

## Research Priorities

The purpose of the conference was to evaluate current knowledge about BMPs to reduce P losses from cropland. After identifying gaps in our understanding, research priorities were drafted during the conference in a wrap up session led by Dr. Laura Johnson. Following the conference, 27 participants took part in an anonymous survey on these research needs.

Research priorities were separated into three categories: soil and water, best management practices and communication. The ranked responses from each category are posted below.

- Soil and water
  - 1. Investigating how soil quality and biology influence nutrient availability
  - 2. Estimating the impact of legacy P on availability/losses
  - 3. Comparing infiltration and DRP losses from tile drains on different soil types that are managed with no-till, rotational no-till or conventional till
  - 4. Impact of gypsum on high soil test P (STP), moderate STP and high stratification
  - 5. Assessing appropriateness of current P test methods
  - 6. Describing P dynamics between edge-of-field to lake
  - 7. Figuring out the roles of other possible factors of DRP loss, such as pH/S and glyphosate
  - 8. Economical on-farm tests for P concentration in runoff and tile drainage, e.g., farmer-friendly devices
  - 9. Economical total P test for soil
  - 10. Discerning the effect of manure vs. commercial P fertilizer on DRP loss/mobilization
- BMPs
  - 1. Influence of cover crops on stratification, P losses and water-holding capacity including species-specific impacts
  - 2. Economical equipment for placing P subsurface
  - 3. Conducting a long-term study on how soil health and DRP losses interact
  - 4. Comparing P losses from light incorporation of fertilizer after broadcast vs. injection
  - 5. Does sufficient soil organic matter (SOM) reduce impacts of stratification on P losses?
  - 6. Determining a threshold for unacceptable stratification
  - 7. Cumulative effect of replacing tile risers with blind inlets on a watershed scale
  - 8. Simple P budget tools for farmers/agronomists to track balances
  - 9. Effects of stacking BMPs on DRP losses
  - 10. Estimating length of time required for P stratification to resolve without tillage after broadcast fertilization stops
  - 11. Evaluation of a “reset”, e.g., one-time inversion tillage to correct P stratification, on overall P and soil loss over time
- Communication
  - 1. Creating consistent messaging from the current science
  - 2. Addressing farmer concerns including profitability and avoiding regulations when communicating BMPs/benefits.
  - 3. Ensure those carrying the message/making recommendations have the trust/confidence of farmers

4. Communicating opportunities to improve the farming system, rather than simply promoting individual BMPs
5. Reaching out to non-operating landowners to improve lease terms and encourage BMPs, e.g., encouraging longer leases that allow tenant farmers to invest in improvements
6. Evaluating and measuring what the people on the ground (SWCD, Extension and non-governmental organizations) are doing with farmers
7. Incorporate BMPs and other farming practice costs, and net economic returns, into the Nutrient Tracking Tool
8. Increasing farmer-to-farmer communications about the efficacy of BMPs
9. Identifying how many farmers we need to reach to be effective

- The following priorities were suggested by survey participants and remain unrated.
  - Creating an inventory of existing BMPs across the WLEB (what, where, when installed, who is managing).
  - Economical soil sampling to detect preferential flow and its effect on DRP losses.
  - Devising guidelines for managing soil P stratification while controlling soil erosion.