

AGRICULTURAL PRACTICE EFFECTIVENESS FOR REDUCING NUTRIENTS IN THE RED RIVER BASIN OF THE NORTH

RESEARCH GAPS AND RECOMMENDATIONS

Workshop Summary Report



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In the spring of 2019 a diverse group of university researchers and extension staff, state/provincial and federal government researchers and water resource managers, and industry professionals came together for a workshop to examine the available research on the effectiveness and suitability of nutrient reduction beneficial management practices (BMPs) in cold climates.

Recent research suggests the effectiveness of many agricultural BMPs differs in cold climates, such as that of the Red River Basin of the North (RRB), from warmer areas where much of the body of knowledge has been developed.

Throughout the workshop presentations and discussion, participants noted the numerous and considerable challenges in determining nutrient load reduction BMP effectiveness and suitability in the RRB, including a lack of research and understanding in cold climate environments. Research is vital to improve our understanding of nitrogen (N) and phosphorus (P) loading sources and pathways, identify critical source areas and priority watersheds, improve the effectiveness of existing BMPs, and develop innovative BMPs more effective at reducing N and P losses, accounting for freeze-thaw and snowmelt runoff events which are common in colder climates.

Some of the most pressing research needs related to an improved understanding of N and P loading sources and pathways are:

- the magnitude of N and P transport to surface waters by wind erosion,
- the roles that legacy P and total, dissolved and particulate P transport to Lake Winnipeg, and other water bodies in the RRB, play in eutrophication, and
- the impact on N loadings to the Red River from expanded adoption of subsurface tile drainage coupled with climate change.

In particular, workshop attendees noted the need for:

- on-farm research or demonstration farms in the highest priority areas representing diverse combinations of climate, soil, and landscape where suites of BMPs can be researched, tested, and evaluated for their effectiveness at reducing N and P losses.
- research to improve the effectiveness of existing BMPs through development of stacked in-field and edge-of-field practices that combine mitigation during the growing and non-growing season.
- research to develop innovative new BMPs that have greater effectiveness. Examples of this include drainage water management that can remove both N and P, cover crops that have limited P uptake but are effective at controlling soil erosion, or tillage practices that increase random soil roughness and reduce crop residue cover.
- research on integrated systems that improve water infiltration and storage, reduce erosion, and minimize nutrient export from croplands in cold climates.

JANUARY 2021

The agriculture community will need clear direction on BMP effectiveness and suitability, as well as integrated systems that work for both erosion and nutrient control in cold climates. Workshop attendees noted that prior to a Basin-wide engagement with the agricultural community about BMPs and their adoption, researchers and extension staff must first undertake the following steps:

1. Confirm and prioritize agricultural BMP effectiveness rankings discussed in the workshop through ongoing collaboration.
2. Establish research priorities to address key knowledge gaps.

As progress is made on these first two steps, organizers of the 2019 event intend to arrange a follow-up workshop that will pursue the remaining steps, with a focus on feasibility:

3. Discuss policy and regulation for jurisdictions across the RRB and identify policy and regulatory priorities for governing agencies to consider aiding in achieving the shared objectives.
4. Evaluate the cost of implementation.
5. Develop strategies to move towards implementation.

In addition to the research and extension community, who were the main audience for the gathering in 2019, the follow-up workshop would require broad representation from the agricultural community and regulators across the RRB.

More information on the workshop, workshop presentations and discussion, and the agricultural BMPs broadly agreed to be effective in cold climates can be found in the full workshop report, which can be located at www.redriverbasincommission.org/rrbc-projects.

