

Reading the Farm: Discovering whole-farm interactions

Final Report for ENE10-114

Project Type: Professional Development Program

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Projected End Date: 12/31/2013

Region: Northeast

State: Pennsylvania

Project Leader:

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Project Information

Summary:

Agricultural professionals are often trained in specialized sub-disciplines of agriculture such as agronomy, business management, animal health and management, or environmental management. Because of this specialization, agricultural professionals often lack an understanding of the interaction between different components of a whole-farm system. As a result, agricultural professionals may have a difficult time understanding how farmers make certain decisions or may make recommendations about one component of a system that have adverse consequences for another part of the system.

To increase understanding of interactions between components of a whole-farm system, we developed an interdisciplinary training program using a Reading the Farm workshop model, which brings together agricultural professionals from diverse sub-disciplines of agriculture for an in-depth tour and discussion of one or more case-study farms. Participants assess the farm from the lenses of the different disciplines including agronomy, animal performance, business management, environmental resources, and social issues, and discover and discuss the various ways that components of the farm system interact. Within these disciplines, twenty-six more detailed topic areas such as soil fertility, weed management, milk production, marketing, water quality, and quality of life were explored, as were a suite of whole-farm assessment skills, including identifying a farmer's goals, asking questions with a whole-farm systems perspective, and knowing when to seek needed information outside one's own area of expertise.

We conducted two training events as part of this project: a Reading the Farm Workshop in August 2010 that focused on dairy farming systems, with 21 ag service provider participants and 11 facilitators; and a Finger Lakes Organic Crop Production Tour in July 2012 that focused on value-added organic grain production and marketing, with 23 ag service provider and 7 farmers in attendance.

As a result of this project, 10 ag service providers used knowledge and experience from the training in new or existing education programs, in fact sheets and technical resources, and in newsletters and other media outlets, reaching a total of 762 ag service providers and 945 farmers who manage 6,250 acres. The project also led to

a significant new collaboration between Pennsylvania NRCS and Penn State Extension to develop a training program in whole-farm systems for new NRCS employees, and strengthened sustainable agriculture networks between farmers and ag service providers in Pennsylvania and New York.

Performance Target:

15 agricultural professionals from Cooperative Extension, government agencies, and non-profit organizations will deliver educational programming on how interactions between components of a farm system affect farm sustainability to 15 other agricultural professionals, and at least 400 of their clientele will receive this information.

Introduction:

Agricultural professionals are often trained in specialized sub-disciplines of agriculture such as agronomy, business management, animal health and management, or environmental management. With training that only encompasses individual components of a farm system, agricultural professionals are prone to making recommendations about one part of a farm system without knowledge or full consideration of how that recommendation may affect other parts of the system. For example, certain agronomic practices may negatively affect animal nutrition, and certain animal housing and management systems can lead to environmental pollution in some contexts. Furthermore, the farm system occurs within the social context of the farm family and surrounding community. Issues such as inter-generational transfer, quality of life, and suburban encroachment interact with farm operations, yet many agricultural professionals have not been trained to understand these interactions.

As the staffing at local-level agricultural service providers such as county cooperative extension offices continues to dwindle due to budgetary restraints, it is now more important than ever for agricultural professionals to be able to understand the farm system from a multi-disciplinary perspective. In an informal survey of 19 agricultural professionals in Pennsylvania during the planning process of this project, a strong need for and interest in a "Reading the Farm" workshop was expressed. Sixty one percent of respondents indicated that they are often or very often in situations where it would be valuable to have an understanding of interactions in the whole-farm system and 90% of respondents indicated that they thought it was very important for agricultural professionals to understand interactions in the whole-farm system. Seventy nine percent of respondents said they were moderately interested or very interested in attending a workshop like "Reading the Farm."

In addition to the interest expressed by potential "Reading the Farm" beneficiaries in Pennsylvania, individuals who participated in a "Reading the Farm" workshop held in Connecticut in August 2006 indicated that they thought a similar project should be conducted in other states. In the evaluation following that event, one person wrote "I think 'Reading the Farm' should be established in all NE states and work on 4 to 5 farms annually." Others wrote "continue this effort in other states and on other farms," "continue to offer each year, share with other states," and "we'd like to replicate it within our state."

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Performance Target Outcomes

Performance target outcome for service providers narrative:

Outcomes

Ten 10 ag service providers who learned through this project used knowledge and experience from the training in new or existing education programs, in fact sheets and technical resources, and in newsletters and other media outlets, reaching a total of 762 ag service providers and 945 farmers who manage 6,250 acres.

2010 READING THE FARM WORKSHOP PARTICIPANT OUTCOMES

We distributed a survey in December 2011 to participants of the 2010 workshop to gauge progress towards completing our performance target. Eighteen of 32 workshop participants (participants and facilitators) responded to this survey. Six participants used knowledge and experience gained at the "Reading the Farm" workshop in educational programs they delivered to other ag service providers and 6 participants used knowledge and experience from the workshop in educational programs they delivered to farmers. These educational programs delivered by the workshop participants reached a total of 732 ag service providers and 754 farmers.

The whole-farm system components that were most frequently included in the educational programs delivered by workshop participants were crop management, livestock management, and environmental quality (6 or 7 participants included these components). Business management and social issues components of whole-farm systems were only included in programs delivered by 1 or 2 participants.

Topics of the specific educational programs that workshop participants delivered to ag service providers and/or farmers included:

- Using cover crops as a forage source on small dairy farms
- Organic farming case studies
- Potential for rolling vertical tillage in Mid-Atlantic cropping systems
- Dry poultry manure injection equipment for environmental sustainability
- Best management practices for livestock health and management and the water quality and soil quality benefits associated with those practices
- Whole farm planning for new organic vegetable farmers, including how farmers' goals fit the environment and markets.
- Integrating animal feeding systems with land use and matching animals to land opportunities

2010 workshop participants also developed these educational products using knowledge and experience gained at the "Reading the Farm" workshop:

- Powerpoint presentation about organic farming systems using one of the "Reading the Farm" host farms as a case study
- Handouts and Powerpoint presentations about the forage quality of cover crops
- Powerpoint presentation about cover crop management in forage based cropping systems
- Newsletter articles about on-farm cover crop trials, with an emphasis on forage quality
- Videos on poultry manure injection equipment and community-based watershed planning

2012 FINGER LAKES TOUR PARTICIPANT OUTCOMES

In August 2013, we conducted a verification survey approximately one year after the 2012 workshop entitled “Finger Lakes Organic Crop Production Tour” to measure completion of our performance target. As a result of the 2012 tour:

- 2 ag service providers incorporated new ideas or information in existing programs or events, reaching 30 agronomy students and 66 farmers managing 3750 acres.
- 1 ag service provider developed new programming that reached 25 organic grain crop farmers managing 2500 acres.
- 1 ag service provider shared information in newsletters or other media outlets, reaching 100 farmers.

BENEFICIAL ON-FARM CHANGES REPORTED BY AGRICULTURAL SERVICE PROVIDERS

Several ag service providers reported beneficial on-farm changes as a result of their educational actions with farmers. One farm developed a more rigorous approach to grain bin management and grain storage to improving quality and invested in more grain cleaning equipment for higher quality; another farm developed new markets for grain waste products by selling them poultry growers; and one farm integrated information from the training about crop rotation schedule, grain storage, cleaning, bulk handling and insect control into their operation.

BENEFICIAIRY OUTCOME STORY

One of the most notable outcomes from the project was the development of a whole-farm systems training program for new conservation practitioners in Pennsylvania. The training program, called ‘Ag 101: Understanding Pennsylvania Farm Operations,’ was coordinated by a “Reading the Farm” workshop participant and featured instruction from 4 other “Reading the Farm” workshop facilitators. The philosophy and goals of the ‘Ag 101’ training program were inspired by the “Reading the Farm” workshop but the training format was slightly modified. The training consisted of a series of webinar presentations to provide background information on production practices followed by facilitated farm visits. Following each webinar series, participants conducted a facilitated farm visit to 1 of 4 farms in various regions of Pennsylvania in February and again in July. A total of 174 ag service providers from 14 different organizations attended portions of the ‘Ag 101’ training. More than half of the participants were from Pennsylvania NRCS or Pennsylvania Conservation Districts. The ‘Ag 101’ program offered 30 hours of training in total, with 60 participants attending 10 or more hours of training and 30 participants attending 20 or more hours of training. Webinars conducted in the ‘Ag 101’ training program are available online at the website <http://extension.psu.edu/aec/conservation-training/ag-101>.

ADDITIONAL OUTCOMES BEYOND THE PERFORMANCE TARGET

The Reading the Farm training program facilitated interactions among ag service providers and farmers that would not have occurred otherwise. These interactions led to several new projects and collaborations between organizations. Most notably, the relationship we developed with NRCS personnel through the August 2010 Reading the Farm workshop led to a new NRCS training initiative focused on whole-farm systems. The training initiative (Ag 101 described above) was a collaborative effort between Penn State Extension and NRCS, with NRCS providing grant funding to Penn State, and the university allocating extension specialist time and providing

administrative support to develop and administer the training.

Other new relationships were developed between ag service providers and farmers during the July 2012 Finger Lakes Organic Crop Production Tour. One of the ag service provider tour participants plans to take his undergraduate agroecology class to the farms featured in the tour. Another ag service provider had a stimulating lunch-time conversation with an organic farmer that was also attending the tour. The conversation led to a collaboration between the farmer and the ag service provider to write a grant proposal to conduct on-farm research on organic crop management.

Additional Project Outcomes

Project outcomes:

MILESTONES ACCOMPLISHMENTS SUMMARY

We conducted two training activities over the course of this project: a Reading the Farm Workshop held in August 2010 and a Finger Lakes Organic Crop Production Tour held in July 2012. Six hundred individuals became aware of the 2010 workshop and one hundred individuals became aware of the 2012 tour. Twenty-one ag service providers ultimately attended the 2010 workshop and 30 ag service providers and farmers attended the 2012 tour.

As a result of the August 2010 Reading the Farm workshop:

- Twenty beneficiaries increased their understanding of how one or more farm system components interacted with other components of the farm system
- Eighteen of the beneficiaries increased their understanding of how 6 or more farm system components interacted with other components of the farm system
- Twenty of the beneficiaries increased their confidence in one or more whole farm assessment skills
- Thirteen of the participants increased their confidence in 4 or more whole-farm assessment skills
- Seventeen of the beneficiaries increased their awareness of how recommendations about one part of a farm system could affect other parts of a farm system.
- Nineteen beneficiaries indicated that they would change how they make recommendations to farmers
- Twenty-one beneficiaries wrote action plans of how they would incorporate whole-farm system concepts into their educational programs
- One year following the workshop, 13 beneficiaries indicated that the workshop had moderately or significantly improved their ability to help farmers implement aspects of sustainable agriculture

As a result of the July 2012 Finger Lakes Organic Crop Production Tour:

- Between 9 and 16 beneficiaries increased their knowledge a moderate amount or a great deal in 8 topic areas related to organic grain crop production and marketing.
- Sixteen beneficiaries increased their understanding of how different aspects of organic grain crop production and marketing interact with each other within the context of a whole-farm system by 'A moderate amount' or 'A great deal.'
- Five beneficiaries made changes to their educational programs within 4 months after the tour and 9 beneficiaries had plans to make changes

INDIVIDUAL MILESTONE ACCOMPLISHMENTS

Milestone 1. One hundred fifty potential project beneficiaries become aware of the workshop opportunity. (April 2010)

Accomplishments for Milestone 1

Over 600 individuals learned about the 2010 workshop opportunity through Penn State e-mail lists, Northeast SARE State Program e-mail lists, and personal networking. One hundred individuals learned about the 2012 tour opportunity, including farmers, extension educators, researchers and students throughout Pennsylvania and the Finger Lakes region of New York. A collaboration with the Cornell Organic Cropping Systems Project facilitated interaction with potential project beneficiaries in New York.

Milestone 2. Forty potential project beneficiaries submit applications to participate in the workshop. (May 2010)

Accomplishments for Milestone 2

Twenty five potential beneficiaries submitted applications to participate in the 2010 workshop. Personal networks proved to be the most valuable way to recruit beneficiaries to the workshop. By networking with state leaders in NRCS, newly hired NRCS field personnel throughout Pennsylvania were encouraged to attend the workshop as part of their basic training. Informal feedback from our target beneficiary group indicated that the 3-day time commitment and the scheduling of the workshop in early August, which is both a prime vacation time and a busy time for county fairs, may have been deterrents to applying to participate in the workshop. For the tour in 2012, 30 beneficiaries registered to attend the tour.

Milestone 3. (Revised Below) Twenty beneficiaries attend the workshop and increase their knowledge of farm system components that are outside their primary discipline and discover at least two ways that components of the whole-farm system interact. (August 2010)

Milestone 4. (Revised Below) Twenty beneficiaries learn at least 3 ways that recommendations from their own discipline affect other components of the farm system. (August 2010)

Milestone 5. (Revised Below) Twenty beneficiaries learn at least 3 ways that recommendations from other disciplines affect their own component of the farm system. (August 2010)

Revised Milestones 3 to 5. Twenty beneficiaries: a) increase their understanding of how components of a farm system interact with each other; b) increase their confidence in skills used to conduct a whole-farm assessment; and c) increase their awareness of how recommendations about one part of a farm system could affect other parts of a farm system. (August 2010)

Accomplishments for Revised Milestones 3 to 5

August 2010 Reading the Farm workshop

Twenty-one beneficiaries attended the 3 day workshop in August 2010 where 26 farm system components were considered in the whole-farm assessments, broadly categorized into areas of agronomy, animal performance, business management, environmental resources, and social issues. Twenty beneficiaries increased their understanding of how one or more farm system components interacted with other components of the farm system. Eighteen of the beneficiaries increased their understanding of how 6 or more farm system components interacted with other components of the farm system.

Beneficiaries also practiced several skills that are important for conducting a whole-farm assessment, such as identifying the farmer's goals for the whole farm system and asking informed questions outside their area of expertise.

Twenty of the beneficiaries increased their confidence in one or more whole farm assessment skills. Thirteen of the participants increased their confidence in 4 or more whole-farm assessment skills.

Seventeen of the beneficiaries increased their awareness of how recommendations about one part of a farm system could affect other parts of a farm system.

Several of the beneficiaries attending the workshop were agricultural professionals with several decades of work experience. However, the facilitated programming was targeted towards entry level professionals, which may explain why there are some individuals that reported minimal gains in knowledge, confidence, or awareness. Despite this, the more experienced beneficiaries played an important role in the group dynamic, sharing their wisdom, experience, and perspectives during the farm tours and discussions.

July 2012 Finger Lakes Organic Crop Production Tour

Thirty project beneficiaries attended one or more components of the 2012 Finger Lakes Organic Crop Production Tour. Sixteen beneficiaries completed a follow-up survey conducted approximately 4 months after the workshop to measure knowledge gain and understanding of system interactions. Complete results from the survey of knowledge gain on topics such as crop rotations for organic production, weed management in organic crop production and other topics are listed in Figure 1 (uploaded as attachment below). In brief, between 9 and 16 people increased their knowledge a moderate amount or a great deal in 8 topic areas that were the focus of the workshop. When asked to what extent the tour increased understanding of how the topics focused on in the workshop interacted with each other within the context of a whole-farm system, 8 responded 'A moderate amount' and 8 responded 'A great deal.'

Milestone 6. Twenty beneficiaries outline how they will use new knowledge on whole-farm interactions in their educational programming and contribute to the development of new educational materials that meet their programming needs. (August 2010)

Accomplishments for Milestone 6

Nineteen beneficiaries at the August 2010 Reading the Farm workshop indicated that they would change how they make recommendations to farmers. These changes included:

- Being more sensitive as to why some recommendations may not be followed
- Looking more closely at the farmers goals instead of just natural resource concerns
- Taking more time to consider all of the options proposed to a farmer
- Understanding how recommendations could affect the profitability and production level of the farm
- Making recommendations that are not just farm specific, but farmer specific.

At the end of the workshop, 21 beneficiaries wrote action plans of how they would incorporate whole-farm system concepts into their educational programs. These plans varied widely among individuals, reflecting the diversity of the beneficiary group. Whole-farm system interactions that beneficiaries planned to include in their future programs included interactions between:

- Farmer goals, production practices and marketing/business decisions
- Production practices and environmental resources
- Agronomic practices, animal nutrition, and milk production per acre
- Soil amendments, soil health, plant health, crop productivity, and profits
- Crop productivity and livestock needs
- Conservation practices, crop productivity and profitability

- Animal nutrition and nutrient management

Activities that beneficiaries plan to organize where information on whole-farm systems will be disseminated included:

- Field days
- Conferences
- Fact sheets
- Newsletter articles
- County fairs
- Winter extension meetings
- Private farm visits
- Whole farm assessments and SWOT analyses for farmer clientele

In a 4-month follow-up survey after the 2012 Finger Lakes Organic Crop Production Tour, participants were asked whether they had used experiences or knowledge gained from the tour to make improvements in their farming system, educational programs, or research activities. Five respondents had already made changes, 9 had not yet made changes but planned to do so, and two were not sure. Specific changes made or planned were:

- Incorporating information into course materials and extension programming.
- Sharing knowledge learned about challenges and opportunities for small grain production with farmers.
- Adopting similar rotations on own farm.
- Planting an organic winter wheat variety trial in association with OGRIN.
- Sharing information with new specialty wheat farmer and other local growers.
- Use a case study of farm in newsletter article and extension publication
- Plan to use information learned in upcoming project
- Take students to one of the case study farms

In addition to these planned actions, these responses from participants illustrate the value participants' saw in the educational experience:

"It help to strengthen and solidify sustainable ag networks in the northeast. There is a tremendous amount going in in both PA and NY, and this trip helped to highlight that. It will definitely improve cross-state-line collaborations in the future."

"It was incredibly useful for networking and it strengthened relationships between Penn State and Cornell. I don't think the questions above about management will capture how successful this event was for building the organic community."

Document 1, uploaded below, contains a full listing of comments from the 2012 Fingers Lakes tour survey respondents.

Milestone 7. Fifteen beneficiaries communicate with project leaders and other participants the successes and challenges of incorporating content about whole-farm system interactions into their educational programs. (August 2011)

Accomplishments for Milestone 7

2010 Reading the Farm Workshop

Eighteen of the 32 service providers (participants and facilitators) from the 2010 Reading the Farm workshop responded to our follow-up survey in December 2011. The survey asked participants to describe the successes and challenges they encountered in incorporating whole-farm system interactions into their educational programs, and also asked questions to help evaluate progress towards our performance target.

Eight of the survey respondents were from Cooperative Extension or University, 6 were from NRCS, one was from the Chesapeake Bay Program Advisory Committee, and one was from Penn State Public Broadcasting.

Three participants described successes using knowledge about whole farm systems in their programs:

- “In my role as Chair of the Chesapeake Bay Program Science and Technical Advisory Committee, the knowledge was instrumental in assisting me to fund appropriate workshops and reviews on agricultural issues. During this phase of TMDL planning, this knowledge was critical to the committee.”
- “Getting a better understanding of Organic Farm Systems has given me a better understanding of challenges that Organic Farmers face and considerations that I previously had not contemplated.”
- “I had a much better understanding about looking at the farm as a whole after the training. I use the knowledge learned, everyday, but no specific stories.”

One participant described challenges using knowledge about whole farm systems in their programs:

- “The main challenges are the intensity of the process with limited resources and other commitments. We have made a plan to use this process more with a farm visit approach but it has not really happened yet.”

In addition to these comments, 13 of 16 participants responding to the survey indicated that the workshop had moderately or significantly improved their ability to help farmers implement aspects of sustainable agriculture during the last year.

These other comments from survey respondents illustrate the impact of the program on their work with farmers:

- “For many who have spent years working with farmers, many of the concepts that were shared during the RTF workshop were not “new”. However, it was great to have the opportunity to spend time with colleagues from other disciplines to learn some of the new ideas within that discipline, to improve our understanding of concepts that we know at least something about, or to receive some reinforcement that the many concepts/ideas that we’ve known and shared with our farmer and ag professional clientele remain current.”
- “The Reading the Farm workshop has positively impacted my understanding of all of the variables that farmers need to consider and contend with on a daily basis. The experience plays a role in how I approach and interact with farmers and the questions I pose to them to understand their experiences.”
- “The course was extremely helpful and changed my understanding of how to work well with my farmer colleagues. I think it has changed my approach more than the content of my work.”

Document 2, uploaded below, contains additional comments from the 2011 Reading the Farm survey respondents.

2012 Finger Lakes Organic Crop Production tour

Six of the 24 participants from the 2012 Finger Lakes Organic Crop Production tour who responded to our one-year follow-up verification survey shared these comments about the impact of the tour on their work:

- “I teach courses in agronomic crop science. Finding resources about weed management practices in conventional crop production is fairly easy. Finding resources (and real examples) about weed management in organic agronomic crop production is very challenging. I benefitted very much by seeing the organic fields and by listening to the growers’ successes and challenges.”
- “In our organic field crops study circles we have incorporated the idea of learning from producers and experts and the experts listening a lot.”
- “Made some really good contacts with other folks doing similar things and have been able to exchange some ideas and experiences with them.”
- “The tour was valuable for several reasons. Although my work with farmers is rather limited, I will be taking a class of undergraduate students to several of

the locations that we visited. So it was great to meet these farmers and hear about their operations. However, the most valuable outcome of the tour for me stemmed from a lunch-time conversation with one of the other farmers on the tour who told me about some innovative practices they are using on their farm. I followed up and ask them to collaborate on a grant proposal that was submitted to the ORG program. Unfortunately the proposal was not funded, but it was rated highly and I will be resubmitting it the next round.”

- [Figure 1 Finger Lakes Tour Survey Data](#)
- [Document 2 Reading the Farm Workshop Survey Comments](#)
- [Document 1 Finger Lakes Tour Survey Comments](#)

Assessment of Project Approach and Areas of Further Study:

Future Recommendations

ASSESSMENT OF PROJECT APPROACH AND IMPLEMENTATION

The Reading the Farm model of ag service provider training has now been used on several occasions and by different facilitation teams throughout the Northeastern US. In reviewing (and in some cases participating in) these trainings, we would like to offer some observations of the various approaches and methods of implementation.

The first observation is that there are many ways to structure and facilitate the farm tour component of a Reading the Farm training. These approaches include

1. Having a cohort of experienced ag professionals who ‘self-facilitate’ a farm tour, in some cases without participation of the farm managers;
2. Having a large (~12 person) group of experienced ag professionals who plan the event and facilitate a farm tour for a larger group of equally to lesser experienced participants;
3. Having a group of ag professionals take a farm tour facilitated by the host farmer and a single ag service provider liaison.

While there is good evidence that all three methods for structuring a Reading the Farm training program described above can be successful, the model that has received the most vocal praise by participants and organizers is the first, ‘self-facilitation’ model described above. Incidentally, this was the model used in the ‘original’ Reading the Farm training held in Connecticut by organizers T. Morris and M. Keilty. Subsequent trainings have deviated from this approach either due to specific needs and circumstances of the various organizing groups or from a lack of understanding of how the Connecticut training was structured. Due to the positive reviews that continue to be expressed for the model used in Connecticut and the fact that its approach has not been precisely replicated, we would encourage future Reading the Farm endeavors to more closely emulate the ‘self-facilitation’ model.

Our final comment is that the Reading the Farm program focuses on training ag service providers in an approach to understanding farming systems rather than on specific practices within a farming system. This can make it a difficult job to verify and compile the ways in which project beneficiaries have extended the content of the project to their farmer clientele. We recommend that in measuring the outcomes of this type of project we should think more about ‘how’ ag service providers deliver content to farmers than ‘what’ content ag service providers have delivered.

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or SARE.



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