was assigned a random value for soil test P (STP) and soil test N (STN), and different scenarios for expected yields and prices for grain and fertilizer. The random values represent what a producer might guess the soil N or soil P level is without having results of a soil test for confirmation.

The resulting yields from nutrient rates applied based on the guesses made without accurate soil test information were compared with the yields obtained when applied nutrient rates were based on actual soil test levels of N and P. Results from this study show that when the guess on soil N and P levels turned out to be exactly correct, and equal to the actual levels, there was no effect on profit from having the actual soil test information – except for the cost of taking and analyzing the soil tests.

However, if the guess is not correct, and the actual soil N or P level is much lower or much higher than the initial guess, the producer would have lost a significant amount of money per acre. In other words, the overall return to accurate information on soil nutrient levels can be significant.

The research paper by Kastens and Dhuyvetter is available at:

[http://www.agmanager.info/crops/prodecon/precision/Soiltest\(revJan2005\).pdf](http://www.agmanager.info/crops/prodecon/precision/Soiltest(revJan2005).pdf)

Considering other variables such as fertilizer and grain price, results show that returns to soil sampling are generally greater when grain prices are lower. This is because potential returns to inputs are tighter at lower crop prices.

If actual soil test levels of N or P are higher than what you expect, producers can realize a significant savings by reducing or eliminating unnecessary nutrient applications. This situation is not uncommon for N, where some fields may have high levels of residual N from previous crops.

On the other hand, if producers overestimate how much N or P is in the soil and actual soil test levels are much lower than expected, yields and income could be increased by applying the higher, correct amount of nutrients needed. In this case, the difference in final income per acre will depend on the cost of the needed nutrients, the yield response from applying the needed nutrients, and crop prices.

If producers are applying a “farm-wide” uniform rate, they may be missing the opportunity to maximize profits for each field. Furthermore, by sampling and fertilizing based on management zones within a field, or based on historical yield map data, producers can further increase the return per acre.