

A final report prepared for the Leopold Center for Sustainable Agriculture

Project Title: Maximizing Conservation and Return of Investment on Farms in the Turkey River Watershed
Grant #XP2016-11

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Nontechnical Summary

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Detailed Report

INTRODUCTION.

Just a few generations ago, producers had smaller farms that were worked by hand or with horses. This type of farming kept them personally connected to every square inch of their land. Farmers saw and experienced differences in field conditions and productivity on a small scale and worked to avoid or find another use for less productive areas. As farmers increased the number of acres in their operation, purchased larger equipment and rented acres from others, their knowledge of the characteristics of the land at a smaller scale diminished in many cases. Thankfully, the arrival of precision technology in modern agriculture has made an incredible difference in a producer's ability to track their processes and maximize production and profitability, even over larger operations.

At the same time, flooding and water quality issues are costing the state of Iowa millions of dollars per year. The Turkey River Watershed has experienced multiple extreme flood events and disaster declarations in the last decade. To address these issues, the Turkey River Watershed Management Authority formed and developed a long-term watershed plan. The plan focused on voluntary efforts in rural and urban areas to help hold water on the landscape and improve water quality. Rural practices, outlined in the watershed plan, focused on the efforts of agricultural producers as being critical to the success of the plan. This project played a large part in showing producers that good land management decisions should look at the whole picture to achieve farm sustainability and landscape resiliency.

B. PROJECT DESIGN, METHODS, AND MATERIALS.

Northeast Iowa Resource Conservation and Development (RC&D) and the Iowa Soybean Association (ISA) collaborated to engage producers in Northeast Iowa to maximize conservation and return of investment (ROI) on their farms. RC&D and ISA

worked one-on-one with producers in the Turkey River Watershed to use innovative technology to analyze the acres in production on each farm. The analysis revealed productive versus unproductive acres. Using a program called Profit Zone Manager from AgSolver Inc (now EFC Systems), this project allowed producers to understand different characteristics of and components within each field, reconnecting them to the nuances of the soil and other subfield characteristics. In doing so, it helped them maximize their ROI while simultaneously increasing the conservation value of their farm.

The AgSolver Profit Zone Manager software looks at each field in production in a grid of 10-30 foot cells in relation to spatially referenced harvest and input data collected by farm equipment. Cost inputs such as fuel, fertilizer, and other expenses are entered into the software program followed by the harvest information or output gains. The software then compares the input cost to the output gains for each grid cell and generates a ROI value for each cell. Based on the values of each cell, the producer can see, cell by cell, the most productive and unproductive areas of their fields. The analysis is most effective if multiple years of data are available given the annual variability of growing conditions.

The RC&D and ISA worked one-on-one with nine producers in the Turkey River Watershed to complete the analysis on 3,500 cropland acres. Using spatially referenced yield data provided by each producer and input cost data in the AgSolver program, project staff analyzed each acre for productivity and conservation potential. Analyzing data for multiple years helped producers identify areas of cropland that were consistently underperforming and as a result actually costing them money. RC&D and ISA staff then reviewed the results of the analysis with each producer to help them understand the results and answer questions they might have. Armed with this data, producers were encouraged to think about their management plan and consider alternative uses or management methods that would help them stabilize the cost of production on the unproductive acres within each field. Their management decisions helped them increase total field productivity and profitability for their overall operation. The AgSolver software was used to simulate some of the potential management changes to help the producers make the best decision for their farm.

Regardless of the location, soils, or topography differences between farms, when analyzing the data from each producer, the project identified that producers had a general rather than specific awareness of the issues on their farms. It also found that, faced with a better understanding of the unprofitability of specific acres, regardless of the similarities in cause of those losses, the producers evaluated their options and made different individual management choices that fit with their specific operation.

C. DATA AND DISCUSSION.

The project found that the participating producers started out with a general awareness of the locations of problem areas or less productive acres in their fields. The ROI analysis provided hard data that confirmed the exact locations within each field where losses were occurring and then quantified the extent of the problem, helping producers understand the degree of the loss. It also provided a summary of the necessary profit gains that would be required to achieve a positive gain, including the minimum commodity price and the minimum yield needed to achieve a positive ROI for each cell. The producers were then able to determine which, if any, management strategies would help improve profitability and make those management decisions with confidence.

The project found that across each of the fields and farms analyzed in this project, similar in-field conditions resulted in areas of negative ROI for the producers. While the root cause of the negative ROI was consistent across different fields and farms, each producer had different ideas for how they could improve their ROI with a change in management strategy. At the producer's request, AgSolver technology was used to simulate the outcome of different scenarios to determine the ROI for alternative management strategies, thereby empowering producers to decide which option was right for their operation.

The project also showed Turkey River Watershed Management Authority members that many opportunities exist to work with producers to implement conservation practices that will help reduce flooding and improve water quality without sacrificing production potential. The project encourages increased participation and partnership between watershed stakeholders and producers.

D. CONCLUSIONS.

The AgSolver Profit Zone Manager software is just one example of many ways producers can use new technologies along with traditional methods and equipment to adapt. In this project, each participating producer found the results from their AgSolver analysis to be valuable in some way even though each was looking at different management techniques to maximize their efficiency. It successfully demonstrated that technology can assist farm operators to maximize efficiency of their operations while simultaneously protecting land and water for future generations. It also demonstrated a need for technical assistance to help producers utilize the data their equipment is collecting automatically.

Results from this project showed conditions in the field that create negative returns on investment that many producers experience regardless of their location. Field/timber boundaries, high traffic areas, and low lying or wet areas were consistent problem areas for producers participating in this project, yet each was managing them differently. After the AgSolver Analysis, it was clear that their current management techniques were not

working and continued to yield negative returns. This software allowed producers to make informed decisions about how to tweak their management strategies to improve their problem areas. In most cases, utilizing a conservation practice or two provided the best results economically. This project proved that technology can help producers realize how conservation can be economical.

One part of the project that struggled was getting producers to participate. However, all the participants were pleased with the knowledge they gained. Finding ways to engage the producers more effectively may improve for similar future projects.

E. IMPACT OF THE RESULTS.

The project encompassed 3,500 acres in production in the Turkey River Watershed. It demonstrated that the use of an innovative technology could quantify the effect of increased conservation practice adoption and improve farm economic efficiency. Producers participating in the project learned about many different conservation practices and cost share programs they could implement that would improve their efficiency. These same conservation practices would also improve water quality and reduce flooding in the Turkey River Watershed. They also learned who to contact and how to get involved with conservation programs. In addition to participating producers, the results and lessons learned from this project were shared with dozens of local producers as well as hundreds of producers throughout Iowa.

This project, along with other similar projects using agricultural technology, has the potential to positively change agriculture in Iowa by demonstrating technological advancements that can be used for conservation and economic efficiency at the same time. Today's farmers are data rich from information collected by combines, tractors and other implements used in production. There are multiple services, like AgSolver Profit Zone Manager, that can help producers interpret the data they have at their fingertips, and a need for similar projects to help connect producers with those services.

F. OUTREACH and INFORMATION TRANSFER

PUBLICATIONS.

N/A

EDUCATION AND OUTREACH.

Northeast Iowa RC&D, with assistance from the Iowa Soybean Association, shared the project results through multiple outlets including:

- A presentation in LaCrosse at the Trout Unlimited Driftless Conference to an audience of conservation professionals and producers from Iowa, Minnesota, Wisconsin, and Illinois.
- A field day/producer meeting held in West Union for a dozen Turkey River Watershed producers
- Northeast Iowa RC&D and Iowa Soybean Association staff facilitated a meeting for producers in the Turkey River Watershed that included presentations from AgSolver staff.
- Eight Turkey River Watershed Management Authority board meetings.
- A meeting in Postville for an audience of 16 producers from Iowa, Minnesota, Wisconsin, Illinois, and Missouri.
- Multiple press releases at the beginning and the conclusion of the project.
- A newsletter summarizing the project and showing the lessons learned. The newsletter was sent to Iowa Soybean Association members which total over 11,000 farmers in Iowa.
- On the Turkey River Watershed webpage and the Northeast Iowa RC&D Facebook page.

Additional presentations are planned with local Farm Bureau Chapters in the Turkey River Watershed to share results with their membership.

COOPERATIVE EFFORTS and STUDENT SUPPORT.

This project fostered partnerships between a local non-profit organization (Northeast Iowa RC&D), a statewide agricultural organization (Iowa Soybean Association), and a local watershed group (Turkey River Watershed Management Authority). Northeast Iowa RC&D led the project and helped coordinate efforts between local and state partners. The Iowa Soybean Association brought experience with the AgSolver software and an element of trust for producers. The Iowa Soybean Association connected the project to a broader audience with their extensive membership. The Turkey River Watershed Management Authority helped include a diverse set of stakeholders such as Soil and Water Conservation Districts, county boards of supervisors, and watershed communities, with rural efforts to improve the watershed. The project has helped and will continue to help all partners involved to connect with local landowners and producers and with successful implementation of the TRW watershed plan.

G. BIBLIOGRAPHY
N/A

H. LEVERAGED FUNDS

Northeast Iowa RC&D leveraged LCSEA funds, along with contributions of \$13,000 from the Iowa Soybean Association and \$15,000 from Northeast Iowa RC&D, to apply for and receive an additional grant from the National Fish and Wildlife Foundation for \$50,000. This allowed the project to have a larger impact by reaching more producers, allowing for the analysis of more acres and increasing the number and type of media outlets to share project results.

I. EVALUATION
N/A

V. **Budget Report**

A. Northeast Iowa RC&D's total request over the project was \$20,000. Expenditures in Year 1 (Feb 2016 to Jan 2017) totaled \$12,268.36. Expenditures in Year 2 (Feb 2017 to Jan 2018) totaled \$7,731.64.

B. The primary expenditures for the grant were salaries and subcontracts. Staff from Northeast Iowa RC&D and the Iowa Soybean Association used the funding to recruit producers to participate in the project, to analyze the data using the aforementioned software and to interpret and present the results to the producers. A minimal amount of funding was dedicated to supplies and travel.

During the second year, the Iowa Nutrient Research Center approved the transfer of funds from the subcontracts to the salaries/wages for Northeast Iowa RC&D to publicize the results of the project through additional marketing mechanisms, i.e. newsletter.

C. Agencies and/or sources of additional funding for the work

- Northeast Iowa RC&D contributed \$15,000.
- Iowa Soybean Association contributed \$13,000.
- National Fish and Wildlife Foundation granted \$50,000.