



Spring 2003, No. 4

### IS YOUR SOIL FERTILITY PROGRAM KEEPING UP?

**Every year, we set yield goals and every year, Mother Nature reminds us she's the one who sets the real limits.** What was planned may not be close to what actually happened. This past year, many areas suffered drought while others had a good season. Year-to-year variability in yields often raises the question, "Do I have any fertilizer left over from the last application?"

**Nutrient budgets provide some insight into the answer.** Nutrient budgets examine fields or field areas to compare how much phosphorus and potassium has been added to how much has been removed. Additions include both organic and inorganic sources. Removals include harvesting of crops, erosion, runoff, and leaching. For practical purposes, farmers and advisers can use a partial budget that examines both additions and removals estimated solely from crop harvest. This will capture most of the budget on areas that, by location, management, or both, are not at a high risk for the other losses mentioned above.

**Yield variability can cause unexpected withdrawals from the budget. Higher than expected yields remove more nutrients than planned while lower yields remove less.** To determine how yield variability has affected a nutrient budget, we need to look back with both a short and a long-term perspective. If the last year was a particularly bad year, but the previous years were better than expected, we might find that in the short term, our budget is on the plus side for nutrient applications. However, if we look back farther, we could discover that phosphorus and potassium have been mined from the soil for several years, making the net budget for the entire time period negative.

**So what is an appropriate budget?** Should a budget show that more has been applied than removed, or should it show just the opposite? To answer this, you need a recent soil test that is representative of the area you are considering. If your soil test is below the target level, then you will want your budget to have greater phosphorus and potassium additions than removals. This positive budget is expected to increase soil test phosphorus and potassium levels. If your soil test is above the target level, then a negative budget (crop removal exceeding nutrient additions) is expected to decrease soil test phosphorus and potassium levels. Without a recent soil test, there is no way of evaluating the appropriateness of your budget.

**Residual phosphorus and potassium from previous nutrient applications can have a positive impact on yields of subsequent crops.** The magnitude of these effects depends on several factors, including soil test levels, the amount of phosphorus and potassium applied, nutrient placement, the crops grown, and the presence of other limiting factors. Generally, the higher the soil test level, the less chance there is of seeing significant yield increases from residual phosphorus and potassium. On depleted soils, yield increases from residual nutrients may plateau at levels lower than that attainable on soils with higher fertility.

**Nutrient budgets, combined with soil tests, can help you determine if your program is on track.** A Microsoft Excel budget spreadsheet, called "PKalc", is available free at the PPI website: [www.ppi-ppic.org/toolbox](http://www.ppi-ppic.org/toolbox).

—TSM—

For more information, contact Dr. T. Scott Murrell, Northcentral Director, PPI, 3579 Commonwealth Road, Woodbury, MN 55125. Phone: (651) 264-1936. E-mail: [smurrell@ppi-far.org](mailto:smurrell@ppi-far.org).