Case Studies

Occupational Health and Safety Issues at Agribusiness Retailers

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JEL Codes: I1, L1, Q1, Q13
Keywords: Agribusiness, consolidation, cooperatives, health, safety

Abstract
This case explores efforts to improve occupational health and safety at RRV Cooperative, a fictional agricultural cooperative located in the upper Midwest. Students are introduced to the operations of farm supply and grain marketing cooperatives and to fundamental concepts in occupational health and safety. Students are asked to analyze data and consider the challenges in changing personal and group habits. Background information presented in this case offers additional teaching opportunities regarding trends in the farm supply and grain marketing industry and U.S. production agriculture.

1. Introduction

The light in Martha Giefer's office was the last one on at RRV Cooperative (RRVC) as day turned to night in July 2016. Martha was hired as RRVC's health and safety director in 2015. In her first year on the job, Martha developed several new projects to improve the cooperative's occupational health and safety. She also inherited a variety of ongoing projects, including an occupational health and safety study conducted by researchers at a land grant university. The university researchers collected data from RRVC and other agricultural cooperatives from 2012 to 2015, so much of the project was completed before Martha's time at RRVC. Nevertheless, the results from that survey, which sat on Martha's desk in a packet entitled "Occupational Health and Safety Survey Results," were the reason for the late night at the office.

Albert Johansen, the long-time general manager at RRVC, hired Martha to be the cooperative's first full-time health and safety director. RRVC is a farm supply and grain marketing cooperative located in eastern North Dakota. The cooperative's business lines include agronomy sales and service, feed production and sales, grain marketing and storage, refined fuels and propane delivery, and convenience stores. Martha applied for her current position at RRVC because the job description interested her and the cooperative was a critical business in her community. A few months after accepting her position at RRVC, Martha attended an occupational health and safety conference at which a university researcher showed data from one of the eight centers funded by Congress to work on health and safety issues. Additional presentations at the conference shared research from two dissertations in applied economics at the state university. Martha appreciated that some new research was focusing on agribusiness retailers such as agricultural cooperatives. Nevertheless, Martha believed that health and safety issues at agribusiness retailers received too little attention compared with similar issues faced by farm workers.

Like her peers at other firms, Martha designs educational and training programs for employees, implements health and safety policies, and completes compliance and regulatory paperwork. She also recommends investments in safety equipment or materials. More generally, Martha was hired to elevate RRVC's safety culture. Safety culture is a major topic among occupational health and safety professionals. Turner et al. (1989) contend that safety culture includes beliefs, attitudes, and practices that promote occupational health and safety. Safety culture may be defined by employee empowerment, which exists when "employees have a substantial voice in safety decisions, have the leverage to initiate and achieve

safety improvements, hold themselves and others accountable for their actions, and take pride in the safety record of their organization" (Wiegmann et al. 2004, 127).

As Martha packed up to head home, she was still seeking answers regarding the survey's results. A few weeks prior, Martha agreed to summarize the survey's findings and make recommendations for future health and safety investments at RRVC's next board meeting. But as she exited the building, Martha was still trying to determine whether the report on her desk really mattered and how it could be used to improve safety culture and RRVC's bottom line. In the morning, she would review the results of the occupational health and safety survey with Albert and then participate in a conference call with the research team. After the call, Martha and Albert planned to discuss initial steps for improving occupational health and safety at RRVC. Martha hoped the next day's activities would help her to:

1. Understand the broad industry trends in the farm supply and grain marketing industries that have changed agriculture and how these changes have increased the need for education and training on occupational health and safety.
2. Differentiate between definitions and measures of safety culture and safety climate.
3. Construct occupational health and safety goals that are measurable and representative of a strategic plan.

Martha believed that achieving these objectives would improve her performance as RRVC's health and safety director and thereby move the entire cooperative in a positive direction.

2. Overview of Agricultural Cooperatives

Cooperatives exist in many agricultural and consumer industries (Boland 2018). Although cooperatives may vary widely, they share several unique characteristics related to the users of the business's goods or services. First, cooperatives are owned by their users, meaning that the users supply financial capital to the cooperative and are entitled to a share of the cooperative's profits. Cooperatives are also controlled by their users, meaning that the users elect directors to oversee the business. Finally, cooperatives are designed to benefit their users, meaning that the goods or services provided by the cooperative are beneficial to the users and that cooperatives should redistribute their profits based on use. In fact, cooperatives are referred to as participatory organizations because the more a customer participates in the business, the more benefits that customer receives.

Oftentimes, cooperatives provide goods or services that would otherwise be unavailable at a reasonable cost. This is true of many agricultural cooperatives, which generally operate in rural areas that may be overlooked by other businesses. Agricultural cooperatives also offer some market power to farm producers in an oligopsonic industry in which buyers are relatively large in size and small in number (Sexton 1986). Agricultural cooperatives include farm supply cooperatives, service cooperatives, and marketing cooperatives. Supply cooperatives offer farm inputs such as fertilizer, seed, feed, chemicals, and fuel. Service cooperatives may provide livestock shipping or grain storage. Marketing cooperatives sell users' agricultural production. Many agricultural cooperatives serve several of these functions and are therefore diversified businesses. In addition to core business lines like input supply and grain storage or handling, many agricultural cooperatives have additional non-agricultural business lines, including convenience stores, restaurants, or repair shops. Agricultural cooperatives are particularly common in the upper Midwest. In 2016, Minnesota, North Dakota, and Wisconsin ranked among the four states with the most agricultural cooperative headquarters (U.S. Department of Agriculture, Rural Development 2017).

3. The Regional Agricultural Economy

Martha grew up on a farm located on the eastern edge of RRVC's territory. Like many farms in that area in the early 1970s, her family's farm included a small beef feedlot, small grains such as hard red spring wheat and barley, and occasionally sunflowers or dry edible beans. Before Martha was born, her grandfather operated a dairy farm on the land. The crops traditionally planted on Martha's farm required relatively few

crop inputs and generated small yields. As a result, RRVC and other area cooperatives did not need large agronomy or grain storage capabilities.

Production patterns in RRVC's area began to change in the early 1990s. During that time, Martha remembers her parents discussing planting soybeans for the first time. Several years later, her parents began planting corn. Martha's college agricultural policy instructor had talked about the "Freedom to Farm" U.S. Farm Bill in 1996. She remembers the instructor discussing likely changes to cropping patterns in the Red River Valley of northwest Minnesota and eastern North Dakota.

Since then, large-scale changes in the region's cropping patterns have occurred. Spring wheat, which was the primary crop in the region for decades, is now grown on fewer acres while corn and soybeans have surged in popularity. In North Dakota's Cass County, which sits in the heart of the Red River Valley, spring wheat acreage decreased by roughly 75 percent during the past two decades (U.S. Department of Agriculture, National Agricultural Statistics Service 2019). Corn yields per acre are several times those of small grains and require much greater volumes of crop inputs, especially nitrogen fertilizer. In addition, farming changed as new planting and harvesting equipment was needed to produce corn and soybeans. Because these crops have relatively narrow planting and harvesting windows, their production presented challenges to existing facilities and operations (Bechdol et al. 2010; Beddow and Pardey 2015). Those challenges spurred advancements in genetics, yield, and planting density that enabled farmers to work faster and operate more acres (Pardey and Wright 2003). Thus, farm sizes increased significantly.

The aforementioned changes had implications for RRVC, which is owned by area farmers. The agronomy and grain assets that RRVC owned in the 1990s were much too small for the demands of its territory's new cropping patterns. Consequently, from 2000 to 2010, RRVC experienced its biggest-ever capital asset expansion. Over the same period, RRVC consolidated with three other cooperatives at the same level of the agricultural supply chain, resulting in RRVC's horizontal expansion. The most recent consolidation occurred in 2013, when RRVC expanded its operations to 22 business locations with 250 employees through a merger with Northern Valley Cooperative. The merger with Northern Valley was a major reason for RRVC's interest in the occupational health and safety survey.

Similar changes have occurred elsewhere as the agricultural cooperative industry has evolved. Specifically, consolidation has reduced the number of agricultural cooperatives while business volume has increased. These trends are depicted in Figure 1. Consolidation among agricultural cooperatives mirrors increasing farm sizes and the emergence of large multinational agribusinesses through mergers and acquisitions among agricultural chemical and seed companies (MacDonald et al. 2018). Although business

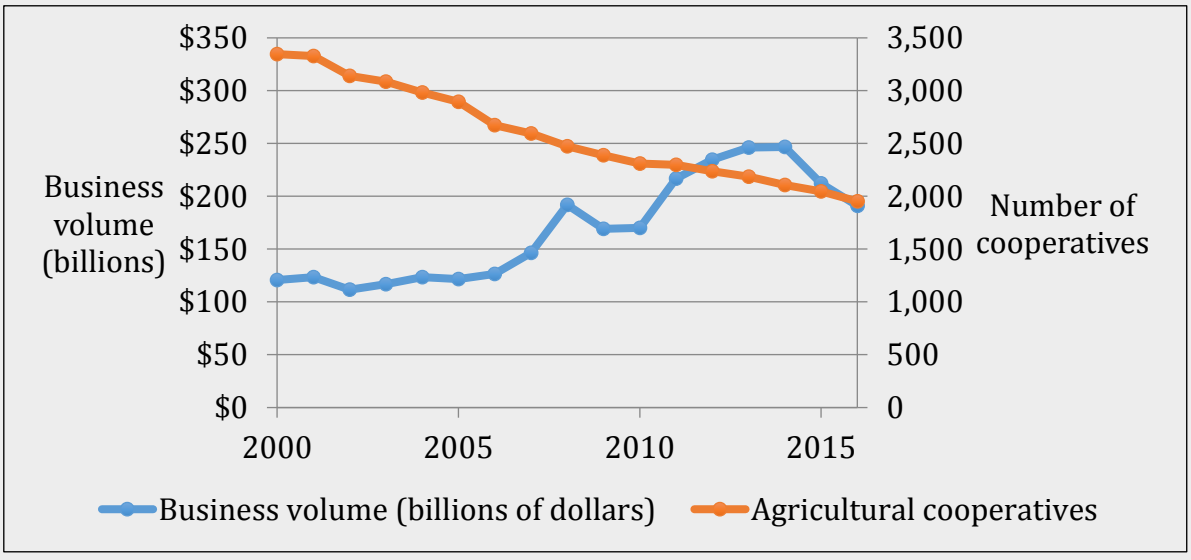

Figure 1. U.S. Agricultural Cooperatives and Agricultural Cooperative Business Volume

Source: U.S. Department of Agriculture, Rural Development (2017).

volume is partially driven by variable commodity prices, many agricultural cooperatives are handling more bushels of crop production than ever.

4. Health and Safety Challenges at Agricultural Cooperatives

The varied business lines at agricultural cooperatives create an array of unique health and safety challenges (Risch et al. 2014). Employees must handle and apply dangerous products like anhydrous ammonia fertilizer. Grain facilities expose employees to the dangers of grain dust explosions and grain engulfment. Large machinery, dangerous driving conditions, and many other hazards are also present at agricultural cooperatives. A recent four-year survey of 15 agricultural cooperatives reveals an average annual total recordable case incidence rate of 6.3 (Hanson 2016).[1] Table 1 shows that this incidence rate compares unfavorably with that of other industries and is roughly double the incidence rate for U.S. private industry.

Industry and employee characteristics pose additional health and safety challenges for agricultural cooperatives. For many cooperatives, consolidation has increased both the number of business locations and the geographic distance between them. As a result, maintaining stringent and uniform health and safety standards may be increasingly difficult for managers and health and safety personnel with cooperative-wide responsibilities. Post–merger employee onboarding may also be a challenge.

Increased business volumes at agricultural cooperatives are a particular challenge because the industry's workforce includes many older employees (Hanson 2016). Older employees may have established poor safety habits over years on the job. Older employees may also have relatively less physical resistance to injury. Many agricultural cooperative employees grew up working on farms or continue to work on farms seasonally or part time. Farms are notoriously dangerous workplaces where unsafe behaviors are often engrained in workers from a young age (Shortall et al. 2019). The average employee age at many agricultural cooperatives is relatively high, which implies that many new hires will be needed in coming years. This generational transition presents an opportunity for improving safety culture and performance while also raising concerns about lost institutional health and safety knowledge.

5. Economic Motivations for Occupational Health and Safety

There are many motivations for improving health and safety at agricultural cooperatives. An employee's desire to maintain quality of life and protect co-workers is the most basic motivation for health and safety. However, a recent survey of agricultural cooperative health and safety directors indicates that business concerns are also on the mind of safety-conscious managers (Hanson 2018). Financial arguments may influence managers who are accustomed to thinking on those terms (Adams 2002). Indeed, experience-rated insurance premia, lawsuits from injured employees, and regulatory fines damage a business's bottom

Table 1. Incidence Rates at Agricultural Cooperatives Versus Related Industries

Industry (NAICS code)[a]	TRC incidence rate[b]
Surveyed cooperatives	6.3
Private industry	2.8
Crop production (111)	5.6
Farm product warehousing and storage (49313)	2.4

Sources: Hanson (2016); U.S. Department of Labor, Bureau of Labor Statistics (2018).

[a] NAICS is the North American Industrial Classification System.

[b] Incidence rates are calculated as (injury and illness cases x 200,000) ÷ total hours worked, representing injuries and illnesses per 100 full time workers. BLS statistics represent 2016 data.

[1] Total recordable cases are all occupational injuries and illnesses that must be recorded for Occupational Safety and Health Administration (OSHA) purposes.

line. Work stoppages due to injuries and illnesses and the use of replacement or retrained workers may also harm a business's efficiency. Lastly, it may be difficult for a business with a poor health and safety reputation to attract and retain strong employees, which is particularly problematic in thin rural labor markets.

6. Overview of RRVC's Occupational Health and Safety Programs

Making RRVC more proactive on matters of occupational health and safety was a major goal for Martha. She instituted a system for anonymously submitting health and safety concerns and increased the frequency of safety inspections performed by herself and location managers. In accordance with "Right-to-Know" laws, Martha also presented information about dangerous chemicals used at RRVC. Her highest-profile effort was leading monthly safety meetings to communicate new policies and explain the findings of safety investigations after workplace injuries, illnesses, or near-misses.

7. Key Questions

Martha came into the office early the next morning to review the survey results before the conference call. The university research team that wrote the report had collaborated with 14 other agricultural cooperatives over a four-year period, from 2012 to 2015. Martha's predecessor, who did not have full-time health and safety responsibilities due to RRVC's smaller size at the time, had enrolled RRVC in the survey prior to his retirement. The researchers collected injury and illness data from RRVC each year from 2012 to 2015. In addition, RRVC employees completed a written survey in 2014. Martha was told of RRVC's survey participation during her hiring process, but she had not thought much about it after she provided injury and illness data to the research team during her first year on the job.

After inquiring about the health and safety survey's genesis, Martha discovered that a number of cooperatives like RRVC participated in long-running roundtables for chief executive officer (CEO) or chief financial officer (CFO) education. In 2010, one roundtable of farm supply and grain marketing cooperative CEOs invited an occupational health and safety speaker from DuPont to a meeting. The CEOs were interested in additional information on occupational health and safety, which led to the creation of a survey and a university-led research project on the topic.

The survey was designed to benchmark the cooperatives against one another and generate a written summary of the safety culture for each cooperative using a scale of zero (poor culture) to 100 (excellent culture). To ascertain the most basic measure of safety culture, the survey asked respondents to rate their empowerment to take actions that prevent injuries to themselves and their co-workers. As she read the report, Martha realized that the response rate had been almost 100 percent for many of the cooperatives. The survey results were broken out by business line and location as well as summarized for the entire cooperative.

Martha wrote down a series of questions to ask on the upcoming conference call. As she reflected on the results, Martha was disappointed that RRVC had received relatively low scores. Moreover, she knew that RRVC's directors would ask her difficult questions at the next board meeting. She wanted to be prepared to answer their questions. Martha also wanted to use the board meeting to propose a strategic vision for occupational health and safety at RRVC. Part of that vision included setting appropriate goals for the next three years. The questions on Martha's notepad were:

1. Why should our board of directors be concerned with occupational health and safety now and in the future? Which industry characteristics and trends are most important to this discussion?
2. What is the difference between safety climate and safety culture? How can these terms be used to frame what we can measure and what we want to measure?
3. Given that the mean score for all of the cooperatives was 72, with a standard deviation of 6.5 and a range of 63 to 84, what does RRVC's overall safety score of 63 signify? Do any important patterns emerge from the survey results and injury and illness data?

4. Where should RRVC's future health and safety investments be targeted? How will the effectiveness of those investments be measured? What is the relevance of causation and correlation to these efforts?

As Martha wrote down the last of these questions, she heard a knock on the door. Albert entered and asked, "Are we ready for the conference call?"

Martha responded, "I guess I am as ready as I can be. I spent some time going over the results last night. Since we have some time before the conference call, let me explain the key points as I see them." Martha went through her notes with Albert and asked for his thoughts about the four-year research project because she was not an employee when the project first started. He explained that one of his main takeaways from the educational programs was that all accidents can be prevented if the root causes of accidents are identified. Another takeaway, one underscored by injury and illness data, was that cooperative employees working with farmers had more reportable incidents than the farmers. That finding led Albert to enlist Martha's help in visiting customers' farms to improve health and safety. Thus far, RVVC had worked with 12 farms to reduce health and safety hazards relevant to both farm workers and cooperative employees. As a result, several farms had placed concrete in slippery areas, made it easier for large equipment to enter and exit a field, or engaged in other types of improvements.

Albert mentioned that education and awareness are critical for occupational health and safety, which is why he adopted the strategy, used by many senior leaders, of starting each meeting or conference call with a safety tip or discussion. RRVC's increased emphasis on health and safety resulted in the hiring of Martha and budgeting for increased annual expenditures for educational programs, which was not an easy task in an agricultural economy with little margin for such programs. But Albert was able to get buy-in from RRVC's directors by explaining how health and safety improvements could help RRVC's bottom line. Furthermore, Albert explained that "it was just the right thing to do."

Albert was unsure about what would emerge in the survey results. The survey was completed in 2014, roughly one year before Martha was hired. He knew it would take time to see results because safety improvements are a continuous process. A follow-up survey was scheduled to be implemented in about three years, or roughly five years after the original survey. Albert believed that the cooperative's safety culture was improving. However, he also acknowledged that safety culture was uneven across RRVC's locations, leaving much room for improvement. As Martha's computer alarm went off, Martha and Albert knew it was time to join the call.

8. Analyzing the Results

After the call participants were introduced, the university professor and doctoral student went through each survey question and discussed the main implications. The questions were aggregated into three main categories: leadership and support, empowerment and action, and accountability and responsiveness. Survey results were also summarized by job category (managers, supervisors, hourly employees, professionals), business location (for confidentiality purposes, a location needed five or more responses for its results to be reported), employee age (ten-year increments starting at age 20), and business line (agronomy, energy, feed, grain, office, retail, transportation). The results were benchmarked against the other cooperatives in the survey. Finally, any written comments from the surveys were discussed.

Martha wrote down the key points as she and Albert listened. After 20 minutes, the speakerphone went silent. It was time for questions. "If I understand you correctly, the overall set of cooperatives had a relatively low score," began Martha. "So, we all have room to improve. But RRVC has more room for improvement than most." There was agreement on that issue. RVVC had not "failed," but rather its results were low and suggestive that improvement was needed.

The conversation then shifted to particular areas in which RRVC could improve. It was clear from the written comments that the employees believed that all of the attention on health and safety was a short-term issue. "We have talked about safety during all of my 40 years as an employee," one respondent wrote, "but when it is planting or harvest season, it is 'all hands on deck,' and safety goes out the window as we

work all hours of the day to help our members." The call participants agreed that leadership from the CEO would be needed to change the culture. In addition, employees recognized that RRVC had increased its investment in occupational health and safety. Although employees recognized some change as a result, surveys revealed that the employees were generally less positive than supervisors about RRVC's safety culture and the effectiveness of the cooperative's leadership in promoting occupational health and safety.

During the conference call and in the survey report, the research team talked about "safety climate." Martha asked the university professor and doctoral student about this terminology. According to the researchers, "Safety culture is an all-encompassing term for values and beliefs that may be evolving everyday. Therefore, it is difficult to capture culture perfectly through a questionnaire. Instead, it may be more accurate to say that those questions describe a firm's moment-in-time safety climate."

The discussion of safety climate and culture led to talk about the connection between survey results and safety outcomes, such as injury and illness frequency and severity. The researchers noted that they wanted to be careful in making sure any relationship between these variables was causal and not simply a correlation. According to the professor on the call, "Just because two things happen at the same time does not mean that one causes the other. If we want to improve safety, we want to focus on things that actually change safety outcomes." The professor mentioned that it is easy to be fooled by reverse causality or endogeneity when examining a relationship between two variables like safety culture and safety outcomes. The researchers promised to send more information to explain these statistical concepts. As the call concluded, Martha looked down at her full notebook and began considering the future of RRVC's occupational health and safety programs.

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IRB Approval: The research that formed the basis for this case study was submitted and found exempt under federal regulations by IRBs at the University of Minnesota (study number 1410E54623) and North Dakota State University (protocol #AG18039).

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1(1) doi: 10.22004/ag.econ.294015

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