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BUILDING AND MAINTAINING ADEQUATE PHOSPHORUS AND POTASSIUM

With the excellent crop yields in many areas this year has come high rates of nutrient removal and exportation from fields. In many cases crop removal of nutrients such as phosphorus and potassium has exceeded the level of input. These imbalances can ultimately result in a drawdown or reduction of soil test levels. A continued drawdown or mining can reduce farm profit potential, increase the risk of yield loss associated with limited soil moisture or surplus moisture, lead to nutritional imbalances with nitrogen and other nutrients, increase environmental risk associated with reduced nitrogen-use efficiency, and make it more difficult to restore phosphorus and potassium fertility to the optimum levels.

Soil phosphorus and potassium levels are increased by applying more P_2O_5 and K_2O than are removed by the harvested crop(s). This raises the question "just how much fertilizer above crop removal does it take to increase soil phosphorus and potassium levels?" A general rule of thumb is that it takes about 12 to 28 pounds of P_2O_5 above crop removal to raise the soil test phosphorus level one part per million. It takes about 8 to 16 pounds of K_2O above crop removal to raise soil test potassium one part per million. The amounts of P_2O_5 and K_2O required will depend on the initial soil test level, rate of crop removal, soil texture, clay minerals present, organic matter level, and tillage system. Knowledge of these relationships gives farmers greater flexibility to manage soil fertility and to negotiate with landlords and lenders.

Inattention to optimum fertilization is not a sustainable farming practice. A frequent soil sampling and testing program should be used to identify phosphorus and potassium needs... at least every three years. Soil testing should be used to monitor soil test levels, not just to see what the levels are in a given field or field area. Considered with crop nutrient removal, soil testing can help nutrient management planners use appropriate rates for the best short-term economic benefits as well as the long-term gain.

Many agronomists believe that farmers should consider a 4-to 8-year approach in raising soil test phosphorus and potassium to optimum levels. It is possible to raise levels more quickly, but the short-term economics are often less attractive.

Fertilizer prices are again a point of concern. There are several things to keep in mind when considering fertilizer prices and rates of application. First, yield produces profit, and balanced and complete nutrition are necessary to produce optimum yields. Next, research has shown that while fertilizer price affects economic optimum rates of application, the effect is not as great as one might expect. Finally, adequate phosphorus and potassium increase nitrogen use efficiency, making balanced nutrition even more important in periods of high nitrogen prices. Beware of overreaction... don't let price increases lead to unprofitable decisions.

Farmers need to evaluate their phosphorus and potassium fertility program to determine if they have been mining, maintaining, or building soil phosphorus and potassium levels. Planning for optimum fertility now will have these benefits: 1) increase profit potential, 2) ensure that soil phosphorus and potassium levels do not limit the return on other crop production inputs, 3) reduce the risk of crop damage in years with moisture and temperature extremes, and 4) enhance sustainability and land stewardship.

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