

Statement of Professional Contributions and Scholarship

INTRODUCTION

I started working for the Green Lake County UW-Extension as an Agriculture Agent in July 2010. I began my work by conducting a needs assessment for farmers and building relationships with the farming community. To meet the needs of farmers, I designed and implemented educational programs based on the gaps identified in the needs assessment.

Green Lake County is located in Central Wisconsin. It has a population of 19,039 and 608 farms with an average farm size of 254 acres. Total land occupied by farms is 154,595 acres, of which 119,913 acres are under crop production. Agriculture contributes \$103 million to the county's economy. It generates \$320 million in economic activity and provides employment to 1,463 people. The major crops grown include: corn (55,976 acres); soybeans (17,022 acres); forages (15,364 acres); vegetables (11,560 acres); and wheat (5,933 acres). The major livestock raised in the county includes cattle and calves (23,461), chickens for meat (18,563), and horses (903) (Census of Agriculture, 2012). The market value of grain production totals \$46 million, milk totals \$29 million, and vegetables account for \$13 million (UW-Extension, 2011).

In September 2010, I conducted a broad needs assessment survey of farmers (n =155) to identify their educational training needs ([Exhibit 1](#)). At the time of the survey, the office records did not include farmers from the Amish community, suggesting no previous educational contact with, or needs assessment of, nearly 200 Amish vegetable growers residing in the southern part of the county. In order to reach this underserved community, I started to visit the Tri-County Produce Auction that was established in 2010 by Amish growers for wholesale marketing of vegetables. At the auction, I began to introduce myself as the UW-Extension Agriculture Agent for Green Lake County. Through the contacts made at the produce auction, I was connected to the Tri-County Produce Auction Board. Through interaction with the Auction Board, I began assessing Amish farmers' educational needs. To better facilitate that assessment process, the Auction Board extended an invitation for me to attend growers' meetings. They suggested that I include a needs assessment question in the post-program evaluation surveys and that I also assess needs during farm visits. After assessing the educational needs of farmers, I conferred with the Auction Board about the design and delivery of educational programs. According to the Amish community's leadership protocol, the Tri-County Produce Auction Board makes decisions on programs that should be offered to growers. By providing programs to this community over the years, I was able to develop a list of Amish vegetable growers to use when providing educational services.

The broader needs assessment survey of farmers identified many important areas for educational programming in Green Lake County. From them, I selected two primary areas as my programming focus: 1) Nutrient Management, and 2) Fresh Market Vegetable Production. My selection of these two areas for programming was guided by the Central Wisconsin Agriculture Specialization (CWAS) Team's programming focus for each county agent. The CWAS Team is a formal collaboration of seven Agriculture Agents from counties in the North Central Region of UW-Extension. In addition to general local responsibilities, each Agriculture Agent in the CWAS Team takes on a specialization role to assist growers and meet their specific educational needs across the seven county area. My specialist role is in fresh market vegetable production.

My programming focus areas were selected on the basis of two large target populations with specific needs. The first group was the 200 Amish growers associated with the Tri-County Produce Auction, who were looking to improve their vegetable production in order to respond to increased regional demand for locally grown foods. The second group was the 300 farmers involved in the Farmland Preservation Program and their need for soil and nutrient management education. The Adams County Agriculture Agent, Don Genrich, had been teaching nutrient management to Green Lake County farmers, and the CWAS Team suggested that I develop expertise in this area and take the programming lead in the future.

The impact of my educational programs in Green Lake County and in the CWAS area, the level and type of my involvement, and my reflections about the programs' role in my professional career are discussed in this document. In addition, my role and contributions at the state level to the Evaluation Leadership & Support Team (ELST) are explained. The Agriculture & Natural Resource Extension (ANRE) Program Director in 2011 asked me to join ELST as a state resource because of my professional background in research, statistics, and publications. The ELST is committed to developing evaluation capacities of Extension educators. In the current climate of fiscal austerity, program evaluation can help Extension ensure the optimal use of resources, demonstrate impact to key stakeholders, and fulfill its mission of research-based educational programming.

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I. NUTRIENT MANAGEMENT

A growing concern for farmers is compliance with local and state regulations for nutrient management. The Department of Agriculture, Trade and Consumer Protection (DATCP) regulation ATCP 50 mandates that Wisconsin farmers manage all agricultural land with a nutrient management plan in accordance with the Natural Resources Conservation Service (NRCS) 590 standard and submit their plan to the county's Land and Water Conservation Department (LWCD). The 2010 Green Lake County needs assessment survey indicated that farmers needed training to develop nutrient management plans which included information on the correct application of manure and commercial fertilizers, understanding nutrient crediting, and adjusting application rates based on soil testing ([Exhibit 1](#)). In response to this need, I taught nutrient management classes to a total of 55 participants in 2011, 2012, 2013, and 2014. In addition, I taught Soil Nutrient Application Planner (SNAP-Plus) classes to another 40 participants. The SNAP-Plus is Wisconsin's nutrient management planning software. My work with Amish growers also resulted in six nutrient management plans developed by Amish farmers. A summary of nutrient management and SNAP-Plus classes and its impact on participating farms is included in [Exhibit 2](#). I have been implementing the nutrient management educational programming through teaching, research and demonstration, and by assisting farmers in developing their plans.

Nutrient Management Education

In this section, two different training programs are discussed: first, the nutrient management training program which teaches principles and practices of soil fertility and nutrient management with a focus on helping farmers develop a handwritten plan; and second, the SNAP-Plus training program that enables farmers to develop their own nutrient management plans using a computer.

In 2011-2014, I collaborated with the CWAS Team and the Green Lake County LWCD to implement nutrient management training in Green Lake. During the first year of this program (February 2011), I organized and implemented a two-day nutrient management training with 15 farmers. For this training, I compiled a nutrient management workbook and distributed it to program participants. In survey evaluations, participants indicated that the workbook was a comprehensive resource that enabled them to write their plans. My experience organizing and implementing the training in 2011 gave me a better understanding of the local farming community and the issues farmers were facing. During the second year of this program (February 2012), I taught the components of a nutrient management plan ([Exhibit 3](#)) and nitrogen crediting ([Exhibit 4](#)) to 19 farmers.

Group interaction with farmers during the nutrient management workshop, and individually as they developed their plans, made it clear to me that phosphorous and potassium management are challenges for farmers. In the 2013 training, I taught phosphorous and potassium management to 11 farmers - in addition to the topics that I taught in 2012. In 2014, I taught another five farmers on the topics of phosphorous, potassium and sulfur management, humus development and the carbon-to-nitrogen ratio ([Exhibit 5](#)). Additionally, I educated farmers through articles in the local newspaper ([Exhibit 6](#)). In a follow-up evaluation survey at the end of the 2012 and 2013 crop seasons and in post-training evaluations, participants reported significant change in their knowledge of and skills in the topics that I taught ([Exhibit 7, 8, and 9](#)).

Marquette County is a part of the CWAS Team. The county seat is Montello. In March 2014, I collaborated with the CWAS Team and Marquette County LWCD to implement a nutrient management training in Montello for five farmers. I taught the components of a nutrient management plan, nitrogen crediting, and potassium management. In the post-training evaluation surveys, participants reported increased knowledge in these topics and also listed practices they planned to change as a result of the training ([Exhibit 10](#)).

During the 2011 nutrient management training sessions in Green Lake, the programmatic focus was on educating farmers to develop handwritten plans. However, a majority of farmers in the classroom had their own laptop computers and they were seeking information on using SNAP-Plus to develop their plans. The nutrient management plans developed by using SNAP-Plus provide the built-in capability for farmers to keep records on the rate, method and timing of all nutrient applications along with the source of nutrients, whether they are purchased fertilizers or on-farm manure and cover crops. With the help of this software, farmers can calculate potential soil and phosphorus runoff losses on a field-by-field basis. The Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP) and UW-Extension jointly developed this software and encourage farmers to use it in developing their nutrient management plans.

The WDATCP conducts SNAP-Plus trainings in regional locations, and Green Lake County farmers have to drive long distances to attend these classes. I developed expertise in SNAP-Plus and taught this program in Green Lake County. I implemented a two-day training program where farmers received hands-on experience with the software and

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Nutrient Management Education (continued)

developed their own plans. In collaboration with the Green Lake County LWCD, I taught SNAP-Plus to 15 farmers in 2012; to 14 farmers in 2013; and to 11 farmers in 2014.

Lessons learned when using computer programs such as SNAP-Plus can be forgotten if not used regularly. Farmers often use SNAP-Plus once a year and may forget how to navigate the software in between uses. I developed a SNAP-Plus handout ([Exhibit 11](#)) that farmers could use as a refresher anytime they want to use this software. Additionally, this handout can be used as a teaching tool for members of their families. This handout guides farmers through the software to develop their own nutrient management plans instead of hiring a consultant. Farmers found the handout to be a useful tool in assisting them in efficient utilization of the software. The evaluation surveys of the training programs (2012-2014) indicated a positive change in the participants' knowledge and skills in SNAP-Plus software ([Exhibit 7, 8, and 12](#)).

The program evaluation surveys conducted at the end of the 2011-2013 crop seasons asked participants to list the practices they changed as a result of the nutrient management and/or SNAP-Plus training. Seven farmers said they balanced their nutrient applications for crops. Five farmers said they applied manure only in those fields where it was most needed. Other farmers said they did a better job of crediting nutrients from manure applications and of using cover crops to add more organic matter to the soil. Farmers also reported reducing the use of nitrogen for corn production by 20 pounds per acre and saving money by not over applying phosphorous and potassium ([Exhibit 7, 8, and 13](#)).

During the years from 2011-2014, a total of 95 farmers participated in the nutrient management and SNAP-Plus training programs. Forty-two training participants representing 9,955 acres wrote, certified, and submitted their own nutrient management plans to the county's Land and Water Conservation Department ([Exhibit 2](#)). Table 1 shows programs/activities that farmers participated in each year, number of farms saving money in nutrient expenses, their farming acres, and total savings in dollars. From 2011-2013, thirty-six producers, farming 18,127 acres, saved \$529,450 in their nutrient expenses as a result of the nutrient management/SNAP-Plus training participation ([Exhibit 7, 8, and 13](#)). In 2012 and 2013, eighteen farmers saved \$19,223 by writing their own nutrient management plans for 6,682 acres instead of hiring a consultant ([Exhibit 7, and 8](#)). In total, farmers saved \$548,673, or an average savings of \$22/acre.

Table 1: Economic Impact of Soil and Nutrient Management Education				
Year	Program Participation/Activities	Number of Farms		
		Saving Money	Farming Acres	Total Saving(\$)
2011	Nutrient Management	8	3,853	\$110,450
2012	Nutrient Management/ SNAP-Plus Training	16	8,373	\$292,980
2013	Nutrient Management/SNAP-Plus Training	12	5,901	\$126,020
	Total	36	18,127	\$529,450
2012	Writing their own nutrient management plan	8	3,081	\$8,373
2013	Writing their own nutrient management plan	10	3,601	\$10,850
	Total	18	6,682	\$19,223
Grand Total		54	24,809	\$548,673

(Note: Table 1 summarizes the results of 2011-2013 evaluation surveys - [Exhibit 7, 8, and 13](#))

As a result of the nutrient management education program, Green Lake County had the highest percentage of cropland with nutrient management plans of the 72 counties in the state of Wisconsin in 2013 (Wisconsin Nutrient Management Update, WDATCP, November 2013). Green Lake County made a significant jump from 2012, when only 45% of its farmland was under nutrient management plans to its state-leading 88% in 2013. This means farmers with nutrient management plans were able to comply with the regulations of state ATCP 50, such as nitrogen soil restrictions near wells and other ground water conduits, maintenance of the phosphorus index within tolerances, restrictions on winter application of manure, and water quality management. Introduction of the SNAP-Plus program to Green Lake County farmers in 2012 had a sizable impact on increasing land acreage with nutrient management plans ([Exhibit 2](#)).

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Nitrogen Management Research in Corn

Corn is the major crop grown in Green Lake County. With the steadily increasing price of nitrogen, farmers have become increasingly concerned about its post-application loss due to leaching and volatilization. As a result, corn growers are looking for options to find the most economical method of nitrogen fertilization. In 2012 and 2013, I conducted nitrogen fertilizer research on sweet corn and field corn. I was a collaborator with five Green Lake County corn growers in this statewide Nutrient Management Team research project to evaluate whether various nitrogen sources impact no-till corn yield. The sweet corn field trial was conducted at three farms. The field corn trial was conducted at two farms; two sites with the farming system of corn after corn and two sites with corn after soybeans. I collaborated with Matt Ruark (UW-Extension Soil Scientist) to develop and design the research, lay out the plots, test the soils, apply the fertilizers, and measure the yields. I co-authored research outcomes with Matt at the statewide Soil, Water, and Nutrient Management Meetings in which a total of 509 crop consultants participated. In addition, I co-presented at the Dodge County site ([Exhibit 14](#)). In a statewide follow-up evaluation survey, participating crop consultants (n = 79) estimated that 4,214 farms across the state with 1,570,700 acres saved \$5,175,400 in their nutrient cost (Matt Ruark, Department of Soil Science, 2014).

In a follow-up evaluation survey at the end of the 2013 crop season, the Green Lake County corn research trial participants (n = 5) reported a change in their knowledge and practices as a result of the nitrogen research on their farms. One of the farmers said, “It does not pay to apply more than 150 pounds per acre of nitrogen in sweet corn.” Another farmer said, “Any urea that I apply will have Agrotain on it, and I will be using less nitrogen on my lighter soils.” The other farmers found the research useful to confirm that smart nitrogen or timed-released nitrogen have a place on their farms. As a result of adopting the research outcomes on 7,550 acres across all five research cooperators farms, the farmers reported a total saving of \$125,000 in their nitrogen expenses ([Exhibit 15](#), page 2).

II. FRESH MARKET VEGETABLE PRODUCTION

In Green Lake County, Amish growers sell their produce at the Tri-County Produce Auction located in Dalton. The produce auction is run by a board of five members nominated from among the growers. I have been implementing educational programs for Amish in partnership with the Auction Board. About 30 Amish growers living in Marquette and Columbia Counties also utilize the educational services from Green Lake County UW-Extension because of their association with the produce auction. My educational work with Amish farmers was cited by the UWEX-ANRE Program Director in the 2013 federal report as an example of program outreach to underserved audiences ([Exhibit 16](#)). I received the ‘Excellence in Young, Beginning, or Small Farmers/Ranchers Award’ in 2013 from the Wisconsin Association of County Agricultural Agents for my work with the Amish.

My educational work with the Amish began by speaking at the Tri-County Produce Auction. This opportunity created an environment to extend my educational services in the community. Since 2010, I have been speaking at the produce auctions to update growers about current agricultural conditions, such as insect and disease outbreaks. The educational information I provided during my presentations encouraged farmers to connect with me for one-on-one educational consultations. Farmers began to ask me to visit their farms and to help solve their vegetable production issues. The word-of-mouth publicity of my farm visits in the community encouraged other Amish growers to ask me for educational help and utilize the services of UW-Extension. Subsequent farm visits and the increased number of educational contacts widened my conversation with growers to assess their educational needs for future programming.

My presence at the produce auction has been instrumental in building trust and relationships with buyers, growers, auction staff, and the Tri-County Produce Auction Board. Buyers often ask me about the crop situation and understand that UW-Extension has been helping growers produce quality vegetables. Additionally, presenting at the produce auction has been a venue for me to connect with the next generation of young Amish farmers who attend the auction with their parents. These young farmers believe that UW-Extension is the place to contact for technical assistance. At present, many young farmers call me directly to request that I visit their farms and advise them on various production issues. I consider this an opportunity to connect and work with the next generation of Amish farmers. These farmers show positive response to new technology and to UW-Extension’s recommendations. The potential implications are that young farmers will increase their use of UW-Extension’s educational service, they will be trained well in vegetable production practices, and they will gain an understanding of sustainable agricultural production systems.

Fresh Market Vegetable Grower’s Workshop

In February 2011, I organized and implemented a fresh market vegetable grower’s workshop for 63 farmers in collaboration with the CWAS Team and state specialists for Vegetable Production, Entomology, and Plant Pathology. During the second year of this program (February 2012), I taught integrated pest management in vegetable

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Fresh Market Vegetable Grower's Workshop (continued)

crops ([Exhibit 17](#)) to 34 farmers. In a follow-up evaluation survey in December 2012, participants reported a positive change in their knowledge and skills in the topics that I taught ([Exhibit 18](#)).

Through evaluation surveys, grower meetings, educational program participation, and on-farm technical assistance in 2012, growers reported a need for knowledge and skills related to soil fertility and nutrient management in vegetable crops. In the 2013 workshop, I taught how to understand soil test reports ([Exhibit 19](#)) to 27 farmers. The goal was to develop the growers' ability to apply fertilizers according to the soil test recommendations. In this presentation, I included the soil test reports from University of Wisconsin Soil and Plant Analysis Laboratories (UW-Labs) illustrating the nutrient requirements of vegetable crops in Wisconsin, such as tomatoes, cucumbers, onions, and bell peppers. In an evaluation survey at the end of 2013, participants reported a positive change in their knowledge and skills in the topics I covered ([Exhibit 20](#), question number 2). As a result of my teaching, growers increased their understanding about the nutrient requirements of vegetable crops in Wisconsin soils. This motivated them to explore the possibility of testing their soils in UW-Labs.

Testing Soils in UW-Labs

As a result of the close ties of Green Lake County Amish farmers to the Midwestern Amish community, Green Lake County Amish growers were testing their soils in Ohio. The Ohio recommendations do not match with UW-Extension's crop nutrient recommendations. For example, the recommended phosphorus application in commercial tomato production in Ohio is 300 pounds per acre (Ohio State University Extension, HYG-1624-10), compared to 40 pounds per acre in Wisconsin (UW-Extension, A3422). The over-application of nutrients by Green Lake County Amish growers following the Ohio recommendations could be detrimental to the environment in the long run. In 2013, I introduced a program to test Amish growers' soils and leaf tissue in UW-Labs so the recommendations and educational information could be aligned with the needs of Wisconsin soils. To support this program, I applied for and successfully received two North Central Region UW-Extension innovative grants (\$2,475 in 2013 and \$2,195 in 2014). These grants paid for the cost of testing growers' soil and leaf tissue samples. Subsidizing the cost of testing their soils through grant funds increased the number of growers who had their soil tested in UW-Labs. Those growers were then able to compare the results with Ohio recommendations and make informed decisions on nutrient applications. By the end of July 2014, a total of 22 Amish growers had tested 44 soil and leaf samples in UW-Labs.

Using the Wisconsin soil test reports, I provided technical assistance to six farmers who developed nutrient management plans for vegetable crops. To develop their plans, I met with each of them at their farms. Based on their available resources, I showed them different combinations of chemical fertilizers and manure that would be most economical to meet the nutrient requirements. Farmers then chose a plan that best fit their farm. As a result of implementing these plans, farmers reported changes in their nutrient management practices, such as application of fertilizers per soil test recommendations, regular soil sampling, and cover cropping ([Exhibit 20](#), question number 8). I consider this an opportunity to increase the number of Amish growers developing and implementing nutrient management plans. The potential implications are increased awareness and likelihood that the Amish farming community will test soils in UW-Labs and apply fertilizers according to UW-Extension recommendations. The long-term impact of this program is the balanced use of nutrients, minimized negative impacts on the environment, decreased phosphorus quantity in the lakes and rivers, increased water quality, optimized crop yield, production of nutrient-rich foods, and increased shelf-life of the produce for consumers.

One of the reasons for the small number of Amish farmers who developed and implemented nutrient management plans is a lack of knowledge and skills among growers about the potential benefits. Another reason is that Amish growers are members of a culturally closed community, which influences their response to new technology or change in production practices. During my educational visits to farms, I discovered private companies providing soil-testing services and selling fertilizers to growers. An Ohio-based Amish company is among them. These companies have long standing trust and business relationships with the Amish community. An additional factor leading to Amish growers' resistance to shifting their soil testing to UW-Labs and following the UW-Extension's nutrient recommendations is the absence of UW-Extension's educational outreach to the Amish community in the past.

On-Farm Technical Assistance

Since 2010, I have been providing on-farm technical assistance to Amish vegetable growers. Growers request farm visits to gain information on disease, insect, and nutrient management for crops such as pumpkins, zucchini, bell peppers, watermelons, tomatoes, squash, cantaloupes, and potatoes. My focus during the farm visits was to educate farmers and to develop their capacity to identify insects and diseases, to schedule insecticide and fungicide

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On-Farm Technical Assistance (continued)

applications, and to apply fertilizers according to soil test recommendations. The farm visits also helped to identify future program priorities and to determine if growers were looking for further assistance. From 2011-2014, I provided repeated on-farm technical assistance to 31 growers. An example case study of the farmers (n = 4) to whom I provided technical assistance is included in [Exhibit 21](#). In a follow-up evaluation survey at the end of the 2013 crop season, farmers reported changes in their knowledge as a result of my on-farm technical assistance. They reported making specific changes in their vegetable production practices based on my technical assistance. Some of the changes farmers reported were: applying proper doses of insecticides, sustaining the crops with a stronger nutrient management program after a virus attack; spraying the correct fungicide (e.g. Bravo) to control diseases in pumpkins and squash; and, treating seeds before planting to avoid seed-borne diseases ([Exhibit 20](#), question number 4).

Twilight Vegetable Field Workshop

Since 2011, I have organized and implemented twilight vegetable field workshops every summer at one of the Amish growers' farms. At these events, growers and educators scout the fields together and talk about current issues, such as insect and disease control. State specialists for Entomology and Plant Pathology attend with me and answer growers' questions. During 2011-2014, a total of 89 growers participated in four annual workshops.

Follow-up evaluation surveys were conducted at the end of the 2011 and 2012 growing seasons. Farmers reported the following changes in their practices as a result of their participation in these workshops ([Exhibit 18](#), question number 8 and [Exhibit 22](#), question number 6):

- Increased scouting of vegetable fields to identify the symptoms of disease and insect problems.
- Spacing plants and rows farther apart to avoid pest problems.
- Altering insecticide sprays to prevent resistance from developing.
- Scheduling regular irrigation during the hot summer to prevent melon fruit cracking.
- Looking for aphids on the underside of leaves and spraying chemical early to prevent viral disease.
- Spraying calcium on bell pepper plants before fruiting to avoid blossom-end rot.

Food Safety and Good Agricultural Practices (GAP) Training

A large volume of fresh produce is sold at the Tri-County Produce Auction. More than 40 wholesale buyers are supplying produce to regional consumers that include hospitals, rehabilitation centers, and chain grocery stores such as Pick 'n Save and Piggly-Wiggly. To protect consumers from foodborne illnesses, the U.S. government regulates food safety policy. Consumer awareness of food safety has driven the increased demand for higher-quality produce. Buyers are asking growers to produce food using good agricultural practices. The Tri-County Produce Auction Board requested that I conduct a food safety training for growers so that they could continue selling produce to existing buyers and so they could also attract new buyers. In collaboration with the UW-Madison Center for Integrated Agricultural Systems (CIAS) and WDATCP, I organized food safety and GAP training in 2012 and 2014. I developed the curriculum for this training ([Exhibit 23](#)). A total of 75 farmers participated in these trainings. Training certificates of 10 large vegetable growers were posted at the Auction House to inform buyers that growers have received training on food safety and GAP. Farmers reported that this training made them more confident in their food safety protocols. By the end of 2013, a total of twenty-nine growers received third-party GAP audit certifications for their farms ([Exhibit 18](#), question number 4 and [Exhibit 20](#), question number 12). As a result of this training, the Auction House also received 'Good Handling Practices' certification to ensure that produce was handled with care and was sold to the buyers in good shape. Additionally, the certificate indicates that the facility employs safety measures related to moving and loading produce. In 2014, the Clark County Agriculture Agent conducted similar training for Amish and Mennonite farmers based on the GAP Training Model I developed for Green Lake County ([Exhibit 24](#)).

Vegetable Newsletters

Responding to the 2012 follow-up evaluation surveys, Amish growers and the Tri-County Produce Auction Board requested that I provide continuous technical updates through a newsletter. Since the beginning of the 2013 growing season, I have been mailing vegetable newsletters developed by Extension Vegetable Plant Pathologist Amanda Gevens to 81 Amish growers. As an addition to the newsletters, I developed fact sheets for growers relevant to current issues in vegetable production which were sent out with the vegetable newsletters. As of August 2014, I have developed 10 fact sheets and an example is included as [Exhibit 25](#).

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Economic Impact of Fresh Market Vegetable Production Program to Amish Growers

From 2011-2014, a total of 89 Amish farmers participated in the Fresh Market Vegetable Production and Management programs. Responding to the follow-up evaluation surveys, farmers reported increased vegetable quantity and increased income due to the on-farm technical assistance and educational programs I provided. Farmers reported a 5-25% increase in their vegetable production/acre. This increased production was converted into an estimated net income (dollars) using the CIAS report (2006). The report shows that fresh market vegetable producers earn an average net income of \$4,679/acre. Therefore, a 10 percent increase in vegetable production per acre means a \$468 increase in growers' average net income per acre.

Results of the follow-up evaluation surveys from 2011-2013 show that growers who reported increased vegetable quantity increased their total net income by \$187,552 while farming a cumulative 485.6 acres. This amounts to an average increased net income of \$386/acre.

The yearly calculation of the data show that in 2011, fifteen Amish farmers growing vegetables on 98.5 acres reported a total increase in net income of \$3,200 ([Exhibit 22](#), page 4). In 2012, thirty-one farmers growing vegetables on 196.5 acres reported a total increase in net income of \$92,293 ([Exhibit 18](#), page 4). In 2013, twenty-five farmers growing vegetables on 190.6 acres reported a total increase in net income of \$92,059 ([Exhibit 20](#), page 6).

The increased income for growers is also evident from the Tri-County Produce Auction Board members' survey responses (n = 4) in 2012. In this survey, board members reported an additional \$87,000 to \$174,000 increase in growers' income due to the on-farm technical assistance and educational programming I provided ([Exhibit 26](#)).

III. PROFESSIONAL DEVELOPMENT OF EXTENSION EDUCATORS IN PROGRAM EVALUATION

I joined the Evaluation Leadership and Support Team (ELST) in July 2011. I conducted a study in collaboration with Professor David Trechter (UW-River Falls) to identify training needs of UW-Extension educators in program evaluation. I compiled and analyzed the data using statistical software. Using the research outcomes, I co-authored a scientific report with Professor Trechter. I presented the study findings to the Dean of Extension and program directors ([Exhibit 27](#)). The ELST used the findings to design a staff development program for Extension educators in all program areas. In 2013-2014, three professional development trainings titled 'Evaluation Essentials' were conducted in Madison, Eau Claire, and Wausau, in which a total of 64 educators and program liaisons participated. In these trainings, I taught how to develop evaluation questions, identify outcomes, and how to measure the change ([Exhibit 28](#)). In a follow-up evaluation survey, over half of the participants reported they would use information learned from the training to develop evaluation questions tailored to program objectives and to design appropriate questions that yield relevant data. I also taught evaluation to Extension educators at the 2013 and 2014 JCEP Conferences and at the 2014 North Central Region UW-Extension Conference. As a member of the ELST, I assisted two ANRE program area teams, Dairy and Nutrient Management in developing evaluation plans for measuring their program impacts.

In 2012, I conducted independent research in 12 states of the North Central Region Cooperative Extension to determine the training needs of Extension educators in program evaluation. Based on this research, I co-authored an article with Professor Robert Martin (Iowa State University) which was published in the Journal of Extension (December 2013, Volume 51, Number 6). The title of the article is 'Does Evaluation Competence of Extension Educators Differ by Their Program Area of Responsibility?' ([Exhibit 29](#)).

Based on my previous research I published two books, [Participatory Agricultural Development](#) (2011) and [A Model for Applying Educational Process Competencies](#) (2011). I used the contents of my first book to plan and implement educational programs with Amish farmers using participatory approaches. I co-authored the second book with Professor Martin, and this book is based on the Cooperative Extension's program development, evaluation, and teaching/learning processes ([Exhibit 30](#)). I received the 'Bound Book Communication Award' from the National Association of County Agricultural Agents (North Central Region) for my first book in 2012 and for my second book in 2013. I have published eight articles in refereed journals. One of my articles, titled 'A Professional Competency Development Model for Extension Educators,' has been published in the Association for International Agricultural Extension and Education Journal. This article is listed as a reference to determine the competency development needs of Extension educators in Iowa State University Extension.

REFLECTION

Coming from Nepal and working in the American farming system is rewarding as well as challenging. Since finishing college in the United States, this is my first professional job with the responsibility of helping commercial farmers. I experienced a combination of fear, stress, and nervousness over how clients were going to perceive me,

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Reflection (continued)

being from a different country and culture, and how they would accept me in the community as an educator. During the first few weeks at my job, I noticed that people had difficulty understanding my accent. After approaching the Regional Director for available resources to help me with this issue, I received a professional development opportunity. After eight months of English accent training, people started to recognize that my accent was improving, and they could understand me better. My increased ability to communicate with farmers increased the effectiveness of my teaching efforts.

During my first year on the job, I found that I needed better skills in order to transfer my academic knowledge to farmers to solve their problems. I realized that these skills could be enhanced by focusing more on the local agricultural community and understanding their farming systems. I started my job building relationships with the communities, striving to understand the local issues. I gained confidence about teaching and learning processes in Extension through a year of experiential learning: observing my colleagues teaching farmers, understanding questions that participants bring to the classrooms, and analyzing how programs were organized and implemented.

During the second year of my programming, I began to teach my clients in the areas of nutrient management and fresh market vegetable production. I am grateful to the CWAS Team, state specialists, and the North Central Regional Director of UW-Extension, who created an environment that fostered my success as an Extension professional. I truly believe that without this support, I could not have advanced as an Agriculture Agent. In the beginning, I was also unaware of the types of evaluation needed to measure the outcomes of the program. Early on, the evaluation surveys that I developed and implemented were not meeting state and federal reporting expectations. I needed to do a better job of evaluating tangible changes experienced by participants, such as knowledge gained, change in practices, and economic impacts. To meet these shortcomings, I first learned about program development, objectives, and intended outcomes. As I became engaged in developing a 'plan of work', I gained insight into my professional requirements. Both experiential learning and professional development training increased my ability to design evaluations and to meet the needs of Extension reporting. The evaluation ability that I developed further connected me with ELST to support other Extension educators in the state.

I helped corn and soybean growers with their soil and nutrient management practices. While offering the nutrient management trainings for the past four years, I realized that most of my training participants were owners and operators of small to medium-sized farms, who were 50 years old or older. It was interesting to learn that young commercial growers often used private consultants for their agricultural service needs. In the future, I would like to find ways to connect with these progressive growers through new educational programs. An important experience that I gained while working with traditional corn and soybean growers is that they value and are most likely to adopt the soil and nutrient management practices that are based on research conducted on local farms. In the future, I would like to introduce a program on 'grain quality' for traditional farmers because it determines the storability and market value of their grain.

In any Extension work, bridging cultural gaps between the educator and audience is essential for effective communication. I have found my work with the Amish community to be a unique experience. During the first six months of my job with UW-Extension, the Amish community did not ask me for educational resources of any kind. As trust developed, the community came to see me and UW-Extension as valued partners. I accomplished this through the slow process of building relationships. After several visits to the Tri-County Produce Auction, the community began to accept that my efforts were to genuinely help them solve their agricultural challenges. The positive relationship between UW-Extension and the Amish farmers has taken time to develop. As I learned more about their cultural distinctions and agricultural education needs, I have adjusted my educational approaches. The community now understands why programs are evaluated and what role they have as program participants. The sharing has been mutual. As I learned more about reaching out to the Amish, they have been receptive to UW-Extension's evaluation and reporting requirements. The relationships I have developed and the trust I have gained through working with the Amish will be a valuable asset to other Agriculture Agents who work with similar underserved communities in Wisconsin. With the Amish farmers, my goal is to shift their soil testing program from Ohio to UW-Labs so that recommendations will meet the specific needs of Wisconsin soils and save nutrient costs as well as the environment.

My future plans are to continue working with the agricultural community and to keep updating my knowledge through professional development opportunities and experiential learning. I strongly believe that networking with colleagues plays a crucial role in success as an Agriculture Agent. My experience in the past four years is that one-on-one contact is the most effective way to build relationships and trust with clients.