

Navigating Challenges: Minnesota's Food and Agriculture Manufacturers and Processors Supply Chains

Table of Contents

Executive Summary 2

Introduction 3

 Minnesota Food and Agriculture Manufacturers and Processors..... 5

 Minnesota and Ag Manufacturers and Processors Navigate the COVID Storm..... 8

 Navigating..... 8

 Responding..... 9

 Adapting 11

 Stabilizing: Resiliency needs 12

 Anticipating the Future 13

Implications 15

Summary 16

References..... 17

Executive Summary

This report illustrates the impact of the novel Coronavirus Disease (COVID) on supply chains for Minnesota food and agriculture manufacturers and processors. A collaboration providing services to Minnesota food and agricultural economic sectors wanted to better understand the supply chain effects of COVID, the resulting pain points and what may be needed to help identify potential new services, resources and supportive actions that would improve supply chain resiliency for Minnesota businesses.

Based on 114 respondents, located throughout Minnesota and representing a wide range of businesses and sectors, the pain points included challenges that resulted in supply chain disruptions, market and sales losses, labor shortages, and bottlenecks. Companies had to make difficult decisions and navigate destabilized supply chains to ensure financial viability. The inconsistent availability of Personal Protective Equipment (PPE) and product inputs furthered supply chain disruptions.

The COVID crisis impeded food and agriculture supply chains, yet they did not break. Companies used creative, innovative strategies in stabilizing their businesses. Respondents agree that resiliency needed greater consideration for supply chains to weather future crises. Resilient supply chains require collaboration, partnerships, and breakthrough innovations. Building a resilient supply chain requires collaboration across many entities, as moving towards greater vertical integration can be expensive, especially if there is a trade-off in terms of resiliency.

The COVID pandemic disrupted Minnesota food and agriculture manufacturers and processors business and exposed critical gaps in making supply chains more agile and resilient. To become more resilient in navigating COVID and future disruptions, Minnesota's food and agriculture manufacturers and processors first and foremost reported the need for the public to feel safe, as well as a need for greater stability. Businesses need new funding opportunities, employees, new connections to markets, additional meat processing plants and regulatory and policy adjustments to improve resiliency. With the pervasiveness of online ordering, virtual meetings and the need for flexible electronic systems, improved technology infrastructure (internet) is vital. Technological systems are necessary for supply chain management and cross communication among partners and collaborators while continuing to build in traceability and transparency. Respondents noted that future policy must take into consideration the unintended consequences of unemployment benefits, such as recipients receiving more money than if they were working.

The future rides on restoring a sense of public safety and confidence. In a stable environment, respondents anticipate economic vitality will be restored in two to six years. Additionally, most believe the effects of COVID will permanently affect how we live and conduct business, given the rapid movement toward pervasive online ordering and virtual meetings.

I. Introduction

As the novel Coronavirus Disease (COVID) hit the shores of the United States in early 2020, an unprecedented perfect storm was brewing for Minnesota food and agriculture manufacturers and processors. The perfect storm is a metaphor that indicates a rare set of factors that converge, creating a unique and impeding force that requires purposeful navigation. The storm began to emerge in light of challenges resulting from national and state effects, stay at home orders, the shutdown of nonessential businesses, fear-based media reports, and a reactive public.¹ With heightening concerns of supply shortages, consumers began panic buying, which created stock depletions, e.g., toilet paper, canned goods, frozen foods, filtered water, hand sanitizers and cleaning supplies.² As people in most foreign countries acted similarly, manufacturing and processing supply chains became disrupted, resulting in many empty store shelves and reinforcing public concerns.³

During the first two months of COVID, the economic impact of the disease spread rapidly as consumer spending fell nearly 20 percent, disrupting 75 percent of supply chains nationwide.⁴ This level of disruption was a siren call to stakeholders to ensure food and agricultural supply chains can weather future crises. Resiliency is referred to as the purposeful development of capabilities in a business or supply chain to mitigate the effects of uncertain circumstances.⁵ To ensure a steady source of food, fuel and fiber to the American public during unforeseen crises, it is vital that we understand Minnesota's food and agriculture manufacturers and processors experiences through the COVID storm to provide meaningful assistance that could lead to more resilient food and agriculture supply chains in Minnesota.

As the COVID storm strengthened, a series of situations caused a domino effect. Given the nationwide lockdown, people began eating at home, causing food demand to suddenly shift from restaurants to grocery stores. Grocery outlets scrambled to meet demand while the food service supply chain sales plummeted, leaving farmers and food service distributors to find new markets quickly. Some transitions were successful while others suffered, creating high unemployment.⁶ With no readily available channel for distribution during this transition, producers plowed under or destroyed fresh produce, and milk was dumped.

Overwhelmed with COVID cases in early April, meat processing plants temporarily closed while a steady supply of livestock was ready for processing. With limited processing substitutes, many animals had to be euthanized and disposed of while reducing rations for young animals to slow growth.⁷ The closures disrupted production in the United States with pork falling 11%, federally inspected beef dropping 21%, turkeys down 8.3%, while broilers held steady at 2%.⁸ Along with falling livestock prices, supply disruptions reduced grocery store availability, which led to higher retail prices. Many meat products were prioritized to ensure adequate supply, while retail stores limited quantities consumers could buy. By the end of May, processing levels resumed to near normal levels, prices increased, as did the supply to consumers. While disruptive and painful to those in the supply chain, adaptation was quick but revealed a need for more resiliency in supply chains.⁹

¹ See Anderson & Holt in Charlton, et al., 2020; Smallman, 2015

² See Anderson & Holt in Charlton, et al., 2020

³ See Lusk & McCluskey in Charlton, et al., 2020

⁴ See Close et al., 2020

⁵ See Close et al., 2020

⁶ See Richards in Charlton et al., 2020

⁷ See Tonsor and Schulz in Charlton et al., 2020

⁸ See USDA, 2020

⁹ See Tonsor and Schulz in Charlton et al., 2020

Companies became painfully aware of how quickly supply chains become fragile.¹⁰ Supply chain adaptation during COVID included tapping into local food chains, e.g., farms, food makers, and beverage companies for needed materials. Given the inherent flexibility in small businesses, some gaps were filled in the near term.¹¹ In the future, it is expected that resilient supply chains will be based on flexible systems, e.g., processing, sales channels, markets, work environment, employee schedules, including readily available financing for farmers and agri-food companies.¹²

Resilient companies and supply chains require a strong technological infrastructure. The technology was heavily relied on during COVID and helped many companies survive. In the United States alone, the use of technology to address consumer demand increased by 20 percent.¹³ Additionally, the agricultural ecosystem depends on broadband and communications technology as an undergirding infrastructure for tracking and tracing. During the pandemic, more technology needs were discovered as perspectives changed on what can be accomplished virtually.¹⁴

The time has come to foster more resilient food and agriculture supply chains in Minnesota. With a novel virus and the converging elements of the perfect storm, unprecedented business disruption occurred in Minnesota. Due to the essential nature of food and agriculture, the following Minnesota food and agricultural groups (AgriGrowth, AURI, the College of Food, Agriculture and Natural Resource Sciences (CFANS) at the University of Minnesota, GreenSeam and the Minnesota Department of Agriculture) partnered to better understand the supply chain effects of COVID, the resulting pain points and what is needed to resolve them to identify potential new services, resources, and collective solutions to benefit Minnesota businesses. The generated data will provide information and perspectives for these partners to consider supportive actions that could improve supply chain resiliency for Minnesota businesses.

To collect the needed information, food and agriculture manufacturers and processors with sites in Minnesota were invited to complete a pulse survey anonymously. The survey collected the respondent demographics with one quantitative question regarding supply chain impacts. The remaining questions were open-ended (qualitative) to understand respondents varying pain points and needs. Surveys were emailed to food and agriculture manufacturers and processors from each of the agricultural partners' databases and collected from June 29 – August 9, 2020, resulting in 114 useable surveys. Given the qualitative nature of the report, the partner's sought as many diverse points of view as possible and then cross-validated them with food and agricultural manufacturing and processing professionals.

This paper describes the resulting experiences and needs of Minnesota food and agriculture manufacturers and processors during the COVID crisis. Section two describes the research method and demographics. Section three provides detailed responses to the open-ended survey questions. The last section includes a discussion of implications and a summary.

¹⁰ See Danoesastro et al., 2020

¹¹ See Thilmany McFadden & Malone in Charlton et al., 2020

¹² See Richards in Charlton et al., 2020

¹³ See Danoesastro et al., 2020

¹⁴ See MinnWest, 2020

II. Minnesota Food and Agriculture Manufacturers and Processors

Food and agriculture manufacturers and processors from throughout the state responded to the survey, ranging from large to small with a wide range of annual revenue. Many served niche markets, describing their businesses outside of the North American Industry Classification System (NAICS) when describing its impacted supply chain.

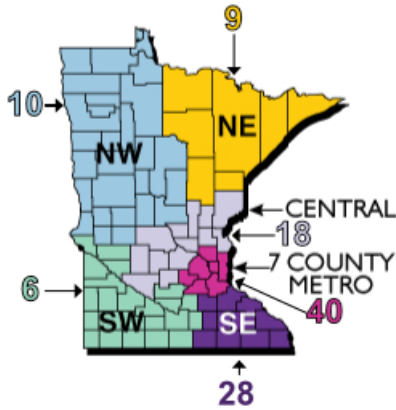


Figure 1. Minnesota Planning Area Map.

While the survey was anonymous, respondents willingly shared their zip codes as part of the demographic information. Sixty-three percent of respondents were in outstate and 35 percent were in the seven-county metro region. Respondent distribution is shown on the Minnesota Planning Area map as developed by the Minnesota Department of Employment and Economic Development, see figure 1. The number of respondents by region is as follows: Southeast (28), Central (18), Northwest (10), Northeast (9), Southwest (6), Metro (40), and three zip codes were unusable.

Respondents represented a wide variety of food and agriculture manufacturing and processing sectors, as shown in figure 2. The category list was based on the sector’s NAICS codes. Fifty (44.7%) respondents selected the ‘comments or add other sector’ category.

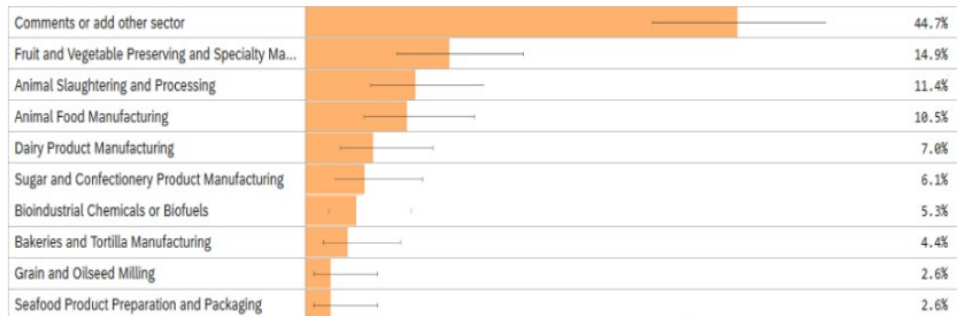


Figure 2. NAICS Food and Agriculture Manufacturing and Processing Sectors.

Of the 50, eight respondents selected both a NAICS category and ‘comments or add other sector’ to further describe their business. Forty-two respondents added a different sector. Descriptions of other sectors included those who provide financial services to the agricultural and processing industries, copackers, manufacturing and processing food specialties, e.g., spices, dry goods, organic mixes, prepackaged, frozen foods, beverage, fresh cut produce, milling and food safety diagnostics. Specialty processors focused on microgreens, organic foods, breweries and distilleries, dietary supplements, maple syrup, small grains and malts, food upcycling, wholesale foods, and wineries. Several companies identified themselves as suppliers of foodservice clients.

Of the respondents selecting the NAICS categories, both fruit and vegetable preserving, and specialty manufacturing included 14.9 percent of respondents, animal slaughtering and processing was 11.4 percent and animal food manufacturing at 10.5 percent. Categories less than 10 percent were manufacturers of dairy products, sugar and confectionery, bio-industrial chemicals or biofuels, and bakeries and tortillas. Grain and oilseed milling, and seafood product preparation and packaging were less than three percent of the respondents. One possible explanation for the high number of respondents adding a sector may be due to the nature of small supply chain businesses focusing on a single product or process.

As shown in figure 3, nearly half of the respondents identified as an owner (49.1%). Other roles were president/CEO (18.4%), vice president/department head (7.9%), operations (7%), chief financial officer (1.8%) and other (15.8%).

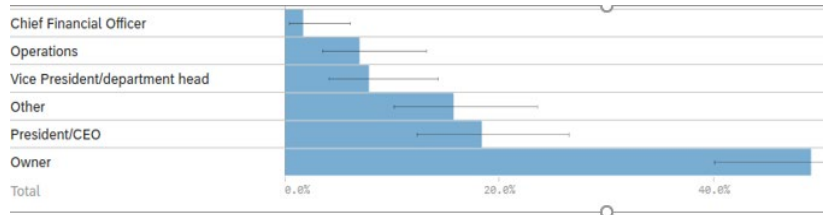


Figure 3. Respondent roles

The 18 individuals who selected the other role option described their positions as: marketing, chief scientific officer, route sales rep, supply chain director, manager, general manager, chief operating officer, quality assurance, food safety quality manager, and plant manager.

Regarding the number of years respondent’s businesses have operated in Minnesota, 41.6 percent were less than 10 years, 17.7 percent 10 – 24 years, 16.8 percent in the 25 – 49 year range, 17.7 percent 50-99 years, and 6.2 percent have operated in Minnesota 100 or more years.

Revenue ranges, represented in figure 4, show 59 companies were in the less than one million dollars category (51.8%), 18 fell in one to five million (15.8%), and 14 were in the five to 20 million range (12.3%). There were five companies in each of the \$20 to \$50 million, \$50 to \$100 million and \$100 to \$500 million, \$50 to \$100 million and \$100 to \$500 million ranges (4.4% per range). Three companies were in the \$500 to \$999 million range (2.6%) and five were over one billion annually (4.3%).

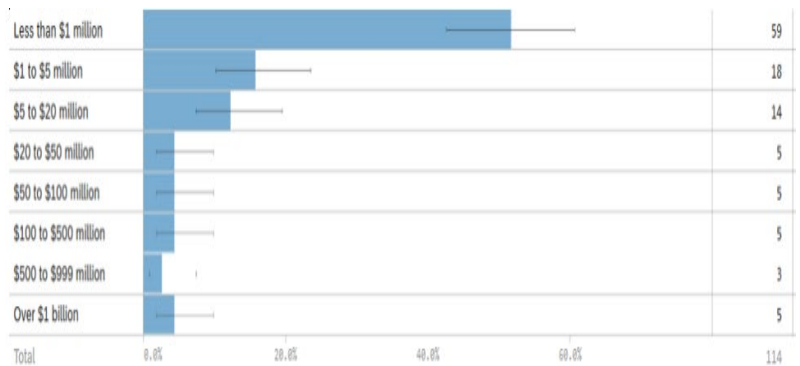
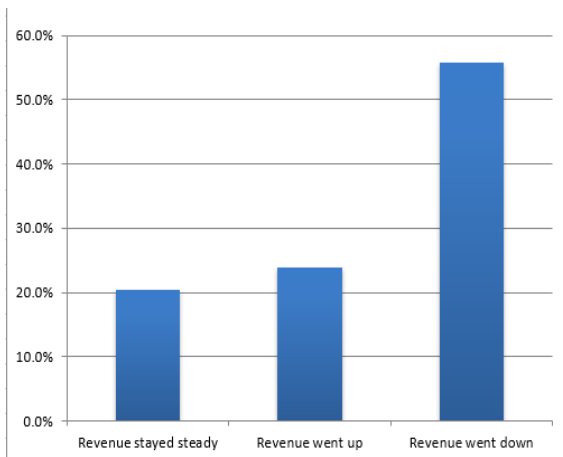


Figure 4. 2019 Annual Revenue



The survey asked businesses about revenue trends after June 29, indicating how COVID affected revenue. Twenty percent of the business revenues remained steady, 24 percent went up and 56 percent reported a decline, as shown in figure 5.

Figure 5. Revenue trend comparison after June 29, 2020.

In looking at employment trends as of June 29, 2020, 55.3 percent had fewer than ten employees, 7.8 percent had 10 – 24, 11.4 percent in the 25 – 49 range, 8.8 percent 50 – 59 and 16.7 percent had more than 100 employees.

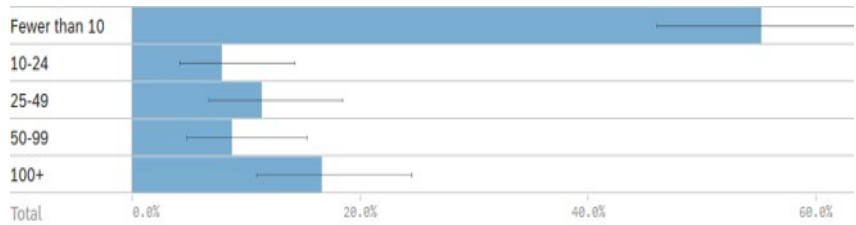


Figure 6. Employment trends as of June 29, 2020.

When asked how this compared to the number of employees prior to the COVID pandemic, 65.8 percent said it was the same, 26.3 percent said it was less and 7.9 percent hired more employees. As of June 29, 2020, most respondents were running one shift (71.1%), around 20 percent ran two shifts per day and less than 8.8 percent ran three. Prior to COVID, 78.9 percent of businesses said had the same number of shifts, 18.4 percent said they had fewer shifts and 2.6 percent had operated more shifts.

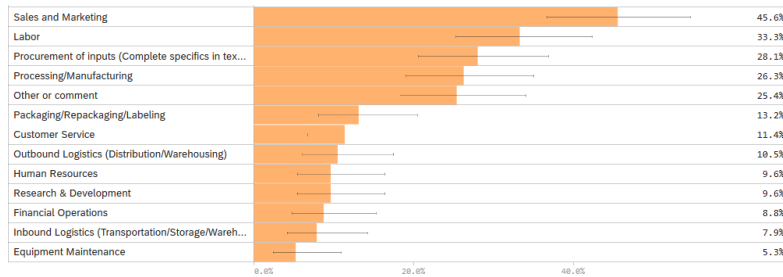


Figure 7. Impacted supply chain operations.

Figure 7 shows the most impacted supply chain operations during the pandemic. Respondents selected all impacted supply chains that applied. Reported as the most impacted were sales and marketing at 45.6 percent, followed closely by labor at 33.3 percent and procurement of inputs at 28.1 percent. Packaging was 13.2 percent and outbound logistics at 10.5

percent. Customer service and human resources were 11.4 percent and 10.5 percent, respectively. Less than 10 percent of respondents reported research and development, financial operations, inbound logistics and equipment maintenance impacts. Twenty-five percent chose the other option. These other supply chain disruptions were described as input delays due to supplier labor shortages, virus outbreaks, shutdowns or reduced shifts, physical distancing retrofitting, no or low stock, long shipping timelines, ingredient shortages and increased prices. Foodservice suppliers lost sales due to reduced demand based on shutdowns, e.g., business and school closures and fair and festival cancellations. Some businesses struggled with partnership arrangements, e.g., loss of use of facilities and the inability to get byproducts.

Regarding specific procurement inputs that were problematic, respondents identified shortages of Personal Protective Equipment (PPE) and cleaning supplies. Some supply chains completely shut down while others experienced delays. Many ingredients were unavailable when needed from both domestic and international suppliers, including whey and fats, flour, sugar, salt, spent grain, eggshell waste, quality produce, and beef and pork proteins. Some disruptions were due to the inability to quickly distance workers at their physical locations or when other companies in the supply chain experienced COVID outbreaks or could not open given the lack of available PPE and cleaning supplies. Shortages of packing labels occurred due to the massive shift in demand. Respondents reported hardware was difficult to procure given plant closures or downsizing, e.g., harnesses, technology products, machine parts and parts imported from China.

III. Minnesota and Ag Manufacturers and Processors Navigate the COVID Storm¹⁵

Manufacturers and processors appeared to be navigating a perfect storm in responding to supply chain disruptions during COVID. Respondents described difficulties they faced in navigating the environment. Businesses used proven leadership and effective management strategies to respond to the many factors impacting their supply chains. Companies struggled to retain employees given lucrative unemployment benefits and the fear of exposure to COVID. Likewise, some businesses felt the strain of low demand, while a few prospered. PPE and disinfectants were in short supply and available supplies were at inflated prices. Awareness programs and COVID state resources helped. Several respondents said federal financial programs were helpful. Creative and innovative ways to move products out the door were discovered in light of strained supply chains and inconsistent deliveries of inputs.

The key to survival was being flexible, adaptable, pivoting very quickly and forming new collaborations. Respondents used clear and frequent internal communications to adapt. To begin a strong recovery, respondents illustrated a need for the public to feel safe along with more grants or loans, employee confidence, new connections and markets, more locker plants, and regulatory and policy adjustments. While the future is uncertain, what is known is that it rides on restoring public confidence.

Navigating

Many respondents commented that business closures and restrictions added to the complexity of keeping supply chains stable. Several survey respondents commented on the challenges; for example one respondent said, “without understanding the true impact of this virus by policymakers, unintended devastating actions put an ill-proportionate burden on industry rather than the burden of this virus on the country's people.” Another respondent clarified by saying, “Shutdowns and restrictions are doing nothing positive for the business climate”, while another talked about the need to comply with varying state restrictions, which was time intensive. A respondent, saying, “we’re trying to deal with the fear generated by earlier models of extreme severity, though not realized, but effectively broadcast by mass and social media” underscored the difficult nature of the situation. Several businesses felt that workers and the general public needed to feel confident in their safety to resume activities. Yet other respondents stated the situation as being beneficial due to changes in consumer purchasing choices, while others were experiencing significant declines and closing their doors.

Thriving companies indicated they could not keep up with demand and anticipated the current trend will last over the next two years. Some companies were experiencing 25 to 30 percent increases in retail sales due to people not dining out and preparing meals at home. For a few respondents, overseas orders and shipments went surprisingly well and were generally on time. Smaller meat processors reported significant advanced bookings, an unprecedented situation. With contracts in place, these companies were having trouble recruiting and retaining employees. One respondent remarked that if the addition of a second shift was possible, they’d realize over a million dollars in new revenue, but they haven’t been able to recruit employees. Other respondents said that many employees have self-selected out of the workplace given high-risk health categories and others were reluctant to return to work, fearful of exposure to COVID. To counter the effects and retain employees, these companies were constantly communicating with government agencies and employees to reduce the fear of the unknown as much as possible.

Many other companies experienced a significant decline in demand, including those who depend on customer interactions, e.g., sales calls, networking and businesses who supply the foodservice sector. One

¹⁵ Opinions in this report are those of the survey respondents and may not reflect the views of the collaborating agencies.

respondent said they lost as much as 90 percent of their customer base with the closure of restaurants and the unintended consequences of lucrative unemployment benefits. Likewise, many businesses depend on one another’s prosperity as summarized by one respondent who said, “unless my main customer stays afloat, the revenue will continue to drop”. Companies trying to remain in business cut expenses, furloughed employees and hoped that enough resources would be available to ride out the situation. A respondent, representing a closed company offered that, “ultimately the biggest issue we encountered was not having the cash flow to continue paying bills and enough employees to weather the storm.” Another could not get vital imported ingredients, which ultimately resulted in closure.

Along with the challenges previously described, some respondents said that “literally everything else that was done in response to the pandemic hurt business”. Additionally, they were not able to get enough PPE, and cleaning supplies prices inflated significantly. Overwhelmingly, respondents said that “unemployment compensation did us lot of harm, we couldn't keep matching the \$600 per week unemployment benefit”. This level of compensation was a disincentive for people to return to work, greatly impeding the ability to get an adequate workforce. Businesses who were struggling tried several strategies with limited success, e.g., downsizing, shifting to faster transportation options or waiting for things to improve. Some processors and manufacturers wondered if the fall harvest would help shore up their businesses or if other supply chain dependent businesses would be able to weather the crisis, which could impact their ability to be resilient. While some respondents felt the supply-chain was fairly steady, they acknowledged many unknowns for the future.

Respondents reported several pain points. The pain points collectively represent respondents’ comments. The pain points included detrimental national and state decisions that resulted in market and sales losses, labor shortages, and bottlenecks. Companies had to make difficult decisions and navigate procuring enough PPE to open their doors. The inconsistent availability of safety items and product inputs furthered supply chain disruptions. Table 1, below, shows the pain points and subpoints.

Pain Points		
Barriers	Supply Chain Disruptions	
<ul style="list-style-type: none"> · National and State effects · Varying state criteria · Shutdowns · Short planning window for reopening · Fearful public · Unemployment higher than wages 	Labor Shortages <ul style="list-style-type: none"> · COVID exposure · Absenteeism 	Safety Lags <ul style="list-style-type: none"> · Lack of affordable PPE and cleaning supplies. · Lags in COVID testing
	Market/Sales Losses <ul style="list-style-type: none"> · Cancelled events · Overnight demand shift in foodservice needs 	Inconsistent Inputs <ul style="list-style-type: none"> · Limited, overpriced PPE · Limited inputs and packaging
	Bottlenecks <ul style="list-style-type: none"> · Meat plant shutdowns and backlogs · High demand in grocery outlets 	Difficult Business Decisions <ul style="list-style-type: none"> · Shifts: e-commerce, new products/markets, plant retrofits · Shutdowns, furloughs & closures

Table 1. Respondent’s pain points.

Responding

Producing goods and services is the work of Minnesota’s food and agriculture manufacturers and processors. The COVID pandemic brought production to a sudden halt for many. Some respondents remarked on the advantage of being an essential business with the ability to remain open, but disruptions still occurred as some of their suppliers or customers up or down their supply chains remained closed. Eventually, resuming business was helpful. Awareness programs and COVID state resources helped as did

federal financial programs. Businesses used proven leadership and effective management strategies. Employee safety and keeping the businesses COVID free became the top priority. Respondents discovered creative and innovative ways to move products out the door, even in light of strained supply chains and inconsistent deliveries of inputs.

Several respondents said that when businesses reopened, it helped to alleviate some pain points, as the business began to flow, and people in those sectors became more hopeful. Resuming ethanol operations was also helpful. With restaurant openings, the availability of sales began again, and some companies were able to regain some footing with an abundant supply of perishable goods, e.g., eggs, milk.

Many respondents said the national financial and state programs were helpful. Small Business Administration (SBA) loans added financial stability and saved some business, at least for the short term. The Paycheck Protection Program (PPP) helped offset wage expenses, maintain staff, ease sales losses, and marketing challenges. Minnesota's awareness programs about COVID were also helpful. Meanwhile, several companies reduced costs and in some cases employees. Labor cutting strategies included reducing hours worked while maintaining employee benefits, while still furloughing some positions.

In the crisis, many respondents used proven leadership and effective management strategies. One respondent said, "the crisis has been a laboratory for young management learning a holistic approach to crisis management". To get adequate supplies, several respondents purchased PPE or available packaging supplies in bulk. Offices in international markets procured PPE and shipped it to United States locations. Most respondents said that being able to work virtually helped maintain operations and accomplish critical work even though being onsite would have likely had better results. Others said that strong technology options to support both employees and clients were very beneficial. Several respondents believed it was important to adopt a crisis management mindset and a response plan that included daily clear communication, cross functional meetings, flexibility, adaptability, diversifying on the fly, creative substitutions and finding temporary labor. One respondent summarized their response by saying the times called for a "willingness to collaborate in new and unique ways with supply chain vendors and customers".

Respondents implemented several strategies to ensure worker safety and continuity of operations. This includes the establishment of safety programs, health screenings and guidance for employees for extra precautions. Although these strategies do not guarantee effectiveness, steps taken were in the right direction to understand and mitigate risk. Most respondents stepped up mitigation strategies, including PPE, to keep workers safe and implemented new protocols to eliminate close contact of employees. One plant safety program posted "KEEP COVID OUT" signs throughout the company to raise awareness about limiting virus spread. Several companies reported planning and preparation for employees testing positive for COVID while others advanced or extended vacation pay and provided a hotline to answer questions about testing guidance and returning to work safely. One respondent gained and communicated facts from governmental agencies and another company voluntarily suspended manufacturing for extra precaution.

Discovering new ways to promote and market products was a common approach. Companies with stranded ingredients adjusted product mixes, added new items and scouted out new sales channels while others turned to purposeful selling strategies. One company found creative customer product sampling strategies outside of traditional grocery stores while others relied on giveaways. Respondents also increased blogging, used social media extensively and distributed newsletters. Several respondents said the biggest positive change was filling the overwhelming demand for online sales for grocery items. Yet a small number of respondents said they did not change anything and have been navigating well given a strong first quarter

or large cash reserves and a great management team to control costs.

Innovative operational practices quickly became the norm. Several companies located other supply sources and broadened the base of suppliers to backfill missing items from main suppliers. One respondent used the Internet more frequently to solve supply chain issues. Bulk products had to be repackaged and alternative suppliers were used for packaging. In some cases, companies conducted forecasting meetings to cover a few weeks from a typical timeframe of a couple of months. In other cases, ordering was done months in advance of the needed supplies rather than weeks. With longer supply commitments, suppliers were able to appropriately staff. A couple of respondents temporarily produced selected supplies to alleviate the long lead times while some ordered in advance to plan for the delays. Other respondents said that scheduling helped, but shortages continued. Some simply persisted and worked harder and longer.

Shortages in the supply chain caused a ripple effect. Not knowing which ingredients would be available, food makers had to rely on their creativity by using available products. With some business recovering or closed, a lingering strain for specific food ingredients occurred along with the need for new suppliers. One respondent highlighted the dependency by saying, “not much could be done, short of starting your own mill”.

Adapting

Given the novelty of the COVID virus, respondents prepared daily for the fluidity of the crisis. They made greater efforts to communicate and work closely with suppliers. A primary strategy of several respondents was to focus one day at a time, communicate clearly to employees, conduct frequent meetings, coordinate with government agencies to gain factual information about COVID and set clear goals. Understanding the value of collaboration, businesses placed a greater focus on networking industry wide with the shared goal of selling goods and services.

The respondents adapted existing systems to keep products moving out the door. To accomplish this, one company planned longer lead times for supply orders, ordered in bulk, and risked carrying more inventory. Several companies brought selected operations in-house for tighter control. Examples included label printing, e-commerce management, and packaging. In one case, a makeshift plant was constructed as the incubation space closed. One company shifted to just in time delivery, shipping more complex finished products without the needed components to avoid creating bottlenecks even though there were efficiency losses and financial costs. In other cases, businesses encouraged early stocking to help mitigate risks of depleted supplies. Respondents worked on varying delivery channels. One example was a salesperson who innovated sales calls by mailing product samples in advance of a virtual meeting. With PPE nearly unavailable, one company found sanitizing ingredients and mixed them in spray bottles.

Most respondents talked about the key to survival in being flexible, adaptable, and pivoting very quickly. Several changed product mixes to fit existing stock packaging while others completely changed markets to stay afloat. One plant made physical adjustments to broaden their customer base to both the retail and the processing sector, which allowed a quick response for changing demand. Many used social media to drive more sales to websites and attract new businesses, including targeting local buyers. Others took advantage of pop up markets and moved to online ordering with curbside pickup. One respondent said, “I pivoted my blend of restaurants and onsite sales to e-commerce sales.” Consumer demand for finished goods led some respondents to bypass industrial customers and take advantage of the changing market, which caused shifts in the packaging and distribution of the finished product. Several companies began manufacturing hand sanitizer, and one developed cocktail kits to go.

Companies took losses to either lessen financial risks or keep products moving and visible to a discerning public. For example, one company sold and drove a load of product to Texas at a discounted rate. Another moved from customer sales to wholesale accounts and one began attending outdoor Farmers Markets for distribution. A company with a long product shelf-life ramped up production and stockpiled in anticipation of pent up demand, which proved effective.

New collaborations sprouted during the pandemic. Several respondents discussed how local and regional partnerships were crucial to filling supply, including regional food producers and product warehouses. Collaboration occurred from customers to material suppliers. For example, a church allowed a business to use its kitchen. Others collaborated for full pallet orders to improve local supply chain performance. To secure unique PPE items for a business, a customer who sold N95 masks arranged a special delivery of masks through their supplier. Community members made masks and distributed them to businesses. Collaboration with local health providers helped get early virus testing and identified asymptomatic workers. Other communities pooled raw materials to leverage buying with local cooperatives. A brewery used excess beer for whiskey production. Creating a new local supply chain, one business gathered inputs for baked goods sales. Others worked together to support food for the elderly and food banks. Several cheesemakers teamed up to make a Minnesota made Cheese Victory Box. Others shared space for harvest capacity. Some made private labels for local barbershops, churches and out of state restaurants. A mobile pantry opened, sourcing from over 75 local farms and selling in a 30-mile radius. One community initiated a capital campaign to build a local processing facility.

To ensure supply, businesses relied on relationships. To help keep long-term suppliers afloat who were struggling with receivables, some paid invoices every ten days. Others pre-paid suppliers. Partnering with local small businesses and developing a network of professional financial managers helped maintain information and deal flow. Yet, some businesses could not collaborate based on prior agreements and some were reluctant based on previously difficult partnerships.

Stabilizing: Resiliency needs

Minnesota's food and agriculture manufacturers and processors, first and foremost, reported a need for businesses and schools to be open and stay open to help bring a sense of safety and stability to the public. Increasing a sense of safety and regaining public confidence was a recurring sentiment of respondents. Expressing concern of business and supply chain continuity, one respondent said, "the early re-openings and public resistance to science and masks are just prolonging the problem." Several respondents stated the need for consistent national leadership and a coordinated plan to address the pandemic with less panic and more education to get the country back to full operations. Respondents agreed around the importance of a streamlined response across all states. When states have their own restrictions, companies that operate regionally and nationally must comply with up to 50 sets of standards, which is time consuming.

In Minnesota, the frustrations of reopening while balancing health and safety were a point of discussion. A couple of respondents felt reopening strategies did not take into consideration the planning time companies needed to procure adequate safety materials. Most respondents underscored the importance of opening all sectors, including education, and a consistent approach in allowing traditional large gatherings of people. For continued sales growth, one respondent said that "restaurants need to be open and stay open along with other grocery and meat markets". Another respondent offered an example, "two of our produce distributors have reduced the items they are purchasing from us by 60 percent, and our grocery customers are not ordering bulk items". While frustrations prevailed, so did the concern for keeping employees and the public safe.

In terms of resources, respondents needed money, employees, technical support, research and development, education and training. Several respondents said the PPP helped but more expansive, forgivable loan programs were necessary to retain key employees until the supply chain and its customers could find stable ground. One person suggested low bridge loans as a vital missing step. Other respondents needed more funding to help grow and expand their sales channels. Other financial needs included seed money, capital and special funding for small business on the front line of innovation. After the last round of unemployment benefits that were more attractive than working for some employees, several companies were in dire need of employees. While high school and college students temporarily filled gaps, their return to school and the forthcoming harvest season, resulted in new employee needs. Respondents reported a potential labor pool exists if people were not so fearful of being exposed to COVID. Some respondents said that having better and more rapid testing methods on site would be helpful along with affordable cleaning supplies, e.g., wipes, hand sanitizer, soap, gloves, masks and toilet paper, further stating, “these are serious issues for ongoing operations”. Capital is critical to retrofit air systems, spatial design and acquire more space to properly space employees. Processors requested assistance in redesigning slaughter floors for social distancing. Several respondents indicated a necessity for planning and action with regard to improving infrastructure resiliency, transportation and rural broadband. One respondent suggested improving infrastructure during a period of low interest rates as important to become more competitive.

Respondents echoed the need for new markets, given the required replacements of businesses that will not reopen. Increased trade and market opportunities or alternatives would be helpful. Smaller more localized food supply chains were viewed as necessary and local governmental support as critical. One respondent said that a “real need exists to investigate monopoly powers in milling, distribution and processing.” Some companies pivoted to online sales to survive while others required improved online systems and processes to ensure long-term resiliency. Additionally, businesses said local and regional food networks need strengthening. Respondents said that marketing assistance to keep local businesses on the public’s radar would be helpful, e.g., local Minnesota Makers publications, email blast reminders to shop local and buy direct from local food makers.

The meat processing gap has been widening in Minnesota for several years given few successors of small and medium sized meat lockers. During COVID, creative solutions were sought for butchers, including using the talents of local hunters and contracting with out of state locker plants. Some respondents noted that the limited number of small and medium sized locker plants needs expansion to have a resilient supply chain. In conjunction, training opportunities for locker plant operators is needed along with timely licensing and inspection capabilities.

In national policy, respondents noted that tariffs negatively impacted them as many of the parts and supplies come from China. Passing the additional cost to customers outprices the market, which impacts profit margins negatively. Key industries such as ethanol and biodiesel need assistance to broaden their product offerings. Several respondents indicated a need for regulatory relaxation, e.g., locker plant operations and production practices. Some respondents asked for reduced taxes and fewer restrictions on electronic filing. Yet others said that while the regulatory framework work was not too bad, Minnesota is still more restrictive in comparison to industries in bordering states, which impedes competitiveness.

Anticipating the Future

While the future is uncertain, what is known is that it rides on restoring public confidence. Respondents felt the public perception needs to be that COVID-19 is under control and decreasing for markets to get back to normal, which they believe will take two to three years. A step toward stability is keeping employees healthy, said one respondent. Another offered that getting people back to work is vital and ensuring

everything stays open, which depends on the greater economic impact for all of agriculture. Yet some respondents felt that it would take time for consumers to be in a public space given new customer purchasing habits. Some respondents believe the pandemic will have a permanent effect on how we live and conduct business, underscoring the rapid movement toward online ordering and virtual meetings, continuance of sanitization measures, employee health concerns, PPE, and labor pool considerations. Most respondents believe the COVID storm will permanently affect how we live and conduct business. With the varying elements that caused the disruptions and the experience of conducting business virtually, companies are more aware of gaps and more involved in their supply chain management.

Respondents expect a cumulative impact over time, with many saying a long and extended process toward recovery is imminent. Some believe there will be ongoing revenue disruptions as virus hot spots develop, causing delays in business investment decisions. The magnitude of the situation is jarring to those who can't quite conceptualize what is occurring. Many are hoping they will be able to remain in business. Concerns centered on increased operational costs with ongoing disease prevention protocols, e.g., prevention technologies, physical barriers, testing and retrofitting businesses. Others expressed thoughts on product demand, wondering if it will rebound to pre-COVID levels. As consumers change buying habits, some believe it will further depress product sales, underscoring that consumption won't likely go down, but it will be different. Yet others say it will depend on the availability of raw materials, ingredients and supplies. The foodservice sector's livelihood depends on when students return to school and people can begin to gather for big events. In the end, businesses understand the situation will unfold and they will need to adjust accordingly. Many respondents commented on responding well and managing their way through the crises, even as it continues. Should an issue like this arise once again, they feel well prepared.

Most respondents believe there will be a slow down with varying projections of when the economy will rebound. Overall, respondents felt demand will be low, sales will lag, losses will continue, and consolidations and closures will occur, causing a reduction in employment. Some expect to see a rebound from 2019 sales levels in two to six years. One respondent said that market indicators suggest that up to two-thirds of people will reduce bar and restaurant visits. Given the time at home, consumer behaviors are expected to change, therefore approximately a third of the market will rebound right away with a slow recovery for the remainder of 2020 and into 2021. Others expect to be operating at 40 to 60 percent of capacity this year and expect to stay there until a clear path to normalcy is apparent. Several businesses expect to recover when they can get a reasonable labor pool. With less demand for raw products ordered from farms, a couple of respondents said disruptions could last longer than one to two years. With a depressed market for grapes, wineries will experience a domino effect over the next one to two years. The livestock sector projects a slowdown, given the lack of profitability and loss of foodservice sales. Yet, some respondents are hopeful, feeling they will be back to normal within a year.

Some businesses are benefitting from the pandemic. Several respondents believe demand will increase as companies begin shipping direct to their customers but expect some lags and are ready for the roller coaster ride. Others expect explosive growth and will continue to grow and build their brand. Respondents projected that home food businesses would benefit. Others are banking on competitive advantage through exceeding customer expectations and offering high-end specialty products at a reasonable price point.

Selling goods and services online was a recurring strategy during the pandemic. One business said e-commerce accounted for 95 percent of its sales. Others offered that as more people eat at home and rely on online ordering, their business will benefit. Therefore, respondents reported a stronger sense of urgency to deploy e-commerce solutions. One respondent summarized by saying, "we are rapidly moving away from brick and mortar retailers to online and we can't move fast enough."

Proactivity was a key strategy for several respondents. Advice included taking the situation seriously and planning accordingly; respondents felt this was especially important for small companies with limited resources. To well position the state and its businesses, company leaders may want to keep an early watch on the changing conditions and be nimble enough to accommodate and exploit opportunities. One suggested tactic was to continue shifting to online sales. Other respondents will figure out profitability on fewer sales and purposefully reduce growth, consolidation or diversification. Another suggestion was to manufacture key critical items such as PPE in the United States. Other business strategies included safety measures such as a continued focus on spacing and mitigating further infections, including HACCP plans. Virtual meetings will be ongoing, which will also help to manage costs.

Respondents said they will have more focus and involvement in supply chain management and less reliance on how things used to operate. The just in time nature of the supply chain will need to have more redundancy or safety features built in to accommodate ebbs and flows of volume and unforeseen shutdowns. Additionally, employees need ongoing flexibility for their work hours to accommodate health risks and to navigate school or childcare closures.

IV. Implications

COVID hindered food and agriculture supply chains, but while disrupted they did not break. Companies used creative, innovative strategies to stabilize their businesses. Yet, respondents agree that resiliency needs to develop in supply chains to weather future scenarios. The disruptions exposed critical gaps that provide insight into how to support supply chain resiliency.

Resilient supply chains require collaboration, partnerships, and new breakthrough areas. Building a resilient supply chain requires collaboration. While companies can diversify and build flexibility and resiliency, the downside of vertical integration is that it's expensive, multi-focused and often reduces flexibility and may ultimately compromise resiliency.

Given the vital importance of the food and agricultural products and services, it is important to consider aspects of the supply chain, including supply chain connections and new innovations. Supply chain resiliency activities and outcomes need to pass through varying scenarios, including potential impacts from the farm sector to the consumer. Looking at this would be a significant step forward in understanding the resiliency factors on items such as supplier options, contracting, types of processing, shipping and marketing. This may assist in illustrating predictive effects when shocks hit the economy and in designing future policy interventions.

One major COVID disruption was the closure of meat processing plants due to the high volume processed at each location and the close geographic proximity of major processing plants in the United States. The disruption caused meat shortages and price increases while an abundant supply of livestock was available. Therefore, increasing the number of meat locker plants in Minnesota is worthy of exploration for a more resilient meat supply chain.

The effects of restaurant closures during the stay at home orders were unprecedented. The sudden decline stressed foodservice supply chains, impacting perishable markets, schools, farms and suppliers who once served a burgeoning restaurant and entertainment market. The foodservice supply chain needs to be detailed and potential markets identified for redirecting products during future disruptions.

More involvement in supply chain management is a necessity, as the processing and manufacturing community becomes less reliant on how things used to operate. Large companies may want to tap into the advantages of local supply chains. In terms of collaborations, companies will need to take quicker action when tapping small business and build trust. Likewise, food and beverage startup companies will want to fully understand how to raise equity rounds to enhance the continuity of operations.

With the pervasiveness of online ordering, virtual meetings and the need for flexible systems, technology infrastructure is vital. Businesses will explore digitizing their supply chain creating more need for electronic systems and cross communication among partners and collaborators while continuing to build in traceability and transparency.

Future policy must take into consideration the unintended consequences of programs, such as unemployment benefits where recipients received more money than if they were working. Employees are a vital component to the success of many businesses. This unintended effect impeded the food and agriculture manufacturer and processor sector.

Minnesota food and agriculture manufacturers and processors were asked to respond to a survey to understand the pain points and corresponding needs to strengthen resiliency in supply chains during the middle of the COVID crisis. Therefore, conducting focus groups to understand how respondents reimagine the future with resilient supply chains could be a valuable next step.

V. Summary

As the COVID storm rages, Minnesota's food and agriculture manufacturers and processors need resources and services to stabilize and form resilient supply chains. The pain points included detrimental national and state decisions that resulted in market and sales losses, labor shortages, and bottlenecks. Companies had to make difficult decisions and find enough PPE to re-open their doors. The inconsistent availability of safety items and product inputs furthered supply chain disruptions. Resuming business was helpful along with COVID awareness efforts and financial programs. Employee safety and keeping businesses COVID free became the top priority. Businesses discovered creative and innovative ways to move products out the door in light of strained supply chains and the inconsistent delivery of inputs.

The crisis revealed gaps that could lead to supportive assistance that include a sense of public safety along with more grants, loans, and capital, new connections and markets, additional locker plants and regulatory and policy adjustments. Capital, labor and a robust technology and infrastructure were big factors in accomplishing supply chain resiliency and economic stability. Supply chain connections, activities and outcomes need to be detailed and scenarios analyzed. Minnesota needs more small and medium sized locker plants in rural areas. Policy and regulation adjustments, government assistance programs, and greater awareness of those programs are also needed.

The COVID storm impeded Minnesota's food and agriculture supply chains, and company leaders rose to the occasion by using creative, innovative strategies to stabilize their businesses and supply chains as much as possible, yet future assistance is welcomed and needed. Timely information from trusted sources and engaging new and existing networks may help us see the bigger picture to creative solutions. Further, placing importance on the power of a community to come together by building our collective strength may help reduce uncertainty. Minnesota food and ag businesses can rise together to proactively build more resilient supply chains.

References

- United States Department of Agriculture (USDA-ERS). 2020. *Livestock, Dairy, and Poultry Outlook*, LDP-M-311. Retrieved from United States Department of Agriculture: <https://www.ers.usda.gov/webdocs/outlooks/98463/ldp-m-311.pdf?v=745.6>
- Anderson, L. R. (1997). Information cascades in the laboratory. *American Economic Review*, 87, 847-862.
- Cal/AMP, A. V. 2020. The Cost and Impact of Food Spoilage and Supply Chain Visibility Solutions. Philadelphia, PA, United States. Retrieved from <https://fjwebinars.com/the-packer/95>
- Charlton, D., Coble, K., Davis, A., Dewey, A., Dorfman, J. H., Ellison, B., . . . Malone, T. 2020. CAST Releases New Commentary on "Economic Impacts of COVID-19 on Food and Agricultural Markets". *QTA*, 3. Retrieved from The Science Source for Food Agricultural, and Environmental Issues: <https://www.cast-science.org/cast-releases-new-commentary-on-economic-impacts-of-covid-19-on-food-and-agricultural-markets/>
- Close, K. G.F. 2020, July 6. *The Digital Path to Business Resilience*. Retrieved from Boston Consulting Group: https://www.bcg.com/publications/2020/digital-path-to-business-resilience?utm_medium=Email&utm_source=esp&utm_campaign=bcg_reading_list&utm_description=featured_insights&utm_topic=digital&utm_geo=global&utm_content=202007&utm_usertoken=84dd3d1547235c1c63b
- MinnWest. 2020. Partners in AG Innovation Conference. *Partners in AG Innovation: Education & Conversation Around Today's Critical Issues*. Willmar, MN, United States. Retrieved July 30, 2020, from <https://partnersinag.com/v2/page/WelcomePage>
- Smallman, S. 2015. Whom do You Trust? Doubt and Conspiracy Theories in the 2009 Influenza Pandemic. *Journal of International and Global Studies*, 6(2), 1-24.
- Yaffe-Bellany, D. A. 2020. *Dumped milk, smashed eggs, plowed vegetables: Food waste of the pandemic*. Retrieved August 30, 2020, from The New York Times: <https://www.nytimes.com/2020/04/11/business/coronavirus-destroying-food.html>