FRESH **THINKING**

CLIMATE CHANGE: MANAGING THE RISK IMPACT ON FOOD SUPPLY CHAINS

In an era where climate change has become a defining global challenge, its impact on food safety is increasingly being recognised as a critical area of concern. Extreme weather events such as heatwaves, droughts and floods are not only disrupting food production and supply chains but are also amplifying the risks associated with food safety. As these climate-related events become more frequent and severe, food manufacturers, retailers and suppliers must adopt new strategies to safeguard the quality and safety of their products.

In a recent webinar, industry experts from LRQA, Barilla and Loblaw discussed the emerging risks presented by climate change, the tools and strategies required to monitor these risks and how businesses are adapting their supply chains and supplier relationships to ensure continued compliance with food safety standards. Here, key takeaways from the webinar are captured, including insights from:

Kimberly Carey Coffin
Supply Chain Assurance Technical Director at LRQA

Patrick Pagliarani
Global Supplier Quality Director at Barilla

Andrew Clarke
Senior Director of Quality Assurance at Loblaw

Emerging food safety risks

Climate change has introduced a wide range of new risks to food safety, with extreme weather events standing out as a major disruptor. Kimberly Carey Coffin, Supply Chain Technical Director at LRQA, highlighted the dual nature of these risks: the direct impact on the production of food and the subsequent risks to food safety throughout the supply chain. She divided these risks into two principal categories—those associated with extreme heat and those related to wet conditions such as flooding.

"Extreme heat increases the prevalence of mycotoxins in grains and cereals," Coffin noted. Mycotoxins, which are toxic compounds produced by moulds, are more likely to proliferate in warmer climates, posing a significant threat to food safety. Crops such as grains, nuts and cereals are particularly susceptible to mycotoxin contamination, which can occur both in the field and during storage. As global temperatures rise, businesses that rely on these crops must take additional precautions to mitigate this risk.

Coffin also pointed out that extreme heat can exacerbate microbiological risks. Warmer temperatures create a more favourable environment for the growth and proliferation of pathogens like Salmonella and Campylobacter, which can thrive when products are subject to poor temperature control management in storage and distribution. This is especially concerning for temperature-sensitive foods, such as meat, seafood and chilled food to go, where even minor deviations in temperature control can lead to significant safety hazards.

Flooding, another consequence of climate change, brings its own set of risks. "Floods introduce soil-borne contaminants into water sources and agricultural land," Coffin explained. This can lead to contamination of crops with harmful bacteria or chemicals, compromising the safety of food products. Additionally, livestock can be exposed to elevated levels of microbial pathogens, which can then enter the food chain if pre-slaughter sanitation practices are not modified to address increased micro loads.

Andrew Clarke, Senior Director of Quality Assurance at Loblaw, expanded on these points by discussing the broader implications of climate change for food safety. He noted that the increasing variability in weather patterns is creating new breeding grounds for foodborne pathogens and parasites. "Foodborne pathogens are good at evolving," Clarke remarked, adding that changing environmental conditions allow these pathogens to spread more easily across regions and through water sources.

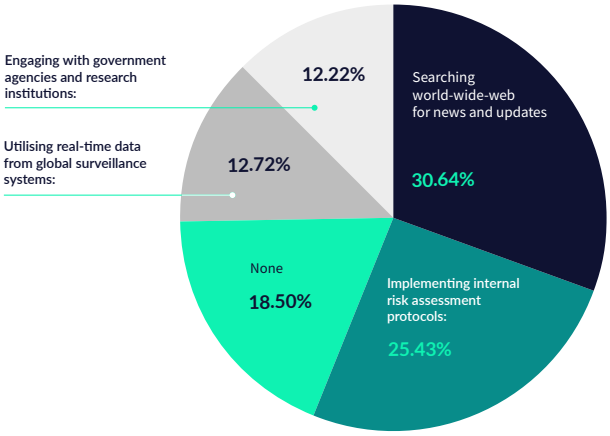
Clarke also raised a particularly concerning issue: the rise of algal blooms in warming oceans. Algal blooms, which are caused by increased sea temperatures, can lead to the proliferation of harmful pathogens such as Vibrio parahaemolyticus in seafood. This presents a serious risk to both seafood producers and consumers, as these pathogens are known to cause severe foodborne illness.

The melting of permafrost, another consequence of global warming, presents a more long-term but equally significant risk. As frozen soil thaws, it can release pathogens that have been dormant for thousands of years. Clarke warned that these once-frozen microorganisms could potentially re-enter ecosystems, introducing new and unknown risks to food safety. Equally concerning is the release of heavy metals, such as mercury, that happens as permafrost melts; these metals can accumulate in seafood, posing health risks to consumers.

During the webinar, the audience was presented with a poll asking how their organisations primarily monitor emerging food safety risks associated with climate change. The results revealed a diverse range of approaches.

The largest group of respondents **(30.64%)** indicated they rely on **searching the internet for news and updates**, while **12.72%** reported **using real-time data from global surveillance systems.** Reflecting on these results, Patrick Pagliarani, Global Supplier Quality Director at Barilla noted that both methods essentially serve the same purpose, with automated scanning offering a more streamlined and efficient approach. He also highlighted **the importance of internal risk assessment protocols, which 25.43%** of respondents reported implementing, although he acknowledged the complexities of conducting comprehensive risk assessments across global supply chains. Kimberly Coffin echoed this view, stressing the increasing necessity of real-time digital tools to help the industry manage emerging risks more effectively. Both panellists agreed that while **engaging with government agencies and research institutions, as 12.22%** of respondents indicated, is critical for long-term monitoring, businesses must increasingly adopt advanced technologies to stay ahead of the evolving food safety landscape.

How does your organisation primarily monitor emerging food safety risks associated with climate change?



Monitoring emerging risks in the supply chain

Given the rapidly changing nature of climate-related risks, monitoring the supply chain for emerging food safety threats is more important than ever. Traditional methods of risk assessment are no longer sufficient to keep pace with the evolving landscape. Instead, businesses must adopt new tools and technologies to gain real-time insights into potential hazards.

Patrick Pagliarani, Global Supplier Quality Director at Barilla, shared his company's approach to monitoring food safety risks in the supply chain. "We've implemented advanced scouting and monitoring tools that allow us to forecast potential risks," he explained. This includes real-time data alerts that provide insights into weather patterns, crop conditions and emerging contaminants. For Barilla, this system has proven invaluable in predicting mycotoxin contamination in cereal crops, allowing the company to take proactive steps to mitigate risks.

Pagliarani also emphasised the importance of partnerships in enhancing monitoring capabilities. "We've found that working closely with technology providers and integrating their solutions into our operations allows us to stay ahead of the curve," he said. By leveraging the expertise of external partners, Barilla has been able to enhance its predictive capabilities and respond more quickly to emerging risks.

Clarke echoed the importance of real-time monitoring, adding that Loblaw relies heavily on horizon scanning to anticipate risks across its global supply chain. "We're connected to a network of organisations, including government agencies and academic institutions, that help us stay informed about potential threats," Clarke explained. This approach allows Loblaw to not only monitor existing risks but also predict future ones, enabling the company to adjust its supply chain strategies accordingly.

In addition to horizon scanning, Loblaw also relies on its network of suppliers to provide early warnings about potential risks. Clarke pointed out that Loblaw's vendor development managers, who are geographically placed in different regions around the world, play a crucial role in identifying and addressing food safety risks before they escalate. "Our suppliers are our eyes and ears on the ground," Clarke said, highlighting the importance of strong relationships with suppliers in ensuring the safety and quality of food products.

The impact of climate change on sourcing and supply quality

One of the most significant challenges posed by climate change is its impact on the availability and quality of raw materials. As extreme weather events disrupt crop yields and reduce the availability of key ingredients, businesses must adapt by finding alternative sources of supply or reformulating products.

Clarke described the difficulties Loblaw faces in sourcing certain products due to climate change. He cited the recent shortage of oranges caused by poor harvests in Brazil as a prime example. "When you lose a major supplier like Brazil, which produces 70% of the world's orange juice concentrate, it has a cascading effect on the entire supply chain," Clarke explained. Not only does the shortage impact the availability of fresh oranges and orange juice, but it also affects the production of a wide range of products that use orange juice concentrate as an ingredient.

Coffin noted that manufacturers are increasingly exploring alternative sourcing strategies to mitigate the impact of climate-related disruptions. "We're seeing more companies diversifying their supplier base and looking for alternative ingredients that can meet the same quality standards," she said. This shift requires a robust risk assessment framework to ensure that new suppliers and ingredients do not introduce additional safety hazards.

In some cases, companies are turning to more innovative solutions to address the challenges posed by climate change. Clarke pointed out that Loblaw has started exploring vertical farming as a way to produce certain crops in a controlled environment, free from the risks associated with extreme weather. "By moving production indoors, we can mitigate many of the risks that climate change presents, such as droughts and floods," he explained.

Adapting supplier due diligence for climate change

As the food safety landscape evolves, so too must the processes businesses use to vet their suppliers. Climate change is forcing companies to rapidly onboard new suppliers, often in regions that are less familiar or more vulnerable to environmental risks. Ensuring that these suppliers meet the same rigorous standards for food safety and quality is a major challenge.

Pagliarani discussed how Barilla has adapted its supplier due diligence process to respond more quickly to climate-related disruptions. “We’ve had to streamline our audit processes to ensure that we can onboard new suppliers quickly without compromising on safety or quality,” he explained. In one instance, Barilla was able to complete an entire supplier audit, from initial assessment to final approval, in just one week—a process that would normally take much longer. The key to this speed was largely ensuring involvement of the right technical expertise from start to finish, enabling decisions to be made confidently, and quickly.

This ability to pivot quickly is essential in today’s volatile supply chain environment. However, Pagliarani stressed that speed must not come at the expense of thoroughness. “Even when we’re moving quickly, we maintain the same high standards for food safety and quality,” he said. This includes conducting on-site audits, reviewing supplier certifications and performing rigorous testing of raw materials.

Clarke noted that Loblaw has also made changes to its supplier due diligence program, placing a greater emphasis on behavioural assessments. “We’re not just looking at compliance anymore; we’re looking at how suppliers behave and how they manage risks,” he explained. This approach allows Loblaw to identify potential red flags early on and take corrective action before they become major issues.

One of the key lessons from the COVID-19 pandemic, according to Clarke, is the importance of flexibility in supplier relationships. During the pandemic, Loblaw had to rapidly onboard new suppliers to meet demand, often relying on virtual audits and remote assessments.

The pandemic taught us how to be more agile in our supplier management processes and we’re applying those lessons to the current climate change challenges.

Ensuring supply chain integrity amid climate change

The integrity of the global food supply chain is increasingly at risk due to climate change. As extreme weather events disrupt production, transportation and logistics, businesses must take proactive steps to ensure that their supply chains remain resilient and capable of delivering safe, high-quality food products.

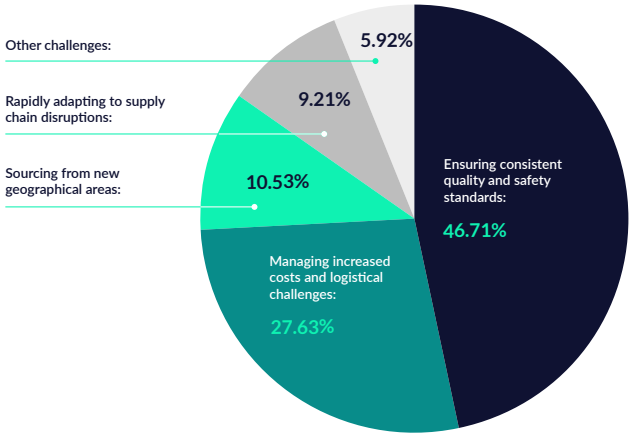
One of the biggest challenges, according to a poll conducted during the panel, **is ensuring consistent quality and safety standards across the supply chain.** Nearly half of the respondents **(47%)** identified this as their top concern.

Clarke noted that the complexity of today’s supply chains makes it difficult to maintain consistent standards, especially when sourcing from new regions.

To address this challenge, companies must invest in robust food safety management systems that can adapt to changing conditions. Clarke stressed the importance of continuously evaluating and updating HACCP plans and other food safety protocols. “Your food safety system should be a living document,” he said. “It needs to evolve as the risks evolve.”

Coffin added that businesses must also invest in data analytics to gain deeper insights into supply chain risks. By collecting and analysing data from audits, inspections and testing, companies can identify trends and patterns that may indicate emerging risks. “Data is a powerful tool for predicting where risks are likely to occur and taking action before they become major issues,” she explained.

What has been the biggest challenge for your business in maintaining supply chain integrity in the face of climate change?



The path forward

As climate change continues to reshape the global food supply chain, businesses must adopt new strategies to manage the associated risks. From implementing advanced monitoring tools to diversifying supplier networks, the food industry must remain agile and proactive in its approach to food safety.

The insights shared by the panellists in this discussion highlight the importance of collaboration, innovation and flexibility in navigating the challenges posed by climate change. As Coffin aptly put it, “We need to ensure that our change management processes are strong and effective, so we can adapt quickly to new risks.”

By investing in cutting-edge technologies, building strong partnerships and maintaining a commitment to continuous improvement, businesses can not only mitigate the risks posed by climate change but also ensure the continued supply of safe, high-quality food products to consumers around the world.

Audience Questions and Answers (Q&A)

At the conclusion of the webinar, the audience was invited to submit questions for the panellists. Below are key highlights from the Q&A session, providing further insights into how climate change impacts food safety and supply chain management.

Question 1

In what ways do you foresee a need to adjust food safety programme requirements due to climate change?

Kimberly Coffin reiterated a point made earlier by Andrew Clarke, stating that food safety programmes should be seen as "living, breathing documents" that evolve alongside changing conditions. From a climate change perspective, she did not believe there was a need to create entirely new requirements, but instead emphasised the importance of incorporating climate-related risks—such as extreme weather events—into existing frameworks. "We need to ask ourselves, what are the biological, physical and chemical risks that might arise from these events?" she said. Coffin encouraged organisations to build these considerations into their supply chain risk assessments and food safety programmes.

Andrew Clarke echoed this sentiment, highlighting the necessity of understanding supply chains in their entirety. He stressed that different risks may be associated with different parts of a multi-source supply chain and that a multidisciplinary approach to developing food safety management plans is crucial. "Procurement or buyers may have a better understanding of the supply chain, while food safety specialists focus on hazards," Clarke explained, reinforcing the value of collaboration across teams to ensure all potential risks are accounted for.

Question 2

Meteorological changes already exist and are used, for example, for raw material purchasing and investments. How can this information be utilised to predict food safety risks associated with raw material sources?

Patrick Pagliarani confirmed that meteorological tools are already in use, particularly in sectors like wheat production. Initially developed to monitor crop output and inform decisions about treatments during the growing season, these tools are now being adapted to assess the health and safety of agricultural products. He noted that these systems help predict potential risks associated with crops, offering an additional layer of data for risk assessment processes. Kimberly Coffin added that meteorological data should be integrated into broader risk assessment frameworks. "This data can help us better understand potential threats and inform decisions about controlling risks," she explained. While it may not necessitate eliminating specific supply sources, it does call for closer collaboration with regions affected by these risks. Organisations must also determine what internal measures are needed to ensure the continued quality and safety of materials from vulnerable areas.

Question 3

How can innovations in agriculture and food production help mitigate the impact of climate change on food safety?

Patrick Pagliarani noted that innovation in agriculture often stems from necessity, particularly when raw materials become scarce. "When a product like cocoa becomes limited, companies are forced to look for alternatives," he explained. While this may not always be considered 'innovation' in the traditional sense, it does represent a significant shift in how products are formulated and produced. Additionally, innovations in agricultural practices, such as regenerative farming, are helping companies support growers in implementing more sustainable practices that can mitigate the impacts of climate change.

Kimberly Coffin expanded on this point by discussing the role of regenerative agriculture in improving both biodiversity and crop output. She highlighted how several companies are working closely with growers to verify the effectiveness of these practices. "There is a real interest in supporting agricultural communities to ensure the sustainability and safety of their products," Coffin said, underscoring the importance of collaboration in driving meaningful change.

Question 4

How should the food packaging industry consider risks related to climate change, beyond raw materials?

Andrew Clarke observed that innovation in packaging is already underway, with developments such as biodegradable materials and the use of seaweed in packaging solutions. However, he cautioned that reducing packaging must be done carefully, as it can affect the shelf life of products, leading to food waste. "We need to ensure that food has the intended shelf life and shortening it can increase wastage, which conflicts with the goal of producing more food for a growing population," Clarke explained. He also emphasised the importance of including packaging experts in food safety discussions to ensure packaging solutions align with safety and sustainability goals.

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