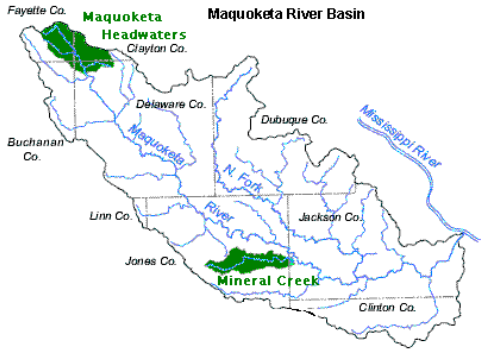
IOWA STATE UNIVERSITY
University Extension

# Nutrient Management Education in a Priority Watershed

### Water Quality Integrated Research, Education and Extension




In subwatersheds of the Maquoketa River Basin in northeast Iowa, Iowa State University Extension is providing facilitation for citizens' watershed councils and integrated research, extension and education programs related to management of agricultural impacts on water quality.

## Nutrient Management Incentive Education Program

**Summary:** This program was developed by Iowa State University Extension water quality specialists as an *alternative approach for public assistance to producers in nutrient-impaired watersheds*. In the *education model* used to deliver the nutrient management incentive program, *producers learn about and implement nutrient management plans* (NMP) on their own farms, *receiving a small per-acre payment for the fields enrolled*. They also *evaluate the economic outcome* of refined practices under the guidance of an extension crop production specialist or other qualified educator. Concurrent field demonstrations on cooperator farms provide tangible evidence and local validity to the education program.

The three-year program gives participants confidence in their ability to ask the right questions of suppliers. They assume increased responsibility for nutrient and manure utilization decisions on their farms. This education model for NMP implementation thus helps put responsibility for watershed nutrient management directly into the hands of watershed residents.

**Background:** Small-acreage diversified livestock farms in northeast Iowa are potential high-environmental impact farms that can profitably use on-farm nutrients. However, the service-provider model for NMP implementation is difficult to apply. Given a choice, crop consultants prefer to serve large-acreage corn-bean rotation farms where management issues are less complex and they can receive more income from their time. Sustainable change in nutrient loading in this landscape requires producers to take a more active role in refining nutrient and manure management on their own farms.

**Description of the program:** Participants engage in a three-year series of workshops conducted by extension crop production specialists or other qualified educators. Watershed project staff handle participant recruitment and manage record-keeping for small annual incentive payments. The workshop format, with eight to twelve participants, makes efficient use of specialists' time, while still allowing for individualized assistance. The workshops also capture the reinforcement provided by participant comments, group discussion and observing peers.

Workshops are tightly focused on soil agronomic potential and optimizing use of manure and legumes as on-farm nutrient resources, with supplemental commercial nutrient application, for profitable crop production. Instructors also stress the importance of refined management to reduce excess nutrients' potential for damaging the environment. Watershed project staff assist with on-farm field demonstrations of refined nutrient management practices. Demonstration results are widely reported and provide tangible evidence and local validity to the education program.

Workshops begin in the Fall and continue for three years. Producers typically adopt new practices slowly, wishing to evaluate management changes over several crop seasons. As participants gain confidence in their nutrient management decisions, they begin to implement the refined practices they have learned on an increasing number of fields.

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**Evaluation:** The impact of the program is evaluated annually at a post-harvest meeting where participants share production and economic results of their nutrient management plans. They also complete baseline and annual surveys to measure changes in knowledge, attitude and management skills. Quantity of fertilizer not used in a given year is a minor part of the program impact evaluation, because it does not reflect the potential for long-term change. Change in management skills as a result of education more accurately predicts sustainable impact from public investment in nutrient management plan development.

**Outputs:** The nutrient management incentive program has produced a set of teaching materials including worksheets, scouting forms and workshop agendas for the three-year course. The materials were standardized for use in the Maquoketa Watershed at the request of the Iowa Department of Natural Resources. Extension Field Specialists/Crops, state specialists, a local crop consultant, and project staff contributed.

**Challenges:** The incentive payment is intended to offset the initial time investment of participants. However, recruitment of participants and enforcement of record-keeping requirements are still the most frequent challenges encountered in the pilot watersheds. Another challenge is securing instructors who can teach successfully using the workshop method. Instructors who understand this education model greatly enhance the success of the workshop series. Some producers will not participate voluntarily. Regulation would be necessary to attain compliance if the goal is to have NMP on all production units.

## Impact of the Program, Maquoketa River Basin watersheds, 2001-2002.

In 2001 eleven producers completed the first year of the program. They rated soil sampling and soil test interpretation as the most useful program components. Eight of the eleven reported reducing nitrogen rates, with an average increased profitability of $2880 per farm. Six of eleven producers reported reduced phosphorus applications because soil tests were high or very high. Seven producers increased the credit taken for manure applications, increasing profits by $1870 per farm. They plan changes for 2002 including contour farming; injecting swine manure; variable rate application of P, K and lime; and more grid soil sampling.

Most participants have livestock, and manure spreaders were calibrated as part of the program. By the end of the first year, only one did not know his manure application rate. Six participants with solid manure spreaders were applying between 10 and 20 tons per acre. Three producers spreading liquid swine manure were applying between 3,000 and 6,000 gallons per acre.

**Participants' Comments:** In 2002, 24 producers from two watersheds completed their first or second year of the program. The following comments show how the program has impacted their thinking about refined nutrient management:

"This program is definitely saving me money. I have cut my N application more than half anywhere I put manure."

"I think this is a great program. I am becoming more conscientious of what I do. I used to just plant and spray and forget about the crop until fall. Now I am realizing there are things I can do during the season to improve my chances of a good crop."

"Well, way my soil tests look I shouldn't need any phosphorus this year. But how long can I go without adding any P?" Another producer responded -- "You should be able to go at least five years and maybe more."

"I learned it did not take as much N to get to yield goals."

"I requested that the co-op soil sampler pull more soil cores than what they were going to do. I think you should have at least 10-12 cores per sample for a good test. Eight cores just don't cut it."

"I can't believe I am hauling manure 2 miles down the road, but that's where the lowest testing fields are. That's where I will get the most benefit."

"I apply manure on a three year rotation based on the phosphorus rate. I have to apply some extra N in the second corn year but that is the best way to keep the soil tests in check."

"I have learned to spread manure like fertilizer. It has value and can improve my bottom line."

"I put down a total of 1500 lbs of plowdown on three farms because the soil tests were off the chart for P. If I hadn't tested, I would have just blanket spread them like any other year."

"I reduced my N rate by 60 units on manured ground. It saved me $10.80 per acre on an 80-acre field."