Introduction

The relatively cool summers coupled with fertile clay and silt loam soils offer unique opportunities and challenges for farming in Kewaunee County. Kewaunee County is a very rural county with 21,000 people, 12,000 of which live in rural areas. Twenty-five percent of the county's residents work in agriculture (Deller, 2011). Residents have a deep understanding and acceptance of the dairy industry since many of them either own, work on, or supply products to dairy farms.

Kewaunee and Door Counties have an informal specialization agreement involving the duties of both agriculture educators. This educator is responsible for planning and implementing educational programs directly relating to dairy and livestock, while the Door County educator provides programming in crops and soils for producers of both counties.

Kewaunee County's number-one industry is agriculture, specifically the dairy industry. Agriculture generates over $487 million of economic activity (Deller, 2011). Since 2007, the county has seen an increase of 10,500 dairy cows, and an average milk production increase of over 3,200 pounds per cow (National Agriculture Statistics Service, 2011). In addition, Kewaunee County topped 100 cows per square mile in 2009, the highest dairy cow population density in Wisconsin. As of 2011, the county has 118 dairy cows per square mile. The trend for larger dairies is also evident in Kewaunee County with 15 farms having more than 1,000 milking cows. However, approximately 80 percent of the county's more than 200 dairy farms have less than 200 cows.

Door County dairy trends show farm and cow numbers have remained very steady in recent years with 8,000 cows on 86 dairies. Farming in Door County poses a land management challenge since over 70 percent of the county is on karst topography with soils less than five feet to bedrock (Door County Land and Water Conservation Department, 2007).

In October 2007, this educator conducted an educational needs assessment pertaining to dairy and livestock topics and issues in Kewaunee and Door Counties **(Exhibit 15)**. Surveys were sent to 536 Kewaunee and Door County individuals that included dairy producers, land owners, and agri-business professionals. The response rate was 24.6 percent (n=132). Seventy-seven percent (n=100) of respondents reported dairy farming as their primary business. Seventy percent of dairy producer respondents milked less than 100 cows, two percent of respondents milked 500-999 cows, and one percent of respondents milked 1,000 or more cows. Participants were asked to rank 24 farm management topics (Lickert Scale 1=low priority, 5=high priority). Based on responses, survey participants reported the top ten topics as profitability, modernizing, reproduction/herd fertility, milk quality, record keeping, cost of production analysis, herd health, employee training, herd nutrition, and heifer management. Since dairy is the major agriculture industry in Kewaunee County, many producers are looking to maximize profit with dairy's secondary income, dairy steers and market cull cows for beef. Based on the needs assessment and personal observations, this educator developed programming on 1) Dairy Herd Management and Profitability and 2) Livestock Production.

Dairy Herd Management and Profitability

This educator works with three distinct groups of dairy producers in Kewaunee and Door Counties. The first and largest group consists of herds with less than 100 cows. The second group consists of farms ranging from 400-600 cows. The third group consists of farms having over 1,000 milk cows. This split in demographics allows this educator to focus on specialized topics for each group. Smaller dairies typically need information on modernization and labor saving measures. Mid-size dairies need education on transitioning into a different style

Dairy Herd Management and Profitability (Continued):

of management of a larger farm. Large dairies need information on employee management and farm safety. Regardless of size, all producers request information on profitability, which consists of labor management, reproduction, record keeping, and producing a quality product.

Farm Management

This educator participates in and/or is the facilitator for seven farm management teams in Kewaunee County and three teams in Door County. Farm management teams consisting of agriculture professionals who work with dairy producers are an effective process to address farm management issues. By gathering professionals from different sectors of the industry, producers get ideas and learn new methods to improve management.

This educator initiated four of the ten teams and actively served as facilitator on the other six. One team was for a family farm with 150 cows that were housed in a compost barn and milked in a new parlor. The dairy producer had moved into the new barn from a tie-stall barn about eight months prior to the first farm management team meeting. Within three months of moving into the new barn, herd health declined because of a very contagious form of mastitis called *Klebsiella sp.* It was at this time the producer inquired about the Grow Wisconsin Farm Management Team Program. This educator worked with the producer to assemble the farm management team consisting of two representatives from the milking equipment company that serviced the farm, a veterinarian, Farm Service Agency lenders, a bank lender, an AI company representative, and a nutritionist. The group discussed major concerns at the dairy and established short, medium, and long term goals to improve farm management for improved milk quality and herd health. During the first meeting the dairy owner shared his story of how the cows had been progressively declining in health due to *Klebsiella sp.* The management team helped him put a plan in motion that would decrease the occurrence of *Klebsiella sp* mastitis in the herd while increasing profitability. Prior to the team meeting the dairy producer was losing an estimated $85,000 a year in income due to mastitis, poor cow health, culling, and deaths. Changes suggested to the producer allowed him to recoup the $85,000 loss and gain an additional $7,000 income a year **(Exhibit 16)**.

Another team this educator facilitates is at a 250 cow dairy with two generations (parents and son) currently working on the farm. The son started a management team to accomplish two goals: begin the farm transfer process to him and to increase milk production. The herd is an exceptional group of cows with extraordinary genetics, yet their milk production is only slightly above the state average. Through a series of team meetings facilitated by this educator, forage quality was identified as limiting milk production. The team focused on improving forage quality through harvesting earlier, increasing the dry down rate through wider swaths, and adding forage inoculants. As a result the producers harvested higher quality forages. The herd has begun a gradual response to the improved forage with increased milk production of three pounds per cow per day, which equates to a projected $45,000 per year in additional income.

Farm management teams are unique to each farm and have varied results. This educator learns new ideas at farm meetings from other professionals and transfers them to other teams. Management teams are an effective way to share ideas while improving farm profitability and professional relationships amongst members. This educator continues to facilitate four teams and has recently started a new one. All 10 teams incorporated management changes as a direct result of team suggestions. Some changes made by farm management team participants over the last five years were grouping pre-fresh cows for a longer period of time before calving to provide a less stressful environment for animals, altering vaccination protocols to improve herd health, improving record keeping to better track cow illness events, and body condition scoring cows so diets could be

Farm Management (Continued):
altered depending on the cow's condition. Because each team is unique and addresses the needs of a given farm, many successful changes have been made.

Farm and Employee Safety
Kewaunee County University of Wisconsin-Extension (UWEX) and The Literacy Partners of Kewaunee County, Inc. (LPKCI) work together closely to educate and serve the literacy needs of Spanish-speaking residents. A survey was developed in 2007 by this educator, the family living educator, and representatives from LPKCI that focused on the farm and worker safety needs of dairy owners who employ Latino workers. The survey questionnaire was sent to 32 dairy producers known to employ Latino workers in Kewaunee and Door Counties. Respondents (n=19) ranked five out of nine safety categories of at least moderate concern, including understanding protocols of warning labels and operating instructions of moving parts of machinery, handling chemicals and dangerous materials, milking parlor hygiene, farm emergency protocols, and electrical safety behaviors **(Exhibit 17)**. The farm worker safety survey and needs assessment of Kewaunee and Door Counties combined with conversations with large dairy owners and this educator helped direct programming in both Kewaunee and Door Counties. Results of the study were shared through a *Journal of Extension* article entitled "Latinos Safety Behaviors Related to English Literacy as Reported by Dairy Producers in Kewaunee County, WI" **(Exhibit 2)**. Study results were also presented to the LPKCI, farm safety focus groups, and UWEX colleagues at the Joint Council of Extension Processionals conference reaching approximately 100 individuals. Due to the results of the study, this educator has continued work with the LPCKI to provide farm safety education in tutoring programs.

Safety programming has been mainly focused on dairy farm employees. Employee training and farm worker safety is often not the highest priority of farm management, but most producers recognize that training is a vital aspect to improve employee performance. Training employees takes time and educational resources are limited. With the increased size of dairy operations, the need for trained farm employees is at an all-time high. Through on-farm and phone conversations with producers in 2011, this educator determined 15 dairies employ between 13 and 85 employees. Producers employ up to 75 percent Latino labor, most of whom work with livestock at entry level positions.

Most dairy farm employee injuries occur while medicating sick cows or milking (Roman-Munoz, 2006). Knowing producers had concerns about employee safety and the need for bi-lingual training materials, this educator co-developed Section I "Cattle Movement" of the "Handling Skills" Module VI of the Dairy Workers' Training series **(Exhibit 13)**. This section focuses on safe cattle handling. The module is in English and Spanish and consists of a self-playing voice-over presentation, a 20-minute cattle handling video, and 13 fact sheets. It has been recognized nationally with a National Association of County Agriculture Agents Communication Award. As of July 2011, 110 modules have been sold nationally and internationally.

"Cattle Movement" was piloted in Kewaunee County in May 2009 with nine participants (six Spanish-speaking and three English-speaking). In addition to the pilot program, this educator has taught the program at seven locations in four counties with a total of 44 participants. Other educators have utilized the module in seven counties and two University of Wisconsin dairies. Evaluations were collected from participants (n=89) that asked them to rate pre- and post-program understanding of topics. The following summarizes evaluations from all seven trainings.

Farm and Employee Safety (Continued):

Table 1. Level of Knowledge/Understanding Pre- and Post-Cattle Movement Training

Topic	Before	After
Understanding low-stress cattle handling	3.3	6.3
Understand natural cattle behavior	4.1	5.9
Understand how cattle see	3.1	6.2
Understand flight zones/points of balance	5.1	6.8
Ability to practice proper restraining techniques	2.2	6.1
Ability to practice proper crowd gate use	5.9	6.8
Ability to practice proper parlor training	5.2	6.6

Lickert Scale 1=Low, 7=High

One hundred percent of participants stated they would recommend the program to other dairy workers. A local dairy producer who hosted the program said, *"I'm so happy you offered this program to my workers, it couldn't have come at a better time."* Continued employee training in proper animal handling practices will have long-term impacts on employee and animal safety. Employees will learn safe methods of moving animals, and if implemented properly, employees will reduce the risk of injury to themselves and to animals they work with.

Continuing farm safety programming, this educator contacted 24 dairies in Kewaunee and Door Counties to offer a safety review conducted by UWEX Agriculture Safety Specialist Cheryl Skjolaas and this educator. The purpose for offering the safety reviews was to identify potential employee safety hazards in response to anticipated Occupational Safety & Health Administration (OSHA) inspections. Nine dairies in the two-county area requested safety reviews. Overall response to the walk-throughs was very positive and producers were grateful for the opportunity to identify safety risks on their farms. One producer said, *"This was great, we didn't even know where to start with OSHA inspections and now we have a better idea. Please come back and see how we have improved!"* Follow-up conversations between this educator and walk-though participants revealed changes made on farms were improving confined spaces labeling, updating wiring/lighting in older facilities, improved guards and fences around manure reception pits, and improving employee training protocols. Based on the success of the safety reviews initiated by this agent, eight extension educators also conducted reviews reaching an additional 26 dairy farms. A summary of the safety reviews was presented to the Kewaunee and Door County Ag & Extension Committees and the Kewaunee County Farm Bureau **(Exhibit 5)**. Although the program is relatively new and long term impacts cannot be determined yet, it is evident through producer response the program is needed and will continue to be valued by many participants around the state.

Reproduction

According to a University of Wisconsin dairy scientist, dollar value per cow per year, increases by approximately $30 for every one percent increase in the herd's 21-day pregnancy rate. Improved reproduction on dairies has an exponential effect profitability. The dairy industry was an early adopter of artificial insemination (AI), when it first became commercially available in the 1940's. Over the last 75 years, producers have also adopted new management practices such as synchronization, sexed semen, ultrasounding, and crossbreeding. This educator developed a field survey in 2009 designed to collect information regarding AI sire use and criteria used to mate cows on Wisconsin dairy farms. The questionnaire was peer reviewed by three county educators and two UWEX dairy reproduction specialists. It was distributed to dairy producers across Wisconsin via meetings, farm visits, e-mail (Zoomerang®), and postal mail in January through April 2009. Responses (n=256) were collected and evaluated **(Exhibit 18)**. Survey results were presented by this educator

Reproduction (Continued):
at a local veterinary meeting update, a local dairy herd reproduction seminar, producer roundtables in three counties, and at the Four-State Dairy Extension Specialist Team meeting reaching approximately 65 people **(Exhibit 6)**. Evaluations were completed at the Dairy Herd Reproduction Update. Ninety-seven percent of respondents (n=29) increased their knowledge on AI sire use in Wisconsin **(Exhibit 19)**.

This educator authored a *Hoard's Dairyman* magazine article (December 2010) summarizing the results of the survey **(Exhibit 1)**. Translated versions were also published in Spanish and Japanese (global circulation 62,562). Finally, a Dairy Team fact sheet with the results of the survey was written and distributed at the 2011 Farm Technology Days **(Exhibit 11)**. The fact sheet is also available on the Kewaunee County UWEX and Dairy Team websites. This educator will continue to develop programs to help producers improve reproduction efficiency on dairy farms.

Reproduction has been a focus of some management teams this educator facilitates. After successfully addressing milk quality, one team then focused on reproduction to increase profitability. Changes in breeding protocols such as timed artificial insemination, inseminator training, and increasing heat detection improved herd reproduction from a 16 percent pregnancy rate to 25 percent and also increased herd profitability by an additional $23,000 per year **(Exhibit 16)**. Reproduction will continue to be a focus for this educator through facilitating ReproMoney teams and additional programming.

Modernization
The majority of Kewaunee County's herds are small, and typically milked in facilities that are old, outdated, labor intensive, and uncomfortable for the large modern dairy cow. In an effort to help producers make informed decisions on modernizing facilities, this educator organized three annual farm tour days from 2008-2010. Tours featured calf raising, transition cow management, and milking parlor installations. Forty-one dairy producers attended the tours. A follow-up post card was sent to attendees of the tours to determine if they saw ideas they could incorporate on their own farms, and if any had incorporated changes to their facilities **(Exhibit 20)**. Respondents (n=20) indicated 100 percent of attendees learned something new that could be incorporated on their own farm. Fifty-five percent of respondents reported adopting an idea or technology. Examples of changes producers made based on ideas they saw on tours were positive pressure ventilation, low-cost crowd gate construction, calf pen group housing, and fan placement for improved barn ventilation. One producer said he used to treat nearly 50 percent of his young calves for respiratory issues, and since installing positive-pressure ventilation in the calf barn he hardly treats any calves at all. Another producer who installed fans over his bedded pack said the new fans do such a good job keeping the bedding dry during the summer that he has not had to buy as much bedding as before he installed fans, saving him nearly $3,000 in 2011 with similar projected savings in years to come.

In 2009, this educator took the lead on planning the annual Eastern District Dairy Team "Start 'Em Right…Raise 'Em Right" calf meeting. The meeting was held at a local dairy with indoor calf housing and modern technologies such as positive pressure and natural ventilation. Dr. Brian Holmes, University of Wisconsin Agricultural Engineer, spoke on calf housing and ventilation. Evaluations (n=66) were collected at the meeting and sixty-eight percent said they increased knowledge of calf housing ventilation. Eighty-nine percent of respondents rated the meeting good or excellent **(Exhibit 21)**.

This educator has made approximately 45 farm visits to address dairy modernization, 30 of those were with UWEX dairy facility specialists. Several visits addressed improving ventilation in older tie stall barns that had been converted to house large groups of heifers and steers. Other visits addressed converting barns to retrofit a milking parlor, renovating older facilities to house dry cows and heifers, and converting an existing facility to

Modernization (Continued):
house animals other than dairy cattle or steers. This educator followed-up with producers to determine if UWEX advice had been incorporated on the farm. Fifteen producers responded and 53 percent reported incorporating changes suggested by UWEX **(Exhibit 22)**. Based on follow-up visits, some changes incorporated were renovating freestalls to house dry cows, rearranging a cow lot to allow animal access to the barn during the winter, and removing a manure gutter and replacing it with a flat surface to allow easier cleaning with a skid steer. All 15 producers who responded to the follow-up survey said they valued the visit and suggestions from UWEX even though some had not yet implemented them on their farm.

Livestock Production

Beef Production
Based on the 2007 needs assessment, 59 percent of respondents in Kewaunee and Door Counties raised dairy steers **(Exhibit 15)**. Since both counties have close proximity to two large meat packing plants, there is opportunity for programming in beef production and risk management. In addition, animal welfare and handling, along with production management were determined to be important.

Dairy steer production was noted as a priority in the 2007 needs assessment and since this educator has a strong background and interest in meat animals, it was a natural fit to program in this area. A dairy steer feeder series was developed and offered in early 2008. This educator served on the planning committee and produced a presentation entitled "What are Packers Looking For?" taught at nine locations in Wisconsin **(Exhibit 10)**. This educator presented the information at six of the nine meetings. Over 350 people attended the meetings, and this educator compiled evaluations from the six meetings where she presented **(Exhibit 23)**. Evaluation respondents (n=91) reported increasing their knowledge on all three main aspects of the presentation.

Local research is an important part of programming. This educator is involved in the second year of a long-term Dairy Steer Muscle Score research project with the goal of developing learning tools for adult producers. This educator is also responsible for evaluating all 500 carcasses for the project. Working with the UWEX Beef Specialist, the project entails tracking pre- and post-harvest loin muscle scores from 500 Holstein steers. Currently 38 steers have been harvested for the project with more than 200 steers currently enrolled from four collaborating farms. The producer who raised the 38 steers found the collected data valuable to his enterprise. Based on carcass evaluation data, he has implemented a more aggressive feed ration on slower-growing steers currently enrolled in the project to market a more desirable animal to the packer. The producer said, "I've never been able to track individual steer performance before participating in this project. I love that I can take this data and implement it directly into my management and see the results with the current group I'm raising."

According to the United States Food and Drug Administration (FDA), dairy cows account for seven percent of cattle slaughtered for beef. An average dairy cow can receive up to 200 injections in her lifetime and she may receive those injections in the incorrect location. Dairy cows have more than 20 times more drug residue violations than beef cows (FDA, 2008). To address this concern of dairy producers, this educator became a certified Beef Quality Assurance (BQA) trainer.

As a certified BQA trainer, this educator worked with one dairy producer in the county who was required to become BQA certified as a corrective action requested by American Foods Group (AFG). This educator worked with the dairy farm manager and veterinarian to create better record keeping protocols to identify cows that received injections. The dairy producer became BQA certified by this educator and has once again been allowed to ship cull cows to AFG. No residue violations have been found since the training was completed in

Beef Production (Continued):
2010. During the time the dairy was not allowed to ship cull cows to AFG, the owner lost an estimated $112,000 in cow cull income.

Producers may not always consider that replacement beef cows and dairy cows are a vital part of the beef industry and eventually end up on the consumer's plate. This educator authored an article for the Wisconsin Agriculturist magazine entitled "Dairy Farmers Also Raise Beef" **(Exhibit 4)**. The article focused on proper injection techniques for all cattle. This educator also presented "Dairy Beef Quality Assurance" at a regional calf management meeting for over 100 dairy producers and calf raisers. The presentation focused on starting BQA with young calves and carrying out the practice through a cow's life **(Exhibit 9)**. Based on post meeting evaluations, 71 percent of respondents (n=66) increased their knowledge on dairy beef quality assurance **(Exhibit 21)**.

Youth livestock production programming is an expectation in Kewaunee County. Over 125 individuals participate in beef, sheep, and swine projects, giving it a strong presence in Kewaunee County. This educator adapted beef information from the dairy steer presentation and developed a new presentation, "What is the Judge Looking For?" **(Exhibit 7)**. Because of this educator's background and expertise, this educator has been sought out to present this and similar topics in neighboring counties. This presentation was also given to approximately 130 youth producers at seven sites in northeastern Wisconsin and included material on carcass evaluation and meat cut identification. Pre- and post-meeting evaluations (n=111) indicated increases in knowledge:

Table 2. Pre- and Post-Meeting Knowledge of "What the Judge is Looking For"

Topic	Pre-Meeting	Post-Meeting	Increase in Knowledge
Judging Live Animals	3.1	3.8	.7
Judging Carcass	3.3	3.5	.2
Meat Cut Identification	2.2	3.6	1.4

Lickert Scale 1=Low, 5=High

Small Ruminant Production
Dairy sheep and goat production has steadily gained popularity in Kewaunee and Door Counties. Since 2007, this educator has received inquiries from 26 individuals via telephone and email regarding dairy sheep and/or goat production. For example, in 2010 a call was received from a dairy (cow) producer who wanted to sell his milking herd and possibly start a sheep dairy. This educator and the potential producer worked through financial planning and the logistics of starting the sheep dairy. University specialists were brought in to assist in developing barn retrofitting plans and flock management. Within six months, the producer obtained a loan from the Kewaunee County Revolving Loan Fund based on the profit analysis conducted by this educator. One month later, the producer was milking sheep and selling milk **(Exhibit 24)**.

This educator planned a Dairy Sheep and Goat Seminar that focused on commercial dairy sheep and goat production. Thirty-three individuals from seven counties attended. This educator developed a presentation which was titled "Marketing Wethers; Maximizing Your Profit with Dairy's Secondary Income" that gave producers ideas and tips on how, and when to market wethers for increased profitability **(Exhibit 8)**. Based on a post-meeting evaluation, 100 percent of respondents (n=31) indicated increased knowledge on dairy sheep and goat production. Ninety percent of respondents reported increasing knowledge on direct marketing wethers from their farm **(Exhibit 25)**. After attending the meeting, one goat producer was able to make an arrangement with a local meat processor to sell her goat meat in his shop on a trial basis. Having held this unique meeting in

Small Ruminant Production (Continued):
Northeastern Wisconsin with positive attendee response, this educator plans to offer similar on-farm meetings in the future focusing on different commercial sheep and goat milk production issues such as body condition scoring, animal health, and genetics.

As a member of the UWEX Livestock Team, this educator authored two fact sheets about raising animals on small acreage **(Exhibits 12 & 14)**. The peer reviewed fact sheets are in English and Spanish. Since its release in September 2008 at the University of Wisconsin Learning Store, the sheep fact sheet has had 453 unique website views and 52 hard copy sales. The Spanish version has had 55 unique views. The English version of the goat fact sheet has had 73 views and 31 sales since November 2010. Both fact sheets have been made available on the nation's leading university sheep and goat website, the University of Maryland's "Sheep and Goat" website: www.sheepandgoat.com.

Reflection and Summary

This educator's work over the last five years has been an asset to the University of Wisconsin. Through unique research such as the Dairy Steer Muscle Score research project, and initiating a farm safety project replicated by colleagues across Wisconsin, this educator has developed innovative programming that adds value to what UWEX offers in agriculture programming. Conducting the AI sire survey resulted in a *Hoard's Dairyman* article that was published in three languages and distributed to over 60,000 producers around the world. This educator's contribution of "Handling Skills" to the series of Dairy Workers' Training learning modules earned a national award. The modules are recognized around the country and on an international level. This educator's work has proven value in Kewaunee County and has shown worth around the world as well.

Through work with a variety of agriculture producers and professionals, this educator has strengthened existing work relationships, and forged new ones with numerous individuals. On-farm team-based problem solving introduces producers and agriculture professionals to UWEX resources and programming. Whether work with the client is team-based or on an individual basis, producers have benefitted from this educator's outreach with university-based research, personal and professional experience, and industry and university consultation. Clients see the effect UWEX has on their farms through labor saving measures, modernization, and education that increases profitability.

On a personal level, extension work is this educator's most rewarding career. Helping a producer increase profitability or learn a more efficient way of farming is the ultimate reward. Not all situations are exciting and enjoyable, however. Shortly after a death of a farm owner in 2010, this educator began estate succession planning with the deceased's widow. Many producers do not have succession plans in place to deal with farm business issues after a sudden death. Working with the family prompted this educator to write an article for the *Wisconsin Agriculturist* titled "Preparing for the Unexpected" **(Exhibit 3)**. Even though tragedy struck this family, it resulted in learning for both the family and this educator. It was an opportunity to help the family but also provide information to other producers to help prepare for an unexpected situation.

This educator values the relationships with clientele, agriculture professionals, and extension colleagues built over the last five years. She will continue making contacts and learning about the agriculture industry to best serve producers. Farm profitability will continue to be a programming focus. Profitability is an all-encompassing topic and includes nearly every aspect of farming. Continued work on farm safety, dairy steer research, and small ruminant education will also continue to be developed, adding to programming diversity. Kewaunee and Door Counties will continue to lose small dairy farms, but cow numbers will increase as farms grow. No matter the size of the farm, advanced technology, modernization, and fine tuning farm management techniques will be needed and this educator will strive to meet these needs.