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TIME TO BALANCE YOUR NUTRIENT ACCOUNT

With the 2003 crop in the bin, it is time to take stock of your nutrient balance. This means gathering the best estimates on the grain yields harvested, and all of the available quality data. Sustainability of crop production systems requires that we keep track of nutrient inputs and removals, and through balance avoid the chance of deficiencies limiting production, or excesses negatively impacting the environment.

Start by gathering information with the tools we have for nutrient management planning. These include soil testing, nutrient removal estimates, and yield goal projections for the 2004 crop. Soil testing is the cornerstone to all nutrient management planning activities. It gives us the annual “check-up” needed to ensure we are still on track with soil nutrient goals. Evaluated over time, annual soil sampling data can provide important insight into how management practices are impacting on soil nutrient supply levels.

Crop nutrient removal calculation requires we draw on our crop yields, grain protein, and some nutrient uptake estimates. Grain protein provides an estimate of nitrogen removal by the crops, while we usually rely on published estimates of grain phosphorus and potassium values. Wheat grain protein content, divided by a factor of 5.7, will indicate the nitrogen content of wheat grain. The factor of 5.7 is unique to wheat; 6.25 is used for all other grains, forage, and straw. So, if you have a wheat yield of 50 bushels per acre, with a grain protein of 13.5%, the nitrogen removal in the grain is [50 bushels x 60 pounds per bushel x (13.5%/5.7/100)], 71 pounds per acre, or 1.4 pounds per bushel.

For grain phosphorus or potassium content we rely on removal estimates from past research. For wheat, we use 0.5 pounds of P_2O_5 per bushel and 0.35 pounds of K_2O per bushel. In our example, that amounts to 25 pounds of P_2O_5 per acre and 17.5 pounds of K_2O per acre for our 50 bushel wheat crop. Similar phosphorus and potassium removal estimates can be found for other crops and forages on the “nutrient uptake and removal tables” link at the PPI website: ><http://www.ppi-ppic.org/ppiweb/canadaw.nsf><. When doing a nutrient balance, it is important to account for all removals. This includes the straw baled for livestock bedding, the total crop removal of a silage crop, and the burning of crop residues.

Adding up nutrient inputs is usually an easy part of the balance. This involves a tally of the fertilizer added, and the manure amendments corrected for their rate of nutrient release. Where manure is used, the soil sample becomes even more important to track the long-term accumulation of nutrients like phosphorus and potassium.

If nutrient removal exceeds inputs, and the soil test indicates a deficiency of that nutrient, it is time to revisit the nutrient management plan. Deficiencies in the system...that is increasing the demand on the soil nutrient supply...will lead to negative long-term impacts on productivity. In many parts of the Great Plains, this is a common problem on our phosphorus-deficient soils, while much less of a problem with soils testing high in potassium. Long-term deficit farming practices work only where you have a large reserve of nutrient capital.

Fall is the time to develop your own farm nutrient balance. By using soil testing, along with nutrient removal and replacement calculations, everyone involved in crop production can develop their own nutrient balance. Consult with your crop adviser for help in pulling the pieces together and drawing on the best science for your area. Remember, the tools exist to make nutrient management planning a science-based activity for all farms.

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Note: *Agri-Briefs* are available online at the PPI website: ppi-ppic.org/agri-briefs