CAN I AFFORD TO APPLY NITROGEN TO MY CROP? *THIS YEAR*

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Nitrogen application is an important part of many successful production agriculture operations. However, the costs and expected benefits of nitrogen need to be considered prior to application decisions. This worksheet helps producers evaluate the application decisions for their operations given both costs and production goals. Producers can modify the worksheet to include actual application rates and costs and to determine break-even yields necessary to cover the cost of applied nitrogen.

Application costs, fertilizer costs, and nitrogen goals per-acre are important considerations when making nitrogen application decisions. Soil tests can help determine the amount of nitrogen fertilizer to use in conjunction with the *Guide to Wyoming Fertilizer Recommendations* (available at http://www.uwyo.edu/soilfert/pubs/blaylock_etal_1996.pdf). Application costs will vary depending upon whether a custom applicator is hired or on-farm machinery is used. If using your machinery, calculate fuel, labor, and machinery cost per-acre to find the application cost.

A custom rates guide is at http://cropwatch.unl.edu/web/economics/customrates to help estimate application costs.

Fertilizer application rates are often in pounds per-acre. Application timing and soil needs will determine which fertilizers to use. After determining the amount and type of fertilizer to be applied, calculate the application costs with the equations below. If you rely on more than one type of fertilizer to meet nitrogen needs, simply adjust the pounds of N applied and percent of N for each type of fertilizer. Then add the cost of each nitrogen source to determine the total cost per-acre for nitrogen application. To determine break-even yield (the yield required to equal the cost of nitrogen application), divide the total per-acre costs by the current (or forecasted) crop price. The result is the per-acre yield increase needed to justify the application (as opposed to no nitrogen application). If a larger benefit is expected, nitrogen application is more than justified; if the expected benefit is less, nitrogen application is not profitable.

This worksheet outlines the costs associated with nitrogen application but can be applied to other fertilizers. When using fertilizers such as (11-52-0) for phosphorus, remember to include the nitrogen received from this and include it in your total nitrogen needs and costs.

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ONE NITROGEN-ONLY FERTILIZER

$$\left(\frac{\#N\ goal}{\%N\ in\ fertilizer} \Big/ 2000 \right) X\ (price\ of\ fertilizer\ per\ ton) + (application\ cost\ per\ acre) = \$\ Cost\ of\ nitrogen\ per\ acre$$

Example: 120#/acre nitrogen goal using urea broadcast (46-0-0) at $554/ton and a $5.37/acre application cost

$$\left(\frac{120\#}{46\%} \Big/ 2000 \right) X\ (\$554)) + (\$5.37) = \$77.63\ /\ acre$$

In this example, if corn is expected to sell for $6/bushel, the added nitrogen fertilizer would need to result in a 12.9-bushel yield increase compared to no nitrogen application.

$Cost of nitrogen per acre/price of corn
$77.63/$6=12.9 bushels per acre

MULTIPLE NITROGEN FERTILIZERS

$$\left(\left(\frac{\#N\ goal}{\%N\ in\ fertilizer} \Big/ 2000 \right) X\ (price\ of\ fertilizer\ per\ ton) + (application\ cost\ per\ acre) \right) +$$

$$\left(\left(\frac{\#N\ goal}{\%N\ in\ fertilizer} \Big/ 2000 \right) X\ (price\ of\ fertilizer\ per\ ton) + (application\ cost\ per\ acre) \right) = \$Cost\ of\ nitrogen\ per\ acre$$

Example: 120#/acre goal, 60# from urea broadcast (46-0-0), $554/ton for urea, at $5.37/acre application cost and 60# from (32-0-0) liquid side-dress, and $426/ton for 32% solution at $5.45/acre application cost.

$$\left(\left(\frac{60\#}{46\%} \Big/ 2000 \right) X\ (\$554) + (\$5.37) \right) + \left(\left(\frac{60\#}{32\%} \Big/ 2000 \right) X\ (\$436) + (\$5.45) \right) = \$87.83/acre$$

In this example, if corn is expected to sell for $6/bushel, the added nitrogen fertilizer would need to result in a 14.6-bushel yield increase compared to no nitrogen application.

$Cost of nitrogen per acre/price of corn
$87.83/$6=14.6 bushels per acre

Online worksheet link: Insert your custom numbers into the worksheet
http://uwyoextension.org/nitrogencalculator