Performance of cropping systems designed to reduce nitrate leaching into shallow municipal well aquifers

Are there Iowa cropping systems that retain N, reduce the risk of nitrate N leaking into shallow municipal aquifers and are workable for producers? Yes, but the systems with the greatest potential for retaining nitrate N utilize perennial grasses and legumes which may be less profitable than corn and soybean.

What was done and why?

Sioux Center, like many Iowa communities, draws more than 50 percent of its drinking water from wells that are less than 50 feet deep. These shallow wells may be strongly influenced by land management practices in the immediate vicinity, as well as in the surrounding watershed.

The Sioux Center Source Water Protection community planning team was formed in 2007. Team members included the Sioux Center water plant operator and city utilities engineer, Sioux County Natural Resource Conservation Service (NRCS) personnel, local landowners and operators, and Dordt College professors. This team met with the Iowa Department of Natural Resources (DNR) Source Water Protection program staff and developed a plan to address the community’s water quality concerns. One element of the plan was to reduce potential non-point source contamination of the well field. The owners of land adjacent to the city’s well field were encouraged to enroll their land in the well head protection Conservation Reserve Program, but had declined to do so.

The objectives of the proposed research were to assess cropping systems with the potential to produce a reasonable financial return for landowners/operators while simultaneously reducing the risk of nitrate N movement into shallow municipal aquifers, and to share the results with those who could benefit from the information (farmers, municipalities, NRCS, Iowa DNR, and the research community).

What did we learn?

The main objective of this research was to assess cropping systems with the potential to produce a reasonable financial return for landowners/operators while simultaneously reducing the risk of nitrate N movement into shallow municipal aquifers. Results indicate this may be possible. Based on these findings, one producer farming land in the capture zone of the Sioux Center well field has decided to utilize a corn-corn-alfalfa rotation instead of continuous corn. The field days where research was shared were well-attended, and in combination with the talks and written reports associated with the project, have increased the visibility of water quality concerns in the community and region.

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