



## Challenges surrounding training the next generation

A proceedings paper presented at the 2017 Western Dairy Management Conference

<http://wdmc.org/2017/Hagevoort.pdf>

Robert Hagevoort, NMSU Ag Science Center at Clovis

David Douphrate, University of Texas Health Science Center School of Public Health

Rick Naerebout, Idaho Dairymen's Association

Jeff Brose, Dairy Enterprise Group, Cargill

Jason White, Purina Animal Nutrition

Anabel Rodriguez, University of Texas Health Science Center School of Public Health

### INTRODUCTION

There are challenges surrounding training the next generation in the dairy industry.

Is this about the next generation of owners and managers, or the next generation of dairy employees and supervisors? Or are we talking about the next generation of service and allied industry professionals? The answer, for the purpose of this article and panel presentation is “all of the above”. Given current industry trends, the challenges associated with effectively preparing the next generation of dairy workers for an industry in transition are issues of great concern. Several industry experts recently have characterized the labor situation as the Achilles' heel of the dairy industry. An Achilles' heel is defined as a weakness in spite of overall strength, which can actually or potentially lead to downfall. The dairy industry has made great strides when it comes to sustainability efforts as was evident during the November 2015 completed 30<sup>th</sup> ADSA Discover Conference on Food Agriculture entitled Creating an Enduring U.S. Dairy Production sector. However, when it comes to preparing the next generation, especially during these challenging times of dwindling margins, extreme market volatility, consumer concerns about where and how food is produced, increasing competition from alternative protein sources, and many other threats, the future success of the U.S. dairy industry relies on how well we prepare the next generation to deal with those challenges. The question is Who is preparing the next generation, and how successful are we in preparing this next generation?

### CURRENT INDUSTRY TRENDS

In the U.S., the number of operations continues to decrease, and the volume of milk produced per operation continues to increase, due to increased production per cow, and the increased numbers of animals per operation. This trend is not unique to the U.S., but manifests itself all across the globe. More milk is being produced by fewer, but larger operations. This consolidation in the industry is primarily driven by economies of scale.<sup>1</sup> The number of dairy cows in the U.S has been holding fairly steady between 9.0-9.3 million head over

the last decade, which prompts the following question. If there were about 90,000 dairy operations at the turn of the century with an average size of about 100 milking cows, and today, only 17 years later, we have approximately 45,000 farms with an average size of about 200 cows; then, how long will it take for the dairy industry in the U.S to evolve to 9,000 farms with 1,000 cows, or 900 farms with 10,000 cows, or alternatively completely flip from the year 2000 to 100 operations with each 90,000 cows? It's a hypothetical question and there will always be room for smaller farms in special markets where producers can secure higher margins because of their niche or specialty products, whatever the driver.<sup>1</sup> However, the real question is, where in the U.S. and on what kind of dairy farms will the large volume of commercial milk for the domestic and the export market be produced? To date the answer to that question has been on farms that (a) have grown in scale or size to offset the smaller industry margins, or (b) those farms that have grown in their level of diversification to be able to offset bad times in one area with good times in another.<sup>1</sup> There is no indication that this trend is not going to continue into the foreseeable future and may be accelerated or decelerated by external impacts such as world markets, weather and climate or public policy decisions.

**IMPLICATIONS OF THESE TRENDS ON LABOR NEEDS** Larger operations hire and employ an increasing number of workers. Our research has shown that on New Mexico dairies in 2008, an average dairy size of 2,100 cows had about 1 employee per 90 cows.<sup>2</sup> In 2011 (after the 2009 economic downturn), that number had increased to 1 employee per 100 cows.<sup>3</sup> After feed costs the next largest expense on large operations is labor costs. Some industry experts are now predicting this ratio is likely to increase to 1 employee per 200+ cows.

Hiring a large number of employees changes the structure and the operational model of the dairy farm. On smaller dairy farms, the person milking the cows is typically also the impromptu maternity technician, hospital technician, milking barn technician, etc. As operations increase in size, we see an increasing degree of specialization and distinction between job functions to the point that positions become highly specialized and training becomes highly technical and job and task specific. These changes require employees who are better prepared, with a higher level of technical skills, particularly hands-on skills. The question again is: who is going to provide that level of specific training, and how are the trainers in turn prepared to provide that training? Many dairies utilize a "buddy training" approach where an experienced employee works alongside the new hire until the new hire demonstrates task proficiency.

The missing link in this system is that oftentimes both employees end up knowing "what" to do, without knowing "why" it is what they are doing. Unfortunately, the lack of worker comprehension of the "why" of the tasks contribute to critical errors, creating some of the major issues in the industry, especially in the public eye (animal handling, antibiotics, etc.). The dairy industry does not have an effective program or a system which instructs while simultaneously developing a worker's ability to do the job effectively and proficiently, regardless of the position on the dairy. There is a need for a system that addresses both comprehension and hands-on and practical training, while simultaneously assessing competency in the process.

Dairy employees are increasingly hired-labor as opposed to family-labor. Family-labor was raised while learning the tricks of the trade, and there was ample time for discussion of the "why". For hired-labor there are many missing links when delivering the same level of training and oversight. NAHMS Dairy 2014 indicates that 99.1% of large operations (>500 cows) utilize hired workers to milk the majority of the cows.<sup>4</sup> The number of operations that train milkers on proper milking procedures increase as herd size increases. Nearly 60% of operations train their milkers. On-the-job training was used on more than 90 percent of these operations.

Our experience in providing on-dairy employee training over the last few years has been that recent hires have no previous experience in working on dairies or with large animals. As a result, employees are not hired based on skills but based on the willingness to perform the job. Therefore the responsibility of all the training mainly

falls on the shoulder of the owner/manager or his designee. It sparks the question how well is leadership prepared to adequately provide this training and oversight? Especially on today's dairies with the daily demands of operating an increasingly more complicated business.

#### MIDDLE MANAGEMENT AND LEADERSHIP DEVELOPMENT

Dairies, with increasing herd sizes and a larger number of hired employees require a different management structure. A layer of middle management or supervisors is now required to oversee the work being done in the different departments (e.g., parlor, maternity, fresh cow, hospital barn & hospital pen, day old calves, breeding heifers, close-up, dry cow, feeding, farming operations, maintenance-mechanic, etc.). Dairy owners in turn are becoming more dependent on front-line supervisors to effectively manage a larger workforce. As a result, owners are increasingly seeking supervisors who demonstrate effective management and leadership skills. However, good workers are often promoted to leadership positions because of demonstrated skill proficiency in their current role (managing cows), not because of leadership or management abilities needed in a supervisory position (managing people). This 'Peter Principle' approach often leads to ineffective supervisory performance, particularly as it relates to leadership in terms of job preparation and training, job evaluation and coaching, and resolving employee issues.

During the 2015 Western Dairy Management Conference, a panel of producers discussed this subject and identified different ways of addressing this emerging issue for their specific dairy operations. Two producers on the panel, both in their own unique ways, had developed different, but functional leadership training models based on core competencies and core values inspired by the situational leadership model. However, very little guidance, few examples, and limited training models within the industry exist to assist them in this process.

One producer hired an accomplished HR manager from the human health industry, without any dairy knowledge, but with an accomplished track record to help develop a functional HR program for his operations. Specialized HR and management consultants can sometimes be of help assisting dairy producers accomplishing these goals. Some dairy extension specialists are venturing into this arena as well.

The goal of one of our latest projects is to reduce injuries and fatalities among a vulnerable workforce on dairy farms by operationalizing an integrating a safety leadership and management model in dairy farm enterprises. The central hypothesis of the proposed project is that a targeted safety leadership and management training will yield improved safety leadership and management practices among dairy supervisors which in turn will improve the safety climate and behavior among workers. The rationale that underlies the project is that improved supervisory safety leadership and management will translate into a reduction of injuries and fatalities among workers.

This 5-year collaborative project will kick off in the spring of 2017, and the team will be working with dairies across the West. The Primary Investigator (PI) for this project Dr. David Douphrate at the University of Texas Health Science Center at Houston, School of Public Health will be working with extension dairy specialists at New Mexico State University (Dr. Robert Hagevoort), Colorado State University (Drs. Noa Roman Muniz and Stephen Reynolds), and Kansas State University (Dr. Luis Mendonca). The project is funded through the National Institute for Occupational Safety and Health (NIOSH) through the High Plains and Intermountain Center for Agricultural Health and Safety (HICAHS), headquartered at Colorado State University.

#### TRAINING NOT JUST A MUST FOR EMPLOYEES AND MANAGEMENT

The lack of a comprehensive understanding of today's dairy industry and the practical aspects of large modern dairy operations is not just reserved for prospective employees. Dairy men continue to express their frustrations that people, not just in society, but within in the industry do not know what owners and managers are

experiencing. Subpar comprehension and the lack of recognition of what it takes to run a large dairy farm from any perspective including the regulatory framework, the financial constraints, and the technical requirements of feeding, breeding and milking of a herd of 3,000 cows is extensive.

In 2007, a group of university faculty, industry representatives and dairy producers in the Southwest, concerned about the direction where many universities were going with their agricultural, animal science and dairy science programs, came together in an effort to do something about this issue. The key issue was preparing the next generation of dairymen, managers and allied industry professionals despite diminishing university dairy programs. This concern was very real because of recent closures of on-campus dairies at Texas A&M University, New Mexico State University and the University of Arizona, despite booming dairy sectors. With the cows gone, the opportunity to learn ceased, which led to fewer students and ultimately to fewer dairy faculty.

A search of U.S. dairy science programs nets the following results for either 4-year or 2-year associate dairy programs. Hoard's Dairyman mentions 40 colleges with a 4-year dairy program and 30 colleges with a 2-year associate or certificate program.<sup>5-6</sup> Of the 40 4-year colleges 10 offer a dairy major, 14 colleges offer a dairy option and 16 colleges don't offer a dairy science degree program. Interestingly of the 40 colleges listed, 39 do have a dairy herd, 25 of those herds are located on campus, and 11 colleges have off campus herds. Of the 30 2-year colleges 19 have a dairy herd.

Although there are several universities that have been able to find funding to update, modernize or even (re)build brand new dairy research/teaching facilities, many of the facilities around the country are older facilities, outdated, and certainly not representative of today's modern dairy operations. In addition, either because of diminished student numbers, tough times in the dairy industry or due to a lack of institutional support, many colleges and departments are having difficulty in keeping the barn doors open.

In 2008 the U.S. Dairy Education and Training Consortium (USDETC), formerly known as the Southern Great Plains Dairy Consortium, was established. A multi-university organization has the goal to meet the educational and training needs of the rapidly changing U.S. dairy industry. The USDETC is a unique partnership between academia, allied industry and dairy producers. Since the cows are no longer where the students and the faculty are located, the premise of this program was to bring students and faculty where the cows are located. The USDETC is organized to provide practical, hands-on large herd dairy education and training.

The program is meant to be a capstone learning experience for advanced college students in Animal Science, Dairy Science and Ag-Business in preparation for entry into the dairy industry or advanced degree programs. The program strives to unite the best students with the best faculty in a geographical location conducive to hands-on practical teaching through on-farm practicals combined with field trips, laboratories and allied industry interactive experiences. Instructional faculty are nationally recognized experts from universities and agribusiness. The material presented ensures that the latest in technology and information is available to the students.

The program has been organized in Clovis, New Mexico, primarily because of its proximity to many large-herd dairy operations within a 30-mile radius. During the 6-week program, students visit about 20 dairies with different housing, milking, and management systems. These visits, field trips, labs and other on-dairy activities, can only be accomplished because dairy families open their doors and welcome the students. Dairy producers realize from experience the value of experiential learning in the realistic setting of an operational dairy farm. These dairy families are the real success story of the program: without their help the Dairy Consortium would

be just another class in college. Throughout its 10-year existence, the USDETC has received exceptional support from producers, producer organizations and allied industry. Many faculty members recognize the value of a capstone class like this by recommending their students to attend.

Since its inception, the USDETC has graduated 40 students per year from 44 different universities throughout the U.S. A little over half of the students come from universities in the Southwest, but increasingly the students are coming from across the U.S. For the last 5 years, program coordinators have capped the program at about 50 students, while the number of applications has now nearly doubled the number of available slots. Program leadership is evaluating ways to expand the program both in number of students as well as the learning experience to possibly include farms in the Midwest.

In a 2013 survey among former Dairy Consortium students, a third indicated they were working on a dairy, while another third of students had found employment in a dairy related industry. Interestingly, 60% of the students rated the program very to extremely important to their status at that time as a student or as an employee, 80% of the students rated the material covered during the program as very to extremely helpful with their coursework and professional career, and 92% of the students rated the Dairy Consortium program A to A+.

Invited to join this panel is Jason White, a Dairy Consortium graduate who recently completed his Master's at Oklahoma State University. Jason will be sharing his experience with the program as a student and as a graduate assistant involved with the coordination and day-to-day operations of the program.

#### PROFESSIONAL ADVANCEMENT PROGRAM

The next step for the Dairy Consortium was to offer this kind of hands-on training and practical education to allied industry professionals. This professional development program provides current dairy professionals with dairy educational experiences beyond their respective fields of expertise. Much like the college student program, the professional advancement program is taught both in both the classroom and on dairies by nationally recognized experts from universities and agribusinesses.

In this program, the client can pick topics from a menu as many topics may not be of interest or applicable to the client. However, these employees may lack professional advancement in areas such as facilities and design, animal handling and welfare, parlor management and milk quality, financial analysis, reproductive management, dairy herd dynamics, dairy labor issues, dairy safety training, calf/heifer development, heat-stress abatement.

For the first time the Dairy Consortium offered a two-week program in 2016 and the feedback has been overwhelmingly positive. During this panel presentation, we have invited Dr. Jeff Brose with Cargill's Dairy Enterprise Group and coordinator for the Dairy Consortium professional advancement program to share his experiences with the newly developed program.

Responses from dairy producers to the program have been very positive. An advantage of the program is to be able to work with allied industry professionals that comprehend the depth and breadth of the business and understand what a producer is experiencing at any point at time. As with the college student program, the success of the professional advancement program lies in the willingness of producers to open their doors and share of their experiences. We see a multitude of opportunities for this program going forward not only in the Southwest, but able to be duplicated across the nation. The Dairy Consortium is looking forward to being able to formulate similar programs to other allied industry companies.

## WORKFORCE DEVELOPMENT

The most daunting challenge in preparing and training the next generation is workforce development. There are virtually no national programs preparing potential dairy workers prior to seeking employment. There are no industry-wide standardized training or certification programs that workers can take to indicate to employers that they have acquired specific proficiency or competency levels. Many of the breeding companies offer certificate programs for artificial insemination technicians, however these are in essence only a “Certificate of Attendance or Completion”, because there is no national program for certification in artificial insemination. Dr. Jan Shearer offers the Master Hoof Care Technician Program through Iowa State University. Successful completion of this program, qualifies the candidate as a Master Hoof Trimmer. The University of the Fraser Valley in British Columbia offers a 1-semester Milker Technician Certificate program.

Beyond basic employee level training and certification, Michigan State University offers a Dairy Management Certificate Program developed to meet the specialized needs of the herd manager and commercial dairy farmer. This technical training program consists of two 15-week semesters and one 9-week semester on campus for a total of 48 credits. Programs of study are tailored to the individual's educational goals. Areas of study include: dairy herd management, nutrition, artificial insemination, crops, and farm management. A certificate is granted at the completion of the program requirements.

Nationally, National Milk Producers Federation (NMPF) in collaboration with the cooperatives, is advancing the FARM Animal Care program assuring responsible management for U.S. dairy producers. A second piece, FARM Environmental Stewardship program is currently under development. Within these programs there is potentially room to house workforce development training and certification programs. The new FARM Version 3.0 will provide educational materials (video training modules) on stockmanship. However, neither one of these programs directly provides actual training programs or on-farm training at this time.

Regionally, there are many producer organizations that have taken on this charge and are providing a myriad of excellent educational programs. Professional Dairy Producers of Wisconsin (PDPW), Professional Dairy Managers of Pennsylvania (PDMP) are just a few which provide excellent educational programs for their membership. Across the country many grass roots state producer organizations partner with industry or university dairy extension programs in an effort to do the same.

However, at this point, essentially all dairy skill training and development is done on-the-job as employees learn the practical “what” skills. The critical “why” portion of the equation is the great unknown. Many allied industry companies have filled this gap and have created workforce development programs in their respective fields of expertise either as a for-a-fee or free-of-charge service program. Many dairy industry professional service providers such as veterinarians, nutritionists, environmental consultants and others have made it an essential part of their service to provide workforce training.

## TRAINING TOOLS TARGET AUDIENCE

A major dilemma for most regarding dairy training is what training resources to utilize. There is only a limited arsenal of training tools developed for a predominantly Hispanic dairy workforce. There is a wide variety of written materials available developed for training purposes, many of them in Spanish and many with a healthy dose of pictures. These materials are very useful; however, many of the skillsets needed on a dairy are difficult to teach with pictures: they require hands-on instruction and return demonstration. Animal handling and stockmanship are probably the best example of that, followed by skills such as breeding, milking, treating sick cows, calf management, etc. Just providing employees (beginners or advanced) with instruction manuals

probably doesn't achieve the level of comprehension and retention we would like, which ultimately leads to process drift and poor performance.

Likely the least effective way of training employees is by simply handing out standard operating procedures (SOP's) or best management practices (BMP's). The dairy industry has been very good in developing these and they are essential reference materials at the management level, but are useless as training or teaching material. They are neither practical nor visual, and they are complex for employees because they often require decision-making along the command chain.

We have provided safety trainings over the last 2 years to 1,048 dairy employees on 28 dairies in 5 states across the U.S. Data obtained during these dairy safety trainings indicate that 77% of the employees are from Central or South American nationality, while 82% indicated their primary language is Spanish. Collected data suggest 30% of trainees had completed a middle school equivalency, 18% had completed elementary level education while 5% indicated they had received no schooling. This suggests that in order to reach all employees, training tools need to be based on secondary education, and be available in both English and Spanish. A complicating factor is that almost 19% of the dairy workforce originates from Guatemala, where some of the employees indicated to only speaking one of the many indigenous languages, limited Spanish, or no Spanish at all.

Interestingly, 32% of the trainees indicated they had completed high school equivalency while 16% had completed a professional degree. However, with over half of the employees having completed a middle school equivalency or less, the training materials will need to be focused on that level of reading comprehension. In short we are dealing with a predominantly adult audience which we initially need to address at probably no higher than a 5<sup>th</sup> or 6<sup>th</sup> education grade level. In order to engage and motivate the majority of the employees in a training program we need to use tools that are innovative and captivate both visual (think in pictures) and kinesthetic (tactile or hands-on) learners. Simple pictures or PowerPoint-based presentations are likely not sufficient nor effective learning tools.

Employees who milk, feed, breed, treat and take care of cows, need to have tools that instruct and train them on those important specific skills. And most importantly, how to perform tasks in a safe manner. Today's newly hired dairy employees are less experienced in farming operations prior to their dairy employment, and basic understanding of working with large herding animals is nonexistent. Dairy owners and managers who grew up around cows may find it difficult how to explain these skills because they learned them instinctively. They know instinctively a cow has a flight zone that changes depending on how calm she is, but may find it hard to explain that to employees. Producers may not know what these specific concepts are called, but they know how they work.

One simply cannot train employees stockmanship using a flow chart. The most effective method to train adult learners is using hands-on learning activities, with a group of cows in the corrals showing how handling concepts work. Currently we do not have a comprehensive program in our industry that teaches employees these skills, tests for comprehension and competency and subsequently rewards them accordingly. In our opinion, every employee working directly with cows should routinely be trained and re-trained on animal handling and stockmanship.

Milker schools or trainings are probably the kind of trainings most frequently conducted on dairy farms. Milking cows is typically the starting position for most employees on a dairy. The task is physically challenging and repetitive, in particular on large farms where milking is a continuous process and the cows are milked in shifts.

To milk cows properly and do it efficiently, a great deal of understanding of a wide range of disciplines such as animal health and physiology, animal handling and stockmanship, and milking machine operation and maintenance are required. Often beginning milkers are instructed how to milk the cows without much detail of why it is they are asked to perform the routine a certain way. A large amount of research has established proper milking routines. If milkers are not instructed the reasons why the routines are what they are and why it is critical to follow these routines, it is easy for workers to find reasons for short cuts and process drift ultimately leading to employee turnover.

Milker schools are typically delivered in a team setting, which may include hands-on show and tell, discussing the why's about the routine and milk let down, animal handling, hygiene, and how to detect cows that may need additional treatment. Training, motivating, and coaching a good group of milkers is a challenging task. We need barn managers that understand the technical aspects of milking cows, but even more important, we need barn managers that can work well with people and who can effectively coach and motivate an effective team of milkers. Simply promoting your best milker is not a guarantee he or she will become an effective barn manager.

Too often milkers are viewed as a unit or team: the day crew or the night crew. However, they are individual milkers who are either more or less experienced. Some do a great job, and some don't. The industry must develop individual performance metrics for our milkers, such that we can evaluate how an individual is performing his or her job – as part of a team. This approach will reward individuals for their specific performances and contributions and coach them accordingly. Judging milkers based on somatic cell counts (SCC) is a poor metric for individual performance. If dairies do not evaluate the individual milker's performance, the farm will eventually lose the best milkers because of a lack of appreciation for the good job they are doing. Critical is the training and development of all barn positions, including that of the "pusher". This person should be the most experienced person in the barn, equipped with the right skills and the patience to always bring cows into the parlor gently, no matter the circumstances.

Beyond what you can do on the farm to train, develop and coach individual employees, we also need a federal farm worker policy that compliments these efforts. A system which is conducive to worker training, development and retention and which would give producers additional incentive to improve job training protocols as part of long-term workforce development. However, the lack of this comprehensive federal workforce policy in agriculture, cannot be an excuse not to develop the right tools and programs at the farm level to adequately train and prepare our employees.

## DEVELOPMENT OF TRAINING TOOLS

In the dairy industry, there is a need for the development of not just more training tools, but for more effective training tools. Effective training tools are materials that maximize learning comprehension and retention in adult learners, both visual and hands-on, in their respective language and at their level of comprehension. In addition, we need appropriate performance metrics which will allow us to measure progress and evaluate job performance for the individual employee.

When developing our initial dairy safety training program in 2011, we originally created two safety training DVD's entitled "Considering Human and Animal Safety".<sup>7</sup> The DVD's contain 12 chapters dealing with both general and more specific dairy safety topics. These chapters are short individual vignettes visualizing and describing specific dairy tasks. After every chapter, there is a "remember" section reiterating the critical messages for the chapter. The DVDs were a hit and over 6,000 copies have been distributed worldwide. The strength of a video is that it visually presents the issues and the narration complements the storyline. The weakness of the DVD is that even though watching it in its entirety takes only 20-30 minutes, the trainee can be distracted and lose attention. This is a legitimate concern with training tools which are not interactive and



where the trainee is only required to watch without participation. Dairy owners have no way to evaluate and measure if trainees actually paid attention and learned the training topics.

In 2014, with funding from OSHA Susan Harwood Targeted Topic Training Grant, Dr. David Douphrate at UT Health Science Center Houston proposed utilizing the video vignettes on iPads to individualize the dairy safety training. This program allowed us to create a continuous training, in both English and Spanish, with interactive activities between vignettes, to more effectively accommodate adult learning for this population. In addition, we added pre- and post- tests to evaluate the training. The trainees were given an iPad and a set of earbuds so that they could individually participate in the training at their own pace. The software allowed us to insert questions throughout the vignettes so that trainees must actively participate and answer questions advance the program. We later discovered this eliminated “group dynamics” where in certain circumstances group leaders may be engaged while followers are not. The individual trainings would take about 1.5 hours, and we could accommodate 20 trainees in a single training session. Trainings were conducted in offices, break rooms or even outside, weather permitting. An additional benefit of using earbuds is that once a person is engaged with the training, trainers can still instruct other trainees on the program without interrupting the others. Training evaluations according to Kirkpatrick’s model of evaluation (e.g., Level I, Level II, and Level III) were delivered. Each worker received a Certificate of Safety Training upon completion of the training and dairy owners received a training report with names of participating workers, the training content, as well as the mean scores of pre- and post-tests. The gender ratio of workers was 15% females to 85% males, with an average age of 34.3 years, and an average of 7.5 years of experience on dairy farms. The most promising part about this project was the average pre-test score was a 73% while the average post-test score was a 94%, suggesting the workers retained the knowledge gained during the safety training.

We have received very favorable feedback from both employees and owners/managers. Both groups liked the visual learning component complemented with interactive questions and a test. One advantage is that in a reasonable timeframe a fairly large number of employees can be trained. We would generally have a group of milkers attend prior to their shift while the current milkers would attend as soon as they came off the shift. Feeders, calf feeders and outside technicians would receive training as they completed their tasks. This training approach created minimal interruption in the daily schedule for owners and managers.

A key question still remains related to degree of training effectiveness related to worker safety behavior. One way to measure this conduct is to return to the dairy and measure worker behavior through observation. This however is near impossible both timewise or budget wise. Additionally, a one-time training is likely not going to make much impact in the long run.

Worker training should be viewed as an ongoing quality improvement endeavor. Training is part of a strategy which starts at the top and makes it way down to individual workers. Training is the means of demonstrating and visualizing the “what” and more importantly the “why”. Training needs to be evaluated and adjusted to the level of experience. However, what this project taught us is that the use of modern technology can accommodate and facilitate on-farm training for adult learners with minimal interruption of the work environment.

## MOBILE LEARNING PLATFORM AND CONTENT DEVELOPMENT

The use of video and audio in an interactive environment as described above can be utilized on the farm for many different training purposes at all levels of experience. This methodology can be used for instruction and it can be used to evaluate comprehension or competency. Additionally, it can be made part of a continuous training program on-farm or as a prerequisite and certification prior to employment. This approach can be made part of a program to evaluate worker performance and as a tool for continued education. The development of content is crucial. We are currently in the process of developing the video content or a video

library for this mobile learning platform. One track is the development of training materials for healthy animals such as: animal handling and stockmanship, feeds & feeding, silage production, equipment handling and maintenance, reproductive health and AI, and milk quality and the milking routine, and others to come. Another track would be that for special needs animals: hospital management and the hospital barn which would include non-ambulatory cow management and euthanasia, animal handling for the maternity area and animal handling for day old calves and heifer raising.

This process is in essence translating paper SOPs to video-SOPs (VSOP), hereby creating a library of video content for the purpose of training and evaluation. Training material would be developed to the highest standards and training modules can be more efficiently distributed to employees via a mobile platform using cellphones or tablets. Employees can be reminded that certain protocols have changed and that they need to (re)take the additional training and (re)certification. Only employees that are involved in these practices and/or cross-trained for these positions would receive these notices. This would allow us to customize a training program for every department with the help of modern technology. We would also be able to monitor who is trained and certified for certain positions or activities. This could help us with scheduling and planning. Moreover, this can also be the basis for a true employee job performance evaluation and promotion program. Employees with the desire to advance or acquire additional skills can do so at their own pace or as part of a concerted company effort. Employees would now have a standard level of competency when applying for a job: dairy owners would know what training a worker has received and their specific skillset. Now we can start hiring based on competency in addition to the willingness to perform the task.

#### TAKING MOBILE LEARNING LIVE

The ultimate goal is to utilize these training modules as a part of hands-on training. We can make content available via mobile platforms such as cellphones or tablets, or screens in parlors, maternity or treatment areas. We can demonstrate on a mobile device the “what” while explaining the “why” directly to employees as they are being instructed by management, consultants or other trainers. We can demonstrate to workers directly on a screen how to pull a calf during a difficult delivery. We could even bring in the veterinarian remotely if needed. At the end of the day nothing speaks as well as seeing it performed while doing it, being instructed in the “what” and “why” simultaneously with the option of evaluating performance live through return demonstration.

We are currently in the final phase of editing the stockmanship video NMPF is planning to utilize for the newly released FARM Version 3.0. This video and other video content are the basis for the development of our next mobile platform training project funded through another OSHA Susan Harwood Training Grant. Safe animal handling and stockmanship training modules include simple cartoonlike representations of difficult to visualize concepts such as the “flight zone”, “point of balance” and “pressure and release.”

We will provide a (small) group of 5-10 animal handlers stockmanship training via iPad after which we will provide live demonstration. This is the only effective mechanism in which concepts such as the “flight zone” or “point of balance” come alive. After the live demonstration, handlers will be provided the opportunity to practice proper animal handling concepts and will be asked to perform a return demonstration to assess skill fluency. As with the safety training, a pre- and post-test will give us a way to evaluate the training tool, and receive information about the level of comprehension.

#### THE DAIRY CONSORTIUM: A VEHICLE TO TRAIN THE TRAINERS

Much effort is required to take these projects from their current research and development phase to real world application on dairies. Even after all the video content is developed, a comprehensive industry effort is necessary to put the program into practice across the national industry. This is where the Dairy Consortium will play a key role. The Dairy Consortium is already in the business of preparing the next generation of dairy

industry professionals. How more appropriate than to use this established and effective program to train the next generation of trainers.

## INDUSTRY BUY-IN AND SUPPORT

A number of drivers have facilitated industry support for this initiative. In an age of diminishing profit margins, owners and managers are looking for opportunities for efficiency and performance improvements. A second driver is the lack of available dairy labor. The flow of potential laborers willing to work on a dairy and perform the physically challenging tasks has diminished greatly over the last few years. Reasons for that reality go beyond the scope of this article and it suffices to state that a lack of comprehensive immigration reform is a significant contributor to the problem. This does imply that current dairy employees have to become more effective, efficient and productive with diminishing time and resources.

Another piece of the equation relates to industry regulations. Working in agriculture in general and dairies in particular is associated with inherent hazards including large animals, large equipment, chemicals and other dangerous working environments. As dairies become larger and hire more employees beyond family labor, they now fall under OSHA regulatory oversight. OSHA has already implemented Local Emphasis Programs (LEP's ) for dairy in Wisconsin and New York, with plans for an additional LEP for Idaho agriculture operations. This means that dairies will be inspected and they have to provide evidence that they conform with OSHA rules and regulations. Regulatory compliance is already being implemented on dairies and it is our experience that most dairy operations are a long way towards becoming OSHA compliant. However, there are certain areas (administrative being one) most producers are unaware and unfamiliar with the exact requirements.

## A PRACTICAL EXAMPLE: IDAHO

Part of the safety training Dr. Douphrate and his team in collaboration with NMSU Dairy Extension has provided is reviewing and preparing for what exactly OSHA rules and regulations mean on a dairy. For example: we are working with producers to identify practical and cost-effective solutions to protect workers for the hazards associated with manure lagoons.

Providing training to over 500+ workers in multiple states is a daunting undertaking. To facilitate this endeavor, the Idaho Dairymen's Association is proactively in search for a dedicated person to deliver safety trainings on Idaho dairy farms. For the purpose of this panel we have invited Mr. Rick Naerebout, Executive Director for Idaho Dairymen's Association (IDA) to share an industry perspective on this project.

## CONCLUSION

U.S. dairies are becoming larger and are employing larger numbers of hired-labor as opposed to family-labor. The industry does not have a comprehensive training program for its managers, supervisors and workers., Our universities have diminished capabilities to prepare the next generation of owners, managers or allied industry professionals. The U.S. dairy industry as a whole has only found limited means to adequately prepare the next generation of employees and middle managers. Leadership development at the middle manager level is almost non-existent.

Dairy families across this country are doing all they can, with the tools they have, to train and prepare employees for increasingly specialized positions through on-the-job training. Larger dairy operations have developed their own individualized toolboxes for this purpose. Many of the tools are currently provided by allied industry either as a service or for a fee. Training materials are developed largely by allied industry and dairy extension. A large part of effective training and preparation programs currently available is provided through excellent efforts provided by grassroots producer organizations. As an industry, we are waking up to the realization that workforce development and HR issues are the Achilles heel of the dairy industry.

The industry collectively must develop tools needed to prepare the next generation. Universities alone have limited capabilities as workforce development is not their mission, nor do they have the resources. A larger role for community colleges is likely required as they are the most logical vehicle for both academic and certificate programs. National dairy organizations supported by cooperatives and in conjunction with grass roots producer organizations will have to determine what exactly those requirements for training and certification programs need to be.

In the Southwest, the USDETC was established to address the issues described earlier. Initially, the efforts were regional; however, over time, the efforts have increasingly become national. The objective was to address the educational needs of the next generation of owners, managers and allied industry professionals. As time progressed and the needs became clearly defined, the USDETC became involved in workforce development through dairy safety training, animal handling and stockmanship training. The next venture is professional advancement or continued education programs for allied industry. Widespread industry support is providing the impetus for this growth. Training tools being developed make use of the latest mobile technologies, are innovative and target the specific needs of the current and future dairy workforce. At the end of the day the question needs to be asked: how sustainable is an industry that cannot adequately address the challenges of preparing the next generation?



**SELECT CITATIONS**

1. Rabobank Industry Note #536. February 2016. Economies of Scale Driving Consolidation in US Dairy. [Cited 2017 January 15]; Available from: <https://research.rabobank.com/far/en/sectors/dairy/Economies-of-scale-US->

[dairy.html?utm\\_medium=Email&utm\\_source=Rabo%257CFAMM&utm\\_content=button%257CDownload-on-the-website&utm\\_campaign=US-Dairy-February-2016](http://dairy.html?utm_medium=Email&utm_source=Rabo%257CFAMM&utm_content=button%257CDownload-on-the-website&utm_campaign=US-Dairy-February-2016)

2. Cabrera VE, Hagevoort R, Solis D, Kirksey R, Diemer JA. 2008. Economic Impact of Milk Production in the State of New Mexico. *J. Dairy Sci.* 91(5):2144-50.
3. Crawford TL, Mayen-Solórzano C, and Hagevoort GR 2011, unpublished data. Economic Impact of Dairy Processing and Milk Production in the Southwest.
4. National Animal Health Monitoring system (NAHMS). Dairy Cattle Management Practices in the U.S. 2014; [Cited 2017 January 6]; Available from: <http://www.aphis.usda.gov/nahms>.
5. Hoard's Dairyman Focus on Education. 2014. Dairy programs provide hands-on learning. [Cited 2017 January 6]; Available from: <http://hoards.com/sites/default/files/2-yr-college-2014.pdf>
6. Hoard's Dairyman Focus on Education. 2016. Find the four-year program that best suits you. [Cited 2017 January 6]; Available from: <http://hoards.com/flex-297-4-Year-Colleges.html>
7. Considering Animal and Human Safety. U.S. Agricultural Safety and Health Centers. Available from: <https://www.youtube.com/user/USAgCenters>, and: <https://www.youtube.com/playlist?list=PLY7XQBihZRNux6fNXaUbfMEfuvE7j89Rb>

## All NMSU offices will be closed November 23rd – 24<sup>th</sup> Thanksgiving Holiday



The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and extension programs. New Mexico State University is an equal opportunity/affirmative action employer and educator. NMSU and the U.S. Department of Agriculture cooperating.