

## **319 Water Quality Protection Project Phase II Final Report Summary**

### **Why did we do a Phase II Project?**

The idea of pursuing a Phase II came about because of the discrepancies between the amount of fertilizer applied on the average by local producers, and the amount that the state standards require. This idea was brought to our attention while implementing the nutrient management plans during Phase I. There was quite a difference in the University of Idaho's fertilizer guidelines and the amount traditionally applied or recommended in certain crops, particularly in onions.

### **What was the project?**

The participants were apprehensive about applying only the amount of fertilizer recommended by the University of Idaho fertilizer guidelines since that amount was considerably less in some crops than what the farmers traditionally applied, and they were concerned about loss in productivity and crop quality. In our focus to reduce the nitrogen impact on groundwater in the Weiser area we required each producer to establish a demonstration plot of about 5 acres within each field contracted. On the demonstration plot, the producer was required to apply fertilizer according to state standards and then apply fertilizer using their normal methods on the rest of the field. The fertilizer applications were to be based on soil sample results, the desired crop yield, and the available nutrients in the soil. A nutrient management plan was developed using the NRCS Idaho Commercial Fertilizer Nutrient Management Plan Spreadsheet. In addition, plant tissue samples were collected on a regular basis during each crops' growing cycle. Additionally, soil moisture sensor systems were installed in both the demonstration plots and in the remaining part of the field.

A comparison was made for each element of the project. The demonstration plot was compared to the rest of the field on fertilizer applications, plant tissue sample results, soil moisture, and yield results.

### **What did we learn from this project?**

Grower acceptance and application of the University of Idaho Fertilizer Guidelines and the application of less nitrogen was quite difficult to achieve. In the second year, the participants were more confident in trusting the University of Idaho Fertilizer Guidelines and the resultant applications were easier to achieve.

In most cases in the bean and corn fields, where the participants reduced nitrogen application, the crop yield was increased in the demonstration plots. Over the two years of the project, by following the Fertilizer Guides, application of nitrogen applied on the demonstration plots was reduced by 7,830 pounds and there was no yield reduction. This application was on 34 acres. With the cost of nitrogen being about seven cents per pound, our participants saved \$548 on the 34 acres.

If we had ten farmers with 100 acres each that would be 230,000 pounds less nitrogen applied in our area. That would save the ten farmers \$16,100.00 in today's dollars. Additionally, this would limit the availability of nitrates moving to the groundwater and over the long term would reduce the concentration of nitrates in groundwater. As the growers became more aware of what was happening, there was less

nitrogen applied in many of the background plots than what was recommended from the fertilizer guidelines; thus creating further savings in reduced applications.

**What do we do now?**

By looking at the results of this project and the potential impact for the area, the primary recommendation is for the practice of following the Fertilizer Guides by all growers on all crops. Certainly there will be exceptions and each situation would have to be analyzed based on current conditions; however, by having a large-scale adherence to the Fertilizer Guides, the resultant impact to both the economic conditions of the individual growers and the health of the groundwater would be positive.

In addition, we have discovered that there may be a need for more education on the use of soil sampling and plant tissue sampling. Those two tools can be used by the grower in determining the nutrients already available to the plant and hopefully eliminating the need to apply additional fertilizer.

A copy of the complete final report can be obtained by calling Weiser River Soil Conservation District at 549-2628 EXT 112.

# Grower Statements

## 1. Would you implement any of the practices from this project on your farm for the future?

- ✓ I plan to soil test more often than in the past.
- ✓ Apply less nitrogen to my beans.
- ✓ I would implement the soil moisture sensors and use the reading to schedule irrigations.
- ✓ Limit the amount of nitrogen applied, especially on sugar beets.
- ✓ I may also use petiole sampling if the expense is not too great and the test could be done early enough to make use of the data.

## 2. What was your greatest success with this project?

- ✓ I was more confident to reduce nitrogen more than I have already reduced.
- ✓ After seeing the yield results on the demonstration plot after the first year, I cut my nitrogen use on my beans by 30 to 40 pounds per acre on my whole farm.
- ✓ Learning about and using the moisture sensors and the data from them to schedule irrigations when needed.

## 3. What was your greatest challenge with this project?

- ✓ The installation and removal of the moisture monitoring systems are too labor intensive.
- ✓ The small plot sizes made it difficult for companies and custom guys to fertilize and harvest on a smaller scale.
- ✓ Remembering to do the things required by the project when we were really busy such as harvesting and weighing the two plots separately and making sure everyone else knew about the two different plots in the project fields.
- ✓ Timing was probably the greatest challenge. Sometimes it was difficult to get the ground work, planting, and fertilizing done within the framework of the project.
- ✓ Another challenge was the difference of the soils and stands in the same field. I think that the results were skewed because of poor yields and stands in some poor soil or soil conditions on portions of the fields.

## 4. Is there anything else that you may have learned or thought differently about because of participating in this project?

- ✓ I found that with furrow irrigation, it is difficult to wet the lower end of the field without over watering the head end of the field.
- ✓ I learned that the onions may use more water than I thought and that the beets and corn need less water than I thought.
- ✓ The beets need less nitrogen than I have been using and the corn and onions seem about right. Some of the petiole samples also showed that the crops may need more of some micronutrients.
- ✓ One thought change is to use more petiole sampling if possible. I think it is almost essential because the soil samples are only part of the equation. They don't tell you what the plant may be lacking even though it may have been applied to the soil.