Texas Agricultural Extension Service
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Dealing with Higher Nitrogen Fertilizer Prices

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Fertilizer management is an important part of crop production, more so now than ever. This is due in part to increasing costs for fertilizer materials, particularly nitrogen fertilizer. Natural gas is used as a feedstock in the production of anhydrous ammonia which is the starting point for production of most commercial nitrogen fertilizers. Natural gas serves as a source both for energy in the reaction and for the hydrogen that is combined with nitrogen (N) from the atmosphere to produce anhydrous ammonia (NH_3). Thus, as the cost of natural gas increases, so does the cost of most commercial fertilizers containing nitrogen.

Over the past 10 years, natural gas prices for North American ammonia producers have been around $2.00 per million British thermal units (MMBtu), but the price climbed to over $6.00 in late 2000 and could reach as high as $8.00 per MMBtu. The demand for natural gas has increased due to cold winters and the greater interest nationally in cleaner burning alternatives to coal and fuel oils. Production of each ton of ammonia requires about 33.5 MMBtu of natural gas. At $2.00 per MMBtu, the wholesale per ton cost for ammonia is about $230 or $0.14 per pound of N. In contrast, at $8.00 per MMBtu, the cost for ammonia will be near $400 per ton or about $0.24 per pound of N. Other nitrogen fertilizers produced from anhydrous ammonia, such as urea and ammonium nitrate, require further processing for their production and will have a proportionately greater cost. Dealing with higher fertilizer prices will require more aggressive management by growers than ever.

First, get a soil test. Routine soil testing will help identify what the fertilizer needs are for each field to achieve optimum growth and production of the planned crop at the expected yield goal. Cost savings achieved by applying just the required nutrients at the optimum rates will conserve input dollars.

Second, purchase fertilizer on a cost per pound of nutrient, not on a cost per ton. This can be calculated easily by dividing the pounds of N per ton of fertilizer material into the cost per ton. In the cost comparisons above, anhydrous ammonia is 82% N and thus contains 1640 pounds of nitrogen per ton (2000 x 0.82 = 1640). If the per ton product cost is $230, then 230/1640 = $0.14. Comparing the per pound cost for just those nutrients recommended by soil test can help in selection of the most economical fertilizer material.

Third, consider alternative sources of nitrogen such as livestock manure or sewage sludge. Manures can be tested for their nutrient content at the Extension Soil, Water and Forage Testing Laboratory in College Station, or at various private laboratories. New EPA Class A sludge materials are available

from several sources. These materials have been specially processed to remove potential pathogens and are required to meet specific limits for heavy metals. Class A materials have no site restrictions on where they may be applied, often have a guaranteed analysis to ensure value, and like manures, provide organic matter important for improving soil tilth. Be sure to make applications consistent with a current soil test recommendation to ensure that essential plant nutrients are applied at the proper rates. Over-application can lead to plant growth problems and be a threat to water quality.

Fourth, ensure that nutrients are applied at the optimum time for efficient uptake and use by the crop. Warm-season grasses should not be fertilized until the crop is actively growing, which generally does not occur until nighttime temperatures are consistently above 60 F. For annual crops, fertilizer applications should be made as near the time of planting as possible to improve availability. Premature nitrogen fertilizer application can lead to nutrient loss by leaching, runoff or volatilization. In addition, it can stimulate the growth of undesirable plants (weeds) that may compete with the crop and require additional inputs for control. Regardless of the crop, split applications of nitrogen can significantly improve the efficiency of nutrient uptake and ensure that fertilizer is available during periods of peak demand.

Finally, growers should evaluate the potential to modify their cropping system to reduce the need for supplemental fertilizer. Incorporation of legume crops into rotational cropping systems can improve soil quality and serve as a source of nitrogen. Legumes form symbiotic (mutually beneficial) relationships with certain soil microbes which live in their roots and enable the plants to fix nitrogen directly from the atmosphere. This nitrogen can be cycled into the following crop to reduce fertilizer requirements. Beef producers also may want to evaluate whether a rotational grazing system may be preferable. Economic comparisons can be used to determine whether an effective grazing system could be more cost effective than hay production to meet long-term goals.