



## Graduate Student Literature Review: Challenges and opportunities for human resource management on dairy farms\*

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### ABSTRACT

Dairy farms are increasing in size and moving from family to external labor. As such, dairy farmers now have the responsibilities of a human resource manager in addition to caring for their animals. The objective of this paper was to review literature in 5 areas of human resource management of a dairy farm: (1) professional accreditation and professional development, (2) extension activities, (3) the role of the advisor, (4) standard operating procedures, and (5) employee training. Although there has been an increase in research in this area in recent years, this review identified numerous areas for future research, including the relationships between farmers and their advisors and employees, and the role of standard operating procedures on dairy farms. In addition, we suggest that future studies could benefit from increased use of participatory research methods.

**Key words:** human resource management, dairy farmer, animal welfare

### INTRODUCTION

Dairy farms in the developed world are increasing in size and moving from being primarily family-run operations to being dependent on external labor (Barkema et al., 2015). This rapid expansion is also associated with technological advancements and improved efficiency (Hagevoort et al., 2013). In the United States, the total number of dairy farms has decreased by 74% over the last 4 decades, but the number of cows has increased by 325% (Chase et al., 2006). Similarly, in Canada between 2006 and 2016, the number of farms decreased by 23%, yet the average production per farm increased

by 39% (Canadian Dairy Commission, undated). As dairy farms increase in size they become more complex (Sischo et al., 2019). Many dairy farms are structured as a business, with the farm manager taking on the role of human resource manager (Hagevoort et al., 2013) in addition to dealing with the day-to-day tasks of working with their animals. Thus, running the farm now requires a set of skills beyond traditional knowledge of animal care.

Farming can be associated with stress and anxiety and has one of the highest risks of suicide in any industry (for review see Lunner Kolstrup et al., 2013). Farmers experiencing stress rarely seek mental health support (Cole and Bondy, 2019) and instead often search for practical advice for how to better manage their farms (Stanley-Clarke, 2019). The stress felt by farmers is often associated with the welfare of the animals in these systems; for example, for farmers in Norway, there was a correlation between those who had higher levels of occupational well-being and lower stress, and animals that were experiencing better welfare (Hansen and Østerås, 2019). Additionally, farmers in Finland stated that improvements in animal welfare were directly linked to their own well-being but did recognize that this was difficult to implement (Kauppinen et al., 2013). By viewing intensification of the dairy industry as a multidimensional issue, there is the potential to improve many aspects of the industry, including animal welfare (Clay et al., 2019).

There are numerous conceptions of animal welfare (Weary and Robbins, 2019), but this paper relies on Fraser et al.'s (1997) 3-component framework: natural living (the animal's ability to perform natural behaviors), affective states (the emotional state of the animal), and biological functioning (the animal's health). Under this framework, welfare threats are best recognized when considering all 3 components. Although the discipline of animal welfare has an animal-centric focus, understanding the complexity of animal management also requires an understanding of the people who care for them (Fraser, 2014), including ethical, economic, and sociological factors (Appleby, 2004). Thus, improv-

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ing animal welfare should be seen as a multidimensional problem that can benefit from understanding and improving management practices on farm and farmer well-being.

Human resource management practices are used to ensure quality employee performance (Hagevoort et al., 2013), and training in this area has the potential to decrease employee turnover, increase profitability, and lower production costs (Schuler and MacMillan, 1984), improving the livelihood of farmers and productivity of their businesses. Research on human resource management for dairy farms has increased in recent years, including on the topics of (1) professional accreditation and professional development, (2) extension activities, (3) the role of the advisor, (4) standard operating procedures (SOP), and (5) employee training. Our objective was to provide a narrative review of the literature in these 5 areas of human resource management on dairy farms. The topics of interest were chosen after reviewing the available literature on human resource management on dairy farms. Articles were included in this review if they addressed 1 of these 5 aspects and used quantitative or qualitative research methods. Given the positionality of the authors, animal welfare was used as a conceptual framework for this manuscript.

### THE ROLE OF PROFESSIONAL ACCREDITATION IN THE DAIRY INDUSTRY

According to Fraser (2014), a profession must include 3 main components: (1) provision of a service or product, (2) competence in a certain knowledge or skill and, (3) creation of public trust through respecting public interest and upholding societal expectation. As Fraser (2014) argued, a feasible model is needed that fosters skills and knowledge transfer for farmers and their workers and facilitates the transition of animal production into a profession. Farmers are not a uniform group, and the degree of professionalism varies (Brassley, 2005). In the next section we discuss the model of professional accreditation and professional development in the dairy industry and other potential avenues of professionalization.

#### Professional Accreditation and Assurance Programs

Professional accreditation is a mechanism for ensuring accountability, promotion of professional responsibility, and quality assurance (de Paor, 2016). An increase in public awareness of animal agriculture has resulted in an increase in industry programs and guidelines (Mench, 2008). Accreditation systems are important to build public trust (e.g., charitable organizations;

Bekkers, 2003), perhaps especially given the public's reaction to investigations illustrating poor practices on some farms (Tiplady et al., 2013). The Dairy Farmers of Canada's ProAction initiative is a required program for all Canadian dairy farms and was developed for consumer assurance with the vision of demonstrating "responsible stewardship of their animals and the environment, sustainably producing high quality, safe and nutritious food for consumers" (Dairy Farmers of Canada, undated). Fraser (2006) divides animal welfare assurance programs into 5 types: (1) nonmandatory welfare codes and guidelines (e.g., Canada's National Farm Animal Care Council), (2) regulations (e.g., United Kingdom), (3) intergovernmental agreements (e.g., European Union Council Directives), (4) assurance programs of corporate customers and their associations (e.g., proAction), and (5) product differentiation and labeling programs. These programs can be based on resources (e.g., bedding type, stocking density), outcomes (e.g., health, behavior parameters), or continual improvement (Main et al., 2014). The success of these programs is dependent upon stakeholder support, ease of implementation, enforceability, and comprehensiveness of the standards (Fraser, 2006).

There is no standardization in animal welfare accreditation programs (Main et al., 2014), and the resulting variation in standards is likely to cause confusion. However, evidence indicates that voluntary standards (i.e., ones in which individuals or companies can choose to participate) have higher rates of compliance than legislative standards (Clark et al., 2016) and can provide outcomes beyond legislative requirements for animal welfare (Lundmark et al., 2018). When comparing 3 animal welfare assessment programs in California (Dairy Quality Assurance Center, Humane Farm Animal Care, and University of California-Davis), Stull et al. (2005) found that although the rankings of farms participating in these programs varied, the 3 programs agreed regarding the bottom farms in the sample. This finding suggests that accreditation systems may be most effective in identifying farms that fail to provide adequate care for their animals. Although implementation of such standards may result in improved animal welfare, Fraser (2014) argues that this is best accomplished if it is prompted by farmers rather than by outside stakeholders. For example, in the United Kingdom, 60% of dairy farmers participating in a producer-led program aimed at reducing antimicrobial use on farms reported that they were willing to change practices on their farms (van Dijk et al., 2017). However, another study reported that UK farmers perceived compulsory regulations and government oversight as necessary to enforce the adoption of such agreements (Heffernan

et al., 2008). These examples illustrate the nuanced views between stakeholders regarding farmer-led and government-led initiatives.

Some form of audit is needed to demonstrate compliance. Stull et al. (2005) argued that third party audits were needed to avoid variation in individual assessments, but for these to be credible (to farmers) the farmers must trust the expertise of the auditors. One study found that organic dairy farmers in the north-eastern United States were concerned about the knowledge and skill level of local organic certifiers (Pereira et al., 2013). Similarly, Croyle et al. (2019) found that farmers in Ontario, Canada, doubted that assessors had adequate knowledge given their perceived lack of training. There is little research into the perspectives of farmers on this topic, and understanding their views on accreditation programs could be important for compliance.

### Professional Development and Education

Knowledge transfer from one generation to another is an important method of learning in agriculture (Wójcik et al., 2019), but more formalized educational programs are gaining traction (Chase et al., 2006). Higher education in agriculture is a way for farmers to be taken more seriously and gain more responsibility within their own farm (Deming et al., 2019). In a study of Irish farmers, 68% of participants had received some form of formal agricultural training (Dillon et al., 2016). Deming et al. (2019) reported that participation in a dairy farm management program increased managerial skills in financial and personnel resources, leadership, communication, and decision-making on the farm. In a sample of US calf care personnel, 70% of owners reported that they had attended college, compared with only 37% of calf managers (Sischo et al., 2019). Only 13% of dairy farm employees from 4 US states reported having some form of higher education (Rodriguez et al., 2018). Thus, formal training within the agricultural sector is increasing for those in managerial positions, but variation remains across job titles on the farm. Ongoing education can also be accomplished via extension activities, a topic that will be discussed further in the next section.

### EXTENSION ACTIVITIES IN THE DAIRY INDUSTRY

Extension models vary greatly by region. Extension activities are one of the main missions of US land-grant universities and are valued by some farmers (Chase et al., 2006). For instance, in Kentucky, 25% of participant farmers indicated that they attended off-farm extension activities at least once per year (Russell and

Bewley, 2011). Canada does not have a similar model of university-based extension, and has instead adopted more of a privatized extension model (Milburn et al., 2010).

Some dairy extension activities are known to be valuable to farmers (Hall et al., 2019). Activities such as participatory discussion groups were associated with decreased SCC at the herd level (Dillon et al., 2016), and receiving information from an extension officer was associated with lower bulk tank SCC (Delong et al., 2017). Similarly, discussions in Danish stable schools allowed for farmers to work collectively on a problem and identify their own farm-specific goals (Vaarst et al., 2007a). Discussion groups can improve farm efficiency (Lapple and Hennessy, 2015) and farmers' confidence in managing their business (Hall et al., 2019). Vaarst et al. (2007b) contacted participants of a Ugandan farmer training program 2 years after the study ended and found that groups still met at least once a month.

There appears to be some merit in providing opportunities for discussion on matters relating to farm management. Discussions incorporated at the farm level with weekly employee meetings or meetings with farm advisors may provide benefits, but to our knowledge this has not been studied.

The trend toward greater use of online communication has changed how farmers access information (Garforth, 2015), but farmers do not always perceive online information as helpful. In Canada, Ritter et al. (2015) found that emails, along with local industry meetings, were least used by farmers when seeking information on Johne's disease prevention. Similarly, Russell and Bewley (2011) reported that, for Kentucky dairy farmers, printed forms of communication (i.e., newsletters, magazines) were a more effective information delivery method than electronic sources (i.e., websites, webinars, podcasts). Chapman et al. (2009) found that print media, equipment dealers, public events, and farm consultants were all important sources of information for disseminating farm safety practices. North American producers also appear to rely on industry news sources such as *Hoard's Dairyman* and *Progressive Dairyman* (both available in print and online) for information on management topics such as stockmanship, farm safety, and employee training (Wilmes and Swenson, 2019). However, provision of information is only one aspect of extension efforts. Workshops consisting of presentations, hands-on demonstrations, and group discussions have been shown to be beneficial for transferring skills related to calving management (Schuenemann et al., 2013). Even though technology can be an important way of disseminating information, it appears that dairy farmers vary in their ability to access this information.

Russell and Bewley (2011) found that time of year was an important factor for educational meetings or seminar attendance, with the best times being those that avoided crop-related conflicts (e.g., November to March in Kentucky). We conclude that both format and timing are important factors when designing extension activities for farmers.

Extension activities have limitations, particularly because they do not appear to reach all farmers. Lapple and Hennessy (2015) found that early participants in an extension program were younger, had larger herds, and were more educated than nonparticipants. Hall et al. (2019) found that 20% of participant dairy farmers from Tasmania, Australia, believed that extension activities were developed for new or inexperienced farmers and were repetitive over time. This work also indicated that caution is warranted when developing activities; Hall et al. (2019) found that farmers were less likely to return to subsequent activities if previous ones were thought to be irrelevant. Given that farmers have varying needs, a participatory approach to extension may be beneficial in allowing for topics to be identified by farmers, increasing the likelihood that they consider the programs relevant.

## THE ROLE OF THE ADVISOR

Advisors are an important aspect of any business. Farmer-advisor dialog is needed to foster shared understanding and build new knowledge (Duval et al., 2018). Advisors in the dairy industry may need training in communication (Bard et al., 2017), specifically in how to discuss farm management practices with farmers. For example, in Australia, a human resource management diploma program created for farm advisors and graduates changed the way they viewed their role in the industry (Nettle et al., 2018). The traditional family dairy farm adds an additional complexity compared with other industries. In this section, we outline what is known about veterinarians and other advisors to dairy farmers and how advising differs in the context of the family farm.

### The Veterinarian as an Advisor

Veterinarians are trusted advisors for dairy farmers (Stanley-Clarke, 2019; Sumner et al., 2020), and farmers respect their veterinarians (Golding et al., 2019). A trusted advisor has an explicit and implicit level of trust from the decision maker (Strike, 2013), and these individuals are believed to provide the highest quality information (Neu et al., 2011). In the dairy industry, the length of the relationship between farmers

and their advisors appears to be an important factor (Stanley-Clarke, 2019). Additionally, the existence of an established relationship increased the credibility of the advisor in the eyes of the farmer. For instance, Croyle et al. (2019) found that farmers in Ontario, Canada, were more likely to take advice regarding animal welfare from someone they trusted, such as their veterinarian, compared with a government official or dairy researcher. Svensson et al. (2019) found that adherence to veterinary advice was dependent on trust, feasibility, and priorities of the farmer. Further research should explore the factors that influence advisor relationships in an effort to create solid advisee-advisor partnerships.

Veterinarians have a prominent role on many farms, providing advice on animal health (Swinkels et al., 2015), treatment protocols (Raymond et al., 2006), animal welfare (Croyle et al., 2019), and antimicrobial stewardship (van Dijk et al., 2017), although individual farmers vary in their intention to contact their veterinarian for advice (e.g., regarding mastitis; Espetvedt et al., 2013). Farmers expect that veterinarians will point out animal welfare issues to which they have become “barn blind” (i.e., “they do not always see something as abnormal because they become accustomed to seeing it every day,” Croyle et al., 2019, p. 7390). However, the veterinary-client model can be paternalistic (Bard et al., 2017), and there may be important gaps between what veterinarians perceive as important to farmers and what is actually important to them. For example, when trying to understand farmer values around herd health management programs, Kristensen and Enevoldsen (2008) found that veterinarians believed farmers valued production and financial performance above others aspects of management, a position that was not consistent with their actual values.

Farmers and veterinarians perceive the role of the veterinarian differently. For example, veterinarians view their role in management of their client’s farm (i.e., optimizing milk production, decreasing economic costs) as more prominent than perceived by the farmers (Hall and Wapenaar, 2012). Additionally, although farmers appear to trust their veterinarians, they do not feel that their veterinarian has a role in management decisions (e.g., antimicrobial stewardship; Golding et al., 2019) or disease prevention practices (Svensson et al., 2018), or they are unwilling to pay for certain services (Duval et al., 2018). Additionally, although a sample of Alberta, Canada, farmers appeared to be satisfied with veterinary services, they were less satisfied with how veterinarians discussed costs related to procedures (Ritter et al., 2019). Santman-Berends et al. (2014) found that some Dutch farmers did not talk to their veterinarian about calf mortality because it did not oc-



cur to them to do so. Furthermore, farmers in Denmark believed that veterinarians lacked general knowledge in farm management (Kristensen and Enevoldsen, 2008) and showed poor ability to work well with other advisors and farm staff (Svensson et al., 2018). These examples speak to the limitations of the veterinarians' role in different areas of farm management.

### Other Advisors in the Dairy Industry

There is little research on the role of advisors other than veterinarians. Bruijn et al. (2013) found that in addition to veterinarians, hoof trimmers and feed advisors have a role in delivering information and motivating farmers regarding foot health management. Similarly, Swinkels et al. (2015) found that nutritionists, other dairy farmers, and other food animal production farmers were positive social referents for dairy farmers; in contrast, government bodies were considered negative referents in regards to antibiotic use. Moreover, pharmaceutical representatives were not trusted as sources of information regarding antibiotic use (Friedman et al., 2007). In addition to veterinarians, other farmers and milk cooperatives are also viewed as important sources of information regarding mastitis treatment (Kayitsinga et al., 2017). Similarly, Santman-Berends et al. (2014) reported that farmers believed that they had a good relationship with their feed supplier. In the Netherlands more than half of the participants in a study undertaken by Derks et al. (2012) discussed nutrition-related matters with only the veterinarian or not at all, suggesting that veterinarians may be trusted over other advisors (e.g., nutritionists) that may have more relevant training. There is some evidence that dairy farmers believe that farm consultants do not work well together (Croyle et al., 2019). Finally, Garforth (2011) found that other farmers had little effect on participants with respect to disease risk management. Future research is needed to identify the positive social referents to dairy farmers, and how these vary depending on the issue at hand.

### Advising in the Context of a Family Business

Dairy farms have been, and largely continue to be, family-run operations passed down to family members from one generation to the next (Deming et al., 2019); as Brassley (2005) describes, "*most farmers... appear to be selected by accident of birth*" (p. 245). This system creates challenges specific to working with family. For example, family farms do not offer the traditional home- and work-life boundaries that exist with other jobs (Deming et al., 2019). Power struggles can ex-

ist, making business decisions complex, particularly in the case of intergenerational conflicts (e.g., parent and child) or gender role-influenced conflicts (Glover, 2014). Additionally, conflict can arise among siblings, particularly in the context of succession and transfer of the family farm (Taylor and Norris, 2000), including resentment from siblings who will not become successors (Cassidy and McGrath, 2014). Deming et al. (2019) found that even when family members worked full-time on the farm, they were not viewed as employees, and job titles or responsibilities were not always clear. Role ambiguity is a potential source of conflict on family farms (Ballard-Reisch and Weigel, 1991).

The unique dynamics of family dairy farm advising has not been explored to our knowledge. In other contexts, it is clear that advisors must navigate complexities regarding family firms and their individual members (see review by Strike et al., 2018). For example, trusted advisors must create an environment that allows individual family members to learn and work together (Neu et al., 2011).

### STANDARD OPERATING PROCEDURES

Protocol development is a necessary component of running a business, as these records act as safeguards from an internal and regulatory perspective (Gough and Hamrell, 2009). Standard operating procedures are a set of steps that show how a company operates (Gough and Hamrell, 2009). When followed, SOP allow for uniformity across personnel in any given task, reduce errors, and can be used as training tools (Barbe et al., 2016). The SOP should be specific enough that they are clear and understandable to employees, yet allow for the flexibility that is needed in day-to-day operations (Gough and Hamrell, 2009). Standard operating procedures are increasingly required for animal welfare assurance programs in the dairy industry; however, although research has shown that many farmers believe that assurance is an important goal of SOP (Bell et al., 2006), little is known about how SOP are used or whether they are effective at achieving the desired outcome.

Although written protocols are viewed as important for specific topics (e.g., antibiotic use; Friedman et al., 2007, Kayitsinga et al., 2017), farm record keeping is sometimes poor (Ellingsen et al., 2012). Additionally, research has found that protocols for commonly performed procedures (i.e., dehorning, hoof trimming, euthanasia) are often not written down (Stull et al., 2005). Hesse et al. (2017) completed a survey of 248 German dairy farms to assess use and development of SOP. Although 82% of participants indicated they had

SOP, only 54% stated that these were available in writing. Lack of time and difficulty in creating SOP were important factors in whether these were present on farms (Hesse et al., 2017). Raymond et al. (2006) found that although the majority of Washington State dairy producers believed that written protocols would decrease errors and production losses, only a third of participants had protocols for common medical conditions. Additionally, Bell et al. (2006) found that although 29% of farmers believed that protocols for lameness and mastitis were useful for new staff, many of these farmers disliked the additional paperwork. Research regarding SOP on dairy farms is limited, and there does not seem to be consensus on their use. However, given that SOP are an important tool for assurance programs (Manghani, 2011), further research should explore what makes SOP work in the context of a dairy farm.

The SOP can be developed in many ways with different stakeholders involved in this process. Boersema et al. (2013) found that preset protocols regarding young stock rearing were provided to farmers by 10% of a sample of veterinarians in the Netherlands. Relatively little in the dairy science literature indicates who is involved in SOP development, but literature from other contexts speaks to the importance of involving multiple stakeholders. For example, SOP should be reviewed by someone outside of the writing process and audited periodically to ensure that the procedure is performed as written (Barbe et al., 2016). Additionally, SOP should act as living documents and be updated when practices change, ensuring that they reflect current practice (Gough and Hamrell, 2009). Unfortunately, Stull et al. (2005) found that 8 out of 10 participating dairies in California did not complete annual reviews of their protocols with on-farm personnel. Further research is warranted on who is involved in writing SOP, and how this influences the effectiveness of these documents.

## TRAINING OF PERSONNEL AND DEVELOPMENT OF TRAINING MATERIALS

Employees are an important part of a dairy farm, especially as farm size grows (Durst et al., 2018). Employees can be hired for specialized tasks (e.g., milking) or diverse tasks (Malanski et al., 2017), and hiring generalist employees can allow for cross-training (Schuler and MacMillan, 1984). However, farmers often lack the time or skill to recruit and select employees, which can lead to hiring employees with an inadequate skillset or aptitude for the job (Bitsch et al., 2006).

Farming has high rates of fatal and nonfatal injuries (Doughrati et al., 2009), and underreporting of injuries is common (Doughrati et al., 2013). Farmers

are concerned with worker safety and training and viewed safe handling techniques as a priority, but this training is not always delivered (Wilmes and Swenson, 2019). In Colorado and Wisconsin, 31% (Menger-Ogle et al., 2019) and 67% (Juárez-Carrillo et al., 2017) of participating dairy farm workers, respectively, did not receive health or safety training at their current place of employment. In one study, 11% of employees (in Michigan, New York, Pennsylvania, and Connecticut; Durst et al., 2018) and 19% of employees in another study (in Colorado; Román-Muñoz et al., 2006) did not receive training when first hired on farm. Erskine et al. (2015) found that 49% of employees on 12 farms in Michigan had not received education regarding mastitis control practices. Lack of training may be a barrier to improving practices on farm (e.g., implementing recommended milking protocols; Belage et al., 2019). Part of this challenge may be a result of farmers lacking training in how to train new employees (Hagevoort et al., 2013; Wilmes and Swenson, 2019).

To train employees, employers need to be able to clearly communicate farm goals and associated tasks, something that is not always done effectively (Durst et al., 2018). The inability to retain quality employees could result in the need to revert to family labor, particularly on small farms, slowing farm expansion (Schewe, 2015). The lack of training can have important consequences for animal care; for example, low stress handling can improve animal health, welfare, and productivity (Hemsworth, 2003).

## Training Dairy Employees

Employees appreciate understanding the importance of why they do their tasks in addition to how to do them (Erskine et al., 2015). Information needs to be simple and accessible to employees with varying levels of education (Friedman et al., 2007). The format of the educational material also appears to matter; laminated posters, flowcharts hung in the barn, videos, and educational seminars were all viewed as good tools for information regarding antibiotic use (Friedman et al., 2007). Current methods of training vary, though a common model is shadowing experienced workers (Wilmes and Swenson, 2019; Bitsch et al., 2006); however, this method can also result in the transmission of bad habits (Wilmes and Swenson, 2019; Bitsch et al., 2006).

Different techniques can aid in the acquisition of new skills, including the use of technology. For example, Rodriguez et al. (2018) developed safety training videos that were shown on tablets to dairy farm employees; 90% of employees found the device easy to use, and 95% of these participants liked this mode of learning.

Most importantly, knowledge of farm safety practices improved when comparing test scores before and after the use of these videos, and 98% of participants reported that they took steps to reduce safety risks in the workplace for both themselves and their coworkers (Rodriguez et al., 2018). When training dairy producers to administer a nerve block for disbudding of calves, Winder et al. (2018) found that no difference in success for online training modules, hands-on training, or a combination of the 2. That said, participants in the hands-on treatment had higher confidence in their ability to perform the procedure compared with online training. Vasseur et al. (2013) found that training using a combination of photographs, live observations, and discussion resulted in increased agreement between assessors of body condition scores in dairy cows. Arthur et al. (1997) reported that dyadic training protocols (training in pairs) was more successful in skill acquisition than training employees individually.

Employee turnover continues to be a challenge in the dairy industry, with one study finding annual turnover from 4 US states ranging from 8 to 144% (Durst et al., 2018). Unlike retail or manufacturing sectors, dairy farms cannot temporarily downsize operations in response to employee shortages, and employee turnover is expensive and disrupts the routine of the farm (Bilikopf and González, 2012). Long shifts in the milking parlor can lead to low job satisfaction and increased risk of turnover (Bitsch et al., 2006). Additionally, Bilikopf and González (2012) found that concerns about compensation and inadequacies of benefits were the top reasons for California dairy employees leaving their positions. From the broader literature there are examples of companies that provide incentives for employees to stay; for example, a compensation system tied to company profits resulted in a turnover rate of less than 1% (Schuler and MacMillan, 1984). In the dairy industry, incentive programs could include increased pay for calf weight gain or lower calf mortality or morbidity. Further research should explore creative solutions and their influence on employee turnover.

### **Training and Language**

With increased migrant labor, language barriers for farm workers are important to understand and accommodate (Wilmes and Swenson, 2019). The US dairy industry is highly dependent on foreign labor (Jenkins et al., 2009), with many workers having little dairy experience (Hagevoort et al., 2013). In a survey of calf care personnel in the United States, Sischo et al. (2019) found that as the number of calves reared increased, the proportion of calf care employees who were comfortable

speaking English decreased. Dual language training resources have been cited as important for farm practices such as antibiotic use (Friedman et al., 2007). Language barriers are also a known source of stress for dairy employees (Griffin et al., 2020).

Diverse cultural and language backgrounds of employees need not be a problem; a survey by Delong et al. (2017) found that bulk tank somatic cell counts were lower when dairy farm employees spoke a different language than that of the farms' primary decision maker. Additionally, training programs that are tailored to employees with different language requirements can aid in employee retention. For example, hands-on technical workshops (Chase et al., 2006) and dual language pocket dictionaries (Raymond et al., 2006) have been shown to be beneficial for Spanish-speaking workers in the US dairy industry. Rovai et al. (2016) found that structured topic-based weekly lessons in Spanish improved worker confidence in completing their jobs, working relationships, and workplace attitude (Rovai et al., 2016). Veterinarians (Erskine et al., 2015) and farm managers (Bitsch et al., 2006) recognize the importance of learning more about the cultural needs of their employees to improve workplace relationships. In conclusion, there can be value in strengthening language and culturally specific training programs in regions reliant on migrant labor.

### **CONCLUSIONS**

Our narrative review of the literature identified areas that warrant further investigation. Our goal was not to generalize the findings presented, but instead to summarize and contextualize the available literature. Although a few papers included in this review made use of participatory methods, the majority did not, and we encourage broader use of these methods in future research to increase the likelihood of translating research into practice (Macaulay et al., 2011). Participatory research methods ask targeted questions, thereby leading to higher quality data and improvements in dissemination (Flicker, 2008). Ultimately, the research should be able to help improve the lives of farmers and the animals under their care: outcomes for the participants should be just as valued as outcomes for the researchers. More research is needed to understand farmer relationships with their advisors and employees; to understand the social network of dairy farmers, particularly how social referents and trusted advisors vary in different contexts; and to understand the role of SOP on dairy farms, particularly in the context of animal care and employee training. Industry stakeholders, including researchers and government, need to understand their



role in the future of the dairy industry. Implementation of programs is likely to be more successful when producer-led or done with the help of a trusted advisor.

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