NEWS & VIEWS

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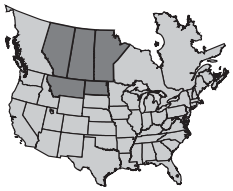

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Managing with High Fertilizer Prices

RECENTLY, fertilizer prices have been higher and supplies of some nutrients have been tighter. Yet most realize, and research continues to confirm, the critical role of fertilizer use in profitable crop production. The result is an increased emphasis on efficient use of nutrients that is effective in accomplishing grower goals. Here are some suggestions for keeping fertilizer bills as low as possible without compromising the yield that brings much needed revenue.

Account for Soil Nutrient Supplies—Soil Test

How much of each nutrient do you currently have in your soil? Take advantage of what is already there by soil testing this fall or next spring. When fertilizer costs increase and supplies tighten, soil test results provide the best guidance for deciding which nutrients should be applied and how much of them to use. If soil test levels of nitrogen (N), phosphorus (P) or potassium (K) are high, you have a better chance to adjust your fertilizer application rates to avoid over-fertilization. Remember, soil test results for N provide a very different picture of nutrient supply relative to P and K. Soil test N levels indicate the supply of nitrate-N in the soil at the sampling time. This will change before spring, and labs often take this into account when evaluating fall samples.

Soil test P and K levels reflect the ability of the soil to supply P and K to the soil solution. When taken up by the crop, more P and K are released from the bulk soil, with the rate of release based on the soil test level – deficient, medium or sufficient. It is also important to remember that an economic response to low rates of P and K applied as a starter band often occurs in the year of application, regardless of soil test level. This is related to the slow movement of soil P and K under the cool soil conditions common at seeding in the Northern Great Plains. So while farmers can take advantage of existing soil P and K reserves, they need to understand that supplies will decline based on crop removal and need to be replenished later in the crop rotation cycle to avoid future nutrient deficiencies and associated income losses.

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Nitrogen Credits

Soil N is much more dynamic and variable than P or K, mainly related to the crops grown and management inputs. It is important to take N credits for previous crops when making fertilizer rate decisions. Most regional soil testing labs will provide some type of N credit based on the previous crop grown. The N credit given for pulse crops (peas, lentils, chickpeas and beans) varies by the crop grown and the yield achieved. For some labs this is calculated for each crop and deducted from the recommendations. For other labs, there is a flat rate credit regardless of the crop grown or the yield obtained. And finally, there are labs that give no credit for having grown a pulse crop or forage legume. So the critical factor is to ensure that you understand from the soil testing lab what type of credit, if any, they are providing for your samples taken from lands that grew pulse crops. It is also important to remember that for perennial forage legumes the N credit may be minor the first year after breaking, and increase to a peak in year two and three. The exception is irrigated lands where the water supply ensures the mineralization of the N from the legume forage crop in year 1. Remember, on dryland fields the release of nutrients from legume crops depends on moisture conditions—if it is dry, expect little release.

Nitrogen Mineralization

There are a number of farmers and their advisors who will be making estimates on N mineralization from soil organic matter this next year. There are a few ways to estimate this N release from the soil, but some understanding of soil organic matter levels helps to get you in the range of what to expect. Soils which have been managed well, with regard to their soil fertility levels, tend to mineralize more nutrients. This occurs in all soil zones, with the total N mineralized being greater on high organic matter soils. Measured soil N mineralization rates range from 20 to 40 lbs N/A on Brown (Aridic Boroll) soils, and 80 to 100 lb N/A on Black (Udic Boroll) soils. In all instances, the mineralization level is affected by soil moisture conditions—the wetter the soil the more N mineralized. So be sure and count on some soil N mineralization, but be aware that it is weather and management dependent.

Account for Nutrient Supplies on the Farm or Nearby

If you have access to manure, whether it's on your farm or your neighbor's, use it as effectively as possible. The current economic and supply conditions may increase the distance that manure can be hauled. You also need to know the nutrient content of the manure and the rate at which manure is applied, so you can calculate how much of each nutrient is being put on. If spreader calibration and manure testing have seemed too time consuming or too expensive to deal with in the past, this may be the year to reconsider. If manure application equipment is dated, it may be time to run the numbers and see if updated equipment capable of applying lower, agronomic rates can be justified. In some cases, manure application rates can be cut in half and still meet crop needs, allowing manure to be a nutrient source on more acres. Record the places within a field where manure is applied. This can be accomplished with flags or global positioning system (GPS) receivers and software.

Timeing and Placement for Efficiency

Spring N applications provide N at a time closer to crop need, reducing the chances for N loss. However, spring applications can also carry higher logistical risks, since conditions are typically wetter than the fall. In some areas, fall N applications can be effective if they are made when soil temperatures drop below 50 degrees F (10 C) and remain there. Nitrification inhibitors can also reduce or eliminate N losses from fall to spring. Remember, for most well drained soils in the Northern Great Plains, fall applied urea and anhydrous ammonia are as effective, and efficient in crop utilization, as spring application. It is areas subject to saturation in fall or spring where N losses are high.

Generally, banded nutrient applications provide higher recovery of N, and first-year recovery of applied P and K than do broadcast applications. For N application, band application is now the standard for efficient crop response. For P and K, some universities and provincial governments suggest rate reductions when they are applied in this manner. If short-term economic decisions dictate banding P and K at rates less than those of crop removal, producers and advisers may want to build in a plan for replenishing soil nutrient supplies in the future, when economic conditions improve. Bands placed near the seed provide early season access to nutrients, while overall higher fertility levels in the bulk soil provide access to nutrients by the larger root system later in the season. This approach has worked well for wheat.

Allocate Money to the Right Nutrients

In times like these, many emphasize that N needs must come first. Before jumping to this conclusion, soil test levels of a field or field area must be examined. In the worst case, it may be found that N, P, and K are all in short supply. When this happens, crop response to any single nutrient will be limited if only that nutrient is applied. For instance, when P levels are low, the plant has a reduced supply of stored energy. Without enough energy, the plant is not effective in absorbing limited soil N, P, or K supplies. In such cases, if recommended rates of each nutrient cannot be afforded, it is best to apply at least some of each nutrient, rather than focus on one nutrient alone. As an example, banding low rates of P near the seed can provide additional energy needed by the plant to help it take advantage of applied N and soil K reserves.

Prioritize Fields and Areas Within Fields

Allocating nutrient funds across the farm should be based not only on soil tests but also on economic evaluations of each field or field area. What is the break-even cost of production for each field in a farming operation? Which fields consistently make money, which ones are hit or miss, and which ones are just a drag on the business? Spending time looking at how fields have performed over time may help farmers and advisers focus resources on the money makers. The goal of such an analysis is to ensure that consistently profitable fields have the nutrients they need to maintain production and revenue levels. With the advent of precision agriculture, this evaluation can be brought to a higher level of resolution, extending the concepts to areas within a field, rather than the entire field.

Examine Yield Goals and Nutrient Recommendations

Since many nutrient recommendations are based on yield expectations, setting realistic yield goals is important. One way to set realistic expectations is to look back at previous years' performance, to get an idea of what typically happens, given specific levels of crop stress. An average of several years yield levels is often useful in setting realistic goals. When your yield goal is to increase yields, select some percentage increase over this average and fertilize to that level of production.

Are nutrient recommendations based on the best science available? University and provincial research and publications set the standard for science-based nutrient management decisions. How do currently-used recommendations compare to these? If modifications or different approaches are being used, is there good information behind them? Many farmers using the hybrid canola technology are reporting higher yields with very high levels of nutrient removal. Look at the scientific guideposts, like university and provincial guidelines, to see how current management practices compare for these high yielding crops.

Summary

When funds are limited and supplies are tight, it is paramount that nutrients be used as efficiently as possible. Efficient use is possible only when informed decisions can be made. **Keeping soil test information up-to-date, identifying profitable fields or field areas, using all nutrient sources available, and adopting nutrient management practices based on proven scientific principles assure the greatest chances for success.** ■