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ESTIMATING YIELD LOSS FOR FERTILIZER RATE REDUCTIONS

A common question asked in unfavorable economic times is: "How much yield loss can I expect if I cut my nutrient rates?" While the inquiry appears simple, answering it is not. Generally, when farmers ask this question, they have too little money available to afford the entire quantity of nutrients being recommended. When governments and industries ask this question, they generally have insufficient supplies of nutrients to meet all the needs of the crops in their regions.

Whether or not measurable yield losses will occur when rates are reduced depends primarily on the quantities of nutrients already available in the soil. The higher the quantity of available soil nutrients, the less responsive crops become to nutrient additions. When no fertilizer is applied, soils that have greater quantities of nutrients will produce yields higher than those with lower levels. This general principle operates regardless of the nutrient.

Another consideration is the philosophy used by the adviser making the nutrient recommendation. Using rates that maximize economic returns to nutrients in one season is not always the objective. There may be other factors, such as addressing the uncertainty in characterizing the nutrient supply of the soil, that are more important. Farmers who want to ensure nutrients are non-limiting often apply rates that exceed those necessary for maximizing short-term economic returns with the objective of maximizing long-term returns. In such cases, cutbacks in application rates may cause no measurable reductions in yield in the short term. The impacts come later. Relying more on the soil resource today means that in the future, soil resources won't be as large and dependence on supplemental nutrients will increase.

A fundamental problem in estimating yield loss is that the yield response to nutrients as well as the soil nutrient supply are often poorly characterized. Just how much an area of the field will yield in a particular year if left unfertilized and how much yield is gained from a nutrient addition are usually not known.

Although limited in scope, it is possible, with many assumptions, to reasonably estimate some amount of yield loss when rates are cut back from those that are economically optimum in the short term. A simple spreadsheet was developed to help farmers and advisers do some general estimates. The spreadsheet is available in the Toolbox section of IPNI's website: >**www.ipni.net/toolbox**<.

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