



# FERTILIZER:

An Investment for 2009 Crops



## Optimum Nitrogen and Phosphorus Rates in Times of Changing Grain and Fertilizer Markets

*One of the challenges for grain producers in the Northern Great Plains (NGP) over the past year has been uncertainty when deciding what rates of N and P fertilizers to use for crops when there have been large fluctuations in both grain and fertilizer prices.* From past experience growers know that they optimize net returns per acre when they can grow a reasonable yielding crop using adequate, but not excessive rates of fertilizer. However, what is that “adequate but not excessive rate,” and does it change much when there are different combinations of grain and fertilizer prices?

*There are planning tools available to determine the economically optimum rates.* It can be useful to show how optimum N or P rates change under different combinations of grain and fertilizer prices. To illustrate this, the following data were generated using Rate of Return Calculators developed by Dr. Rigas Karamanos of Viterra (formerly Westco Fertilizers) for the Manitoba Provincial government. The calculators are based on a large database of nutrient response field experiments conducted by Westco Agronomy Research during the last two decades. The fertilizer and wheat prices used in the calculations are generalized NGP prices at the times noted, and optimum fertilizer rates and net returns were generated using the calculators mentioned (**Table 1**).

**Table 1.** The effect of fertilizer and wheat prices on optimum N and P rates and net returns.

Date	Urea 46-0-0, \$/ton	MAP 11-52-0, \$/ton	Wheat, \$/bu	Optimum N rate, lb N/A	Optimum P rate, lb P <sub>2</sub> O <sub>5</sub> /A	Net return to N fertilizer, \$/A	Net return to P fertilizer, \$/A	Total net return to N and P fertilizer, \$/A
15-Jan-2004	334	306	3.80	100	25	58.61	4.11	62.72
3-Mar-2008	743	1,144	11.10	110	25	198.16	4.63	202.79
9-Jan-2009	585	660	5.80	100	25	81.38	2.05	83.43
10-Feb-2009	444	472	5.65	110	25	97.92	5.40	103.32

*Fertilizer prices follow grain prices, and usually when grain prices increase there is an increased market demand for fertilizer that results in increased fertilizer prices.* The converse is also true. Lower grain prices result in a decreased demand for fertilizer and lower fertilizer prices result. In **Table 1**, the economically optimum N and P rates changed very little when the four different dates were considered. Admittedly, if grain prices had stayed at the 15-Jan-2004 level of \$3.80/bu, and the fertilizer prices of the other dates were used, then optimum N rates would have changed. For example, at the \$3.80/bu wheat price, the optimum economic N rates in lb N/A would have been, respectively, 100, 90, 80, and 60 for urea prices of \$344, \$444, \$585, and \$743 per ton.

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Fortunately, supply and demand forces in grain and fertilizer markets interact in such a way that it is rare that there is a drastic change in fertilizer prices without a previous change in grain prices, be it up or down. The exception could be if natural gas prices, the main feedstock and input cost for N fertilizer manufacturing, increased greatly without an increased demand for grains.

In summary, even though grain and fertilizer prices increased and subsequently decreased over the past year and a half, the optimum economic N and P rates changed very little. Net returns to fertilizer have remained positive and fertilizer is still a viable investment for farmers. 🌱

*Abbreviations and notes for this article: N = nitrogen; P = phosphorus; K = potassium.*

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*Decision aids to help farmers and advisers make more informed decisions are available in the Toolbox section of IPNI's website: [www.ipni.net/toolbox](http://www.ipni.net/toolbox).*



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