

# *Farm to Fridge:*

*The Movement of Protein  
Across an Increasingly  
Complex Global Supply Chain*



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# *Protein: The Original World Traveler*

Every plate of food has a story.

It may have been purchased from a supermarket or ordered off a menu, but where did it really come from? And how far has it journeyed to where it is now? To the idealistic consumer, the perceived food journey of “farm to table” and the realistic one of global travel are quite different. The truth is, protein is a commodity that’s traded all over the world, often exchanging hands many times before it ends up as the chicken dish at your dinner table.

**And not even a global pandemic is strong enough to break its cycle.**





## In the spring of 2020, as the COVID-19 pandemic reached a fever pitch, the world looked a lot different —

from restaurant closings and quarantined cooking to grocery shortages and factory illness outbreaks, creating far-reaching effects across the food industry and greater planet. But the weaknesses exposed in the supply chain have also prompted new innovations, greater global flexibility, and shifting consumer behaviors, setting us up for an uncharted, yet opportunistic future.

### In this report, we explore:

- The movement of proteins like **chicken, beef, pork, seafood**, and the relatively [new category of alternative protein](#) around the world
- How **proteins are traded** and **value is added** between source markets and destination markets
- The differences between the industry **before and after COVID-19**

With insights from protein system developers, processing innovators, and shipping experts, we'll explore the complex world of how meat ends up on the plate in front of you — and the opportunities ahead for processors willing to pioneer the new future of protein.





# *Protein Before Pandemic*

Global food trade has always been highly regulated. From political barriers to complex tariff codes, the protein supply chain must work around rigid specifications of not only regulatory compliance but customer preference and satisfaction.

Even before COVID-19, the protein market faced regular challenges and rapid shifts due to:

- price fluctuations
- trade barriers
- animal-borne illness (most notably African swine fever, avian flu, and Mad Cow Disease of the early 2000s).

More recently, however, new factors have arisen, including sustainable sourcing, labor concerns, changes in consumer diets, and technological advancements in shipping and processing.

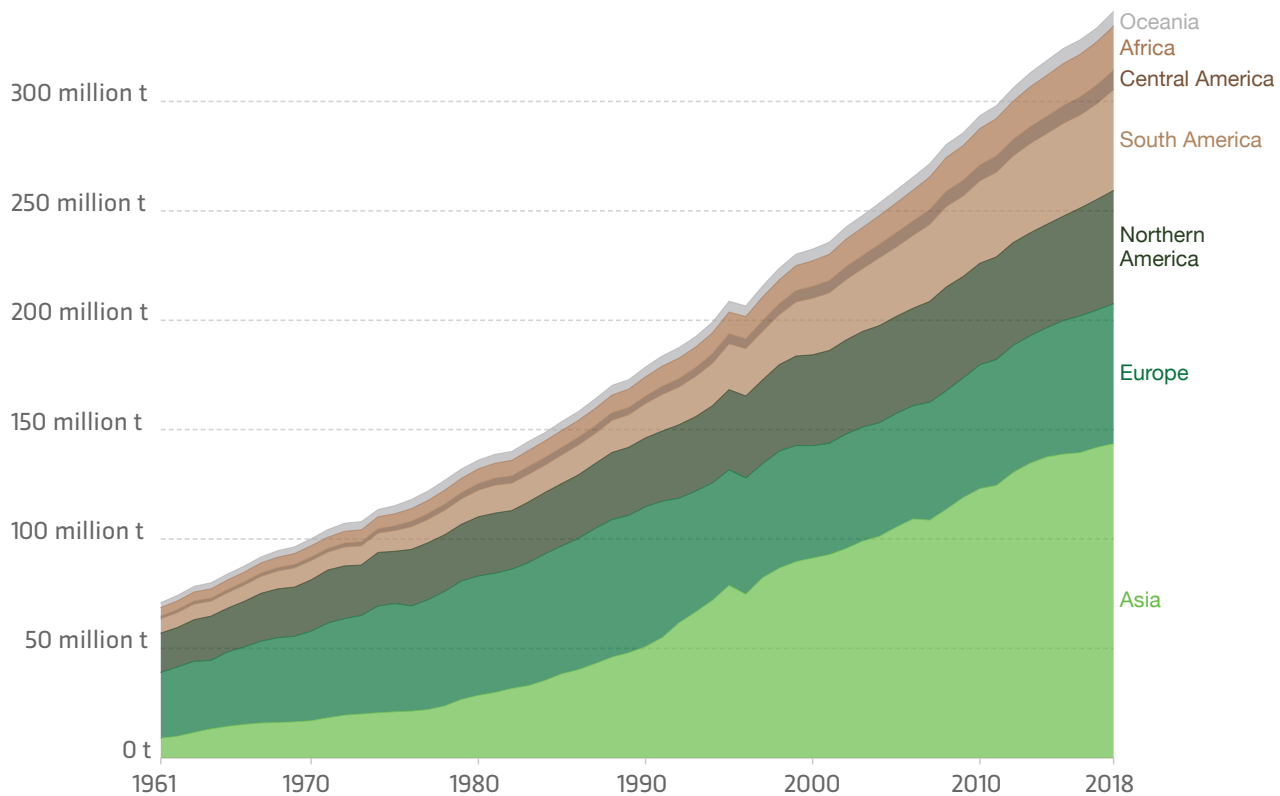




With these considerations in mind, protein industry professionals were preparing for a 2020 filled with more innovations in alternative proteins, as well as a number of new product development projects. But with the onset of the coronavirus pandemic, these projects were put on hold — and may still be for the next year or two.

Now, protein suppliers, processors, and customers must shift their sights toward navigating the “new normal” of a COVID-conscious population who still favor the highest quality, best price, and greatest accessibility possible.

*The world now produces more than 320 million tons of meat each year.*



Source: UN Food and Agriculture Organization (FAO)

OurWorldInData.org/meat-production • CC BY



# *COVID-19 Exposes Deep-Seated Weaknesses in the Supply Chain*

In early 2020, the COVID-19 pandemic swept the world, starting in Asia and eventually making its way across Europe and North America.

But human health was not the only thing it impacted. As public places closed and people quarantined inside their homes, foodservice took a major hit, passing the baton instead to the retail industry, whose sales soared across protein and essential goods. Yet, meeting that demand was no easy feat, especially as the spread of COVID-19 brought with it unforeseen challenges in the supply chain.





## Labor Dependency

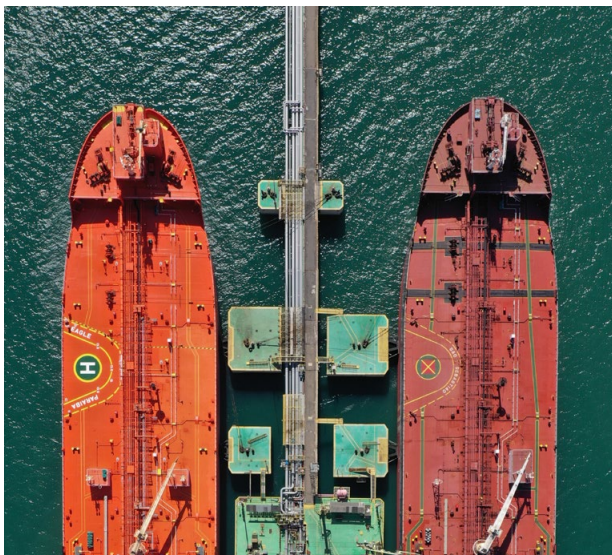
Protein processing has long been a labor-intensive process. When meat packing plants around the world began to shut down as a result of rampant COVID-19 cases, it exposed the urgency for increased focus on employee health and safety, as well as the need for more machinery, technology, and automation in meat processing.

### WHY MEAT PROCESSING PLANTS?

Source - [BBC NEWS](#)

Because COVID-19 is transferred through droplets, meat packing plants are uniquely positioned for rampant spread due to:

- Close quarters between employees on a line
- Heavy machinery, resulting in the need to shout and project droplets
- Cold, wet environments, which are favorable for the virus to linger
- On-site or nearby dormitories, where employees gather



## Shipping Delays

When China shut down, hundreds of thousands of tons of meat sat on boats as a result of COVID-19 testing at the border and low man power to intake the supply. But predestined shipments cannot simply be rerouted to customers in other destinations, as many products are bespoke and tailored to meet customer-specific requirements. Plus, exported meats may be unwanted in other areas, as parts of the carcass primarily shipped to China (like chicken lungs, feet, or intestines) may not be desirable in other regions. Without proper refrigeration, much of the food spoiled. In addition, the low availability of shipping containers resulted in increased shipping lead times worldwide.



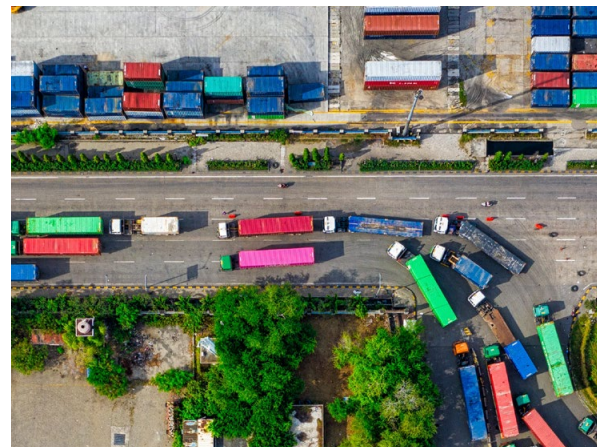


## Sourcing From China

North American and European protein processors source a number of raw materials from around the world. Many of these ingredients come from China, including commodity materials like garlic powder and other spices typically used in formulations. When Chinese production stopped, it created anxiety among processors to ensure they received their orders on time and in full. But it also allowed suppliers who have traditionally been commodity producers to try their hand at adding value for export. For example, shrimp suppliers in India and Indonesia began to increase their offerings for valued added export products, putting themselves on the map for new customers all over the world, including North America.

## Stockpiling

In the early days of COVID-19 quarantining, consumers were driven to stockpile supplies — not of value-added proteins and specialty items, but of primal meats and basic goods. To keep up with demand, many new product development projects and launches were halted and still haven't resumed. With foodservice completely shut down for months and restaurants just now starting to reopen, many products that would've been sold during that time are still waiting to be used and may not be needed until as late as 2022.



## Delivery Preparedness

Meal kits have been a rising trend for the past several years in response to consumers' desire for fast and fresh, yet high-quality food. The same is true for food delivery, stemming from consumers' increasing online shopping habits and "have it now" culture. When COVID-19 sent people into quarantine, it amplified these habits, increasing reliance on food delivery and meal kits that eliminate the need for shopping. Yet, consumers still expect restaurant quality, requiring coating systems that can sustain freshness and crispness beyond food preparation to eventual delivery.

“Countries that might’ve previously been a commodity supplier are actually starting to do their own value adding for export. With China being shut down and the supply chain being disrupted...everyone’s getting more of a share of the pie.”



JONATHAN TOMLIN


Corporate Executive Chef, Global  
Culinary, Griffith Foods



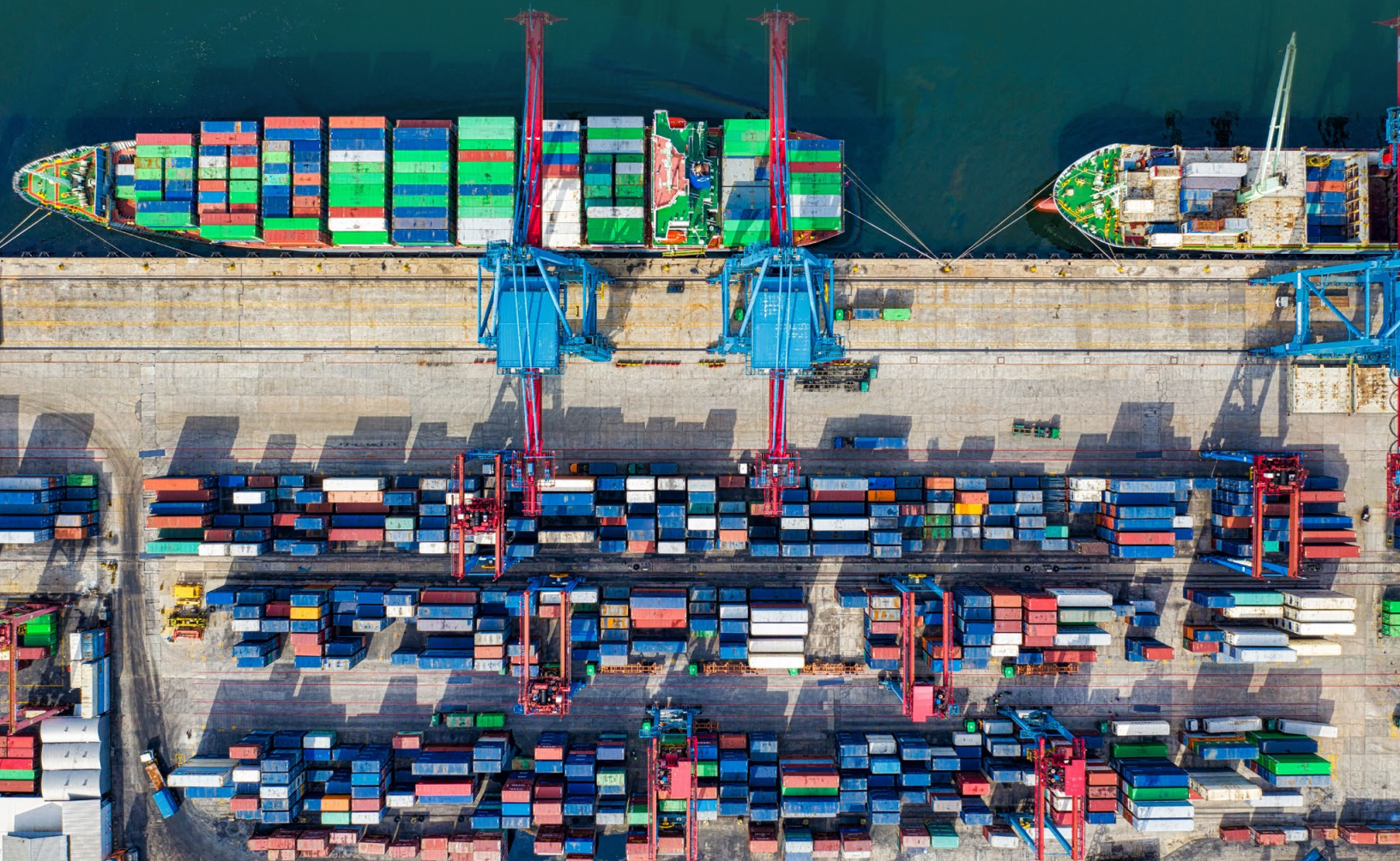
# *Meat Migration:*

## *How Different Proteins*

## *Move Around the World*



The global movement of protein is a highly complex, highly volatile process with its own rules, regulations, and industry best practices. Under the umbrella of each type of protein, those details become even more nuanced. Let's take a look at each of the four main protein staples (and the newer category of alternative protein), how they typically move around the planet, and what opportunities lie ahead for each category.





# Beef

## Expensive and Primal

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Beef is an expensive protein that's highest in demand in developed countries. Unlike chicken, seafood, and pork, beef is typically traded without value-added. This is because flavors and seasonings are usually added at the point of consumption, either at home or in a restaurant. Despite the emergence of recent trends toward alternative protein, beef consumption continues to rise. In fact, [cattle meat production](#) has more than doubled since 1961, increasing from 28 million tons per year to 68 million tons in 2018.

In spring 2020, the beef industry made headlines as shortages swept across the U.S. due to processing challenges and subsequent plant closures from laborers infected with COVID-19, resulting in production [losses of up to 25%](#). Because there is more leeway in cattle slaughter weights, however, beef producers have not had to suffer the same euthanization decisions facing hog and poultry producers. Though cattle are continuing to gain weight, they are slated to come to market later this year and into 2021.

## OPPORTUNITY

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There are large opportunities that exist with processing lesser known value cuts of beef into marinated, tenderized products that will resonate well in export markets. This includes flavor profiles consistent with products that are consumed in larger export markets like China.





# Poultry

## Cheap and Universal

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Chicken is a beloved protein worldwide. In the U.S. alone, it accounts for [more processed meat](#) than all other categories combined. It is also inexpensive to produce and lends well to value adding. And because different cultures favor different parts of the carcass (traditionally white meat in the U.S. and U.K. and dark meat in Latin and Asian nations), processors can fetch more revenue from the whole bird. But that may be changing as [younger generations](#) begin to favor more international cuisine.

Like beef and pork processing, poultry plants also saw many closures due to COVID-19 among workers. But unlike beef, poultry production faces crucial weight concerns, ultimately leading to millions of chickens being euthanized due to inability to process them for meat. This exposes the need for more automation and technological innovation in poultry processing, while prioritizing worker health and safety. The good news? Poultry demand will remain relatively stable as consumers pursue lower-priced animal protein in the face of economic hardships.

### OPPORTUNITY

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As global chicken preferences shift toward thighs and legs, poultry processors in the U.S. may begin keeping more dark meat instead of exporting it. In addition, technological advancements are necessary to automate more poultry processing, especially in markets that are emerging as major exporters. But with automation comes new protein challenges like managing quality and taste of mechanically separated chicken.



# Pork

## Valuable, yet Illness-Prone

[Pork is the most consumed meat](#) in the world accounting for 36% of intake. With so many varieties (from pork chops to ham steaks to bacon to sausage), it's easy to forget it all comes from the same animal. Plus, pork lends well to the value added sector and exporting to different countries with a number of flavor profiles. Flavor differences lie in pre-rigor versus post-rigor processing, which is crucial to the development of pork products.

The biggest challenge plaguing the pork industry is African swine fever (ASF), which kills almost 100% of the animals it infects. And despite being in existence for more than a century, there is still no vaccine. Swine deaths from the sickness total more than 100,000, and the number culled was already 5.4 million in the spring of 2020 (compared to 2019's 6.9 million total). In addition, the pork industry [suffered more losses](#) as a result of COVID-19 from temporary plant closures, worker absenteeism, and restaurant closures, causing hog values to plunge.

## OPPORTUNITY

When not facing pandemic, pork has a large opportunity to improve its import/export movement by cleaning up labels and managing its various restrictions. The U.S. faces some significant challenges due to the widespread use of ractopamine in pork production and the fact that 160 countries (including China, the largest consumers of pork) have banned the substance's use. This means that any U.S. plant producing pork for export to China must be ractopamine-free and either have a dedicated plant for handling this product or a rigorous segregation and sanitation process to prevent cross-contamination.



# Seafood

## Ready for Innovation

Trends in seafood production tend to follow price and cost of labor, especially as it relates to value-added products. In Asia, breeding is typically done by hand, a feat which cannot be accomplished in North America, tempting buyers to seek out where shrimp and labor are cheapest.


Luckily, seafood plants didn't experience the same COVID-19 detriment as other protein producers, as laborers in seafood production facilities tend to be more spread out. However, when China shut down, it greatly impacted seafood import hubs like the U.S. who receive 85-90% of their share from other countries. However, innovation in the seafood industry has been on the rise since the pandemic, perhaps prompted by faltering confidence in traditional proteins that have recently fallen to outbreaks and labor issues. Despite being traditionally conservative and not lending well to innovation (e.g. canned tuna is a commodity that has been steadily falling over the past decade and leaves little room for creativity), the value added seafood industry is taking advantage of these global changes by showcasing new developments, even more so than before the pandemic.

"I believe the pandemic (at least for value-added seafood suppliers) actually drove innovation as company's took advantage of having consumers' attention. Given negative publicity around traditional proteins or a need to "mix it up"...consumers were driven to seafood and alternative proteins."

NICOLE HOULE

Account Director, Griffith Foods

“The biggest weakness of the protein supply chain due to the pandemic is the labor-intensive process that is the harvesting of animals. I fully expect we will see more advancements in technology to facilitate mechanical harvesting of protein.”



-MICHAEL SNODGRASS

VP, Global Business Development,  
Griffith Foods



# Alternative Protein

## New and Emerging

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As a newer segment, the alternative protein sector is also small — but growing. New projects and plant-based start-ups continue to emerge and move between markets with very few trade barriers. Plus, the industry is starting to see more plant-based seafood options (like alternative tuna, crab, and salmon) instead of just replication of traditional meats like beef and chicken. The complexity comes in labeling, as alternative proteins come from a variety of bases (e.g. soy, fungi, pea, etc.), corresponding to a number of different tariff codes.

In the midst of protein shortages, animal illness, and labor constraints due to COVID-19, alternative protein caused consumers to take a closer look at the emerging market as a viable option. In fact, Nielsen reported that sales of alternative meat products in grocery stores [went up a whopping 264%](#) after COVID-19 struck.

## OPPORTUNITY

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Opportunities abound for alternative protein, both in consumption and export. As animal protein processors continue rebounding from the losses of 2020, now is the perfect time to capitalize on consumers' shifted attention toward plant-based meat. The market is ripe for the picking abroad, too. In spring 2020, [Starbucks China launched](#) three new Beyond Meat products as part of a push for greater sustainability. The key is in replicating unique processing capabilities that may not be present in certain markets, which may require strategic sourcing. The more the industry can enable movement, the more opportunities exist.

“As animal protein processors continue rebounding from the losses of 2020, now is the perfect time to capitalize on consumers’ shifted attention toward plant-based meat.”

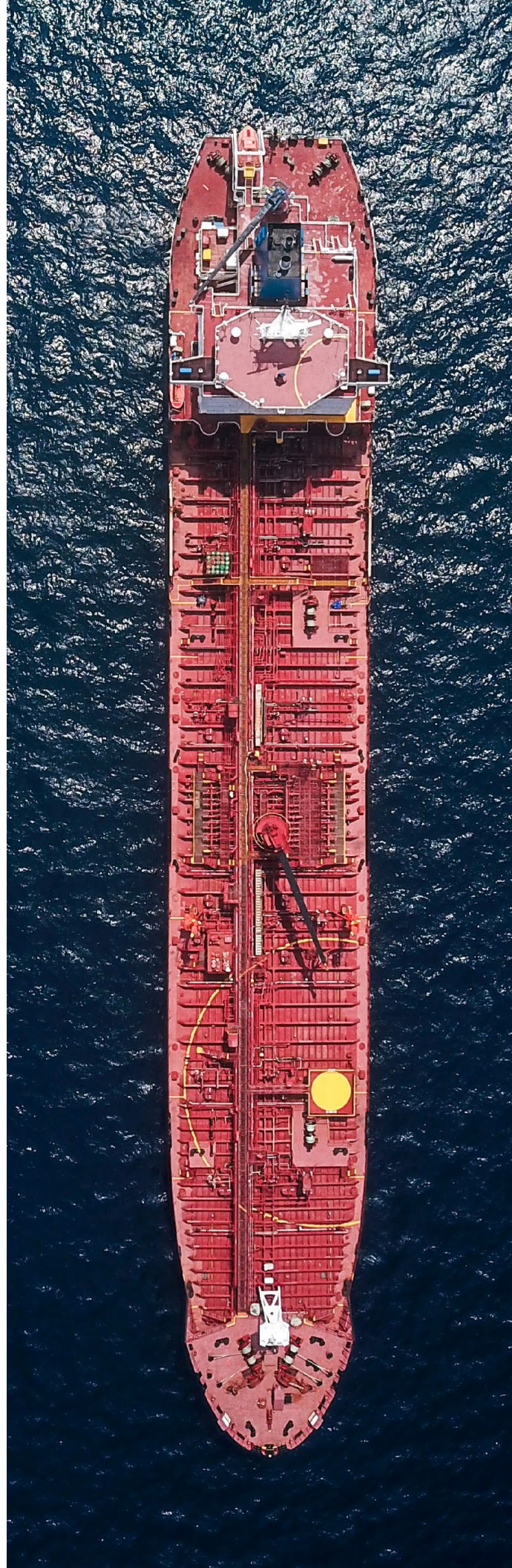




# *Pivoting Toward a “New Normal” of Protein Processing*

There's no doubt the protein industry (and the world) will look different as we emerge from the effects of COVID-19.

The pandemic has brought major setbacks, but out of the destruction also comes new innovation and trends for a more efficient supply chain.



## TREND 1

## *Greater simplification and flexibility of the supply chain.*

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COVID-19 has exposed the need for greater agility and options in importing and exporting, as complex and lengthy supply chains do not allow for quick reaction to market movement, which is an industry norm. With large hubs like China shut down, traders were left at a standstill, resulting in lost revenue and wasted product. The silver lining? Food industry customers are more willing than ever to explore new options for sourcing ingredients and moving products around the world.



For the supply chain to be stronger going forward, it must be easier to produce value-added products with:

- Nimble, reliable ingredient sourcing
- The ability to process in the source country if possible
- Making raw materials (with destination country flavor profiles) available in source countries
- More reliable global food development partnerships

"We're seeing an acceleration in the willingness to move products around the world. It's better received now than before COVID. People have had to move product more actively than they have in the past, and they've realized it isn't as hard as they thought it was."

NEIL SWINYARD

Senior Director, MarketLink™,  
Griffith Foods



## TREND 2

## *Conscious, sustainable ingredient sourcing.*

As consumers continue to move toward healthier, more sustainably-minded diets, ingredient sourcing discussions have pivoted from taste-only considerations to ethical concerns.

While price is still a heavy motivator, many companies are beginning to avoid deals with producers lacking ethical practices, whether in animal treatment, environmental issues, or others.

At the same time, industry players and consumers alike are opening their eyes to source countries they may not have originally considered. For instance, Thailand is now one of the largest poultry producers in the world, adhering to some of the strictest global processing standards.



"I think consumers believe Thailand is still a developing country. But they've got some of the highest standards in the world when it comes to poultry production."

LEE BATH

Commercial Manager,  
MarketLink™, Griffith Foods

## TREND 3

## *Delivery culture opens the doors for creative innovation*

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COVID-19 walloped the foodservice industry in early spring 2020 as restaurants were completely closed down, forcing consumers to either cook at home or order in. But as restaurants begin to reopen across the globe under new restrictions (i.e. masks required, digital menus, social distancing, etc.), what will the future of the foodservice sector look like?

Some believe the ability to eat fresher food at home has led consumers to reconsider dining out altogether. But as economies reopen and consumers begin to regain their finances, health, and sense of security, others believe the restaurant industry will, in fact, rebound — albeit under new norms. Consumers will continue to utilize food delivery, but with a greater emphasis on food quality, foodservice companies will also expect more from processors. This may include better breadings that retain crispness throughout delivery, an even greater prevalence of meal kits and time-constrained meal prep options, and even [blockchain networking](#) for greater visibility and transparency across the supply chain.





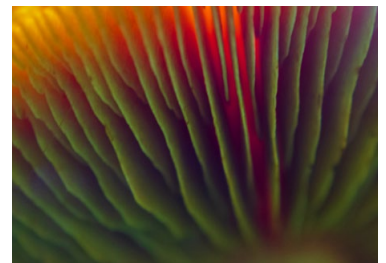
## TREND 4

## *Increased dependence on new proteins.*

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The Food and Agriculture Division of the United Nations has predicted since 2012 that world meat production will need to double by 2050 in order to keep up with a population that will reach 10 billion by the same year. But current protein processing sources and methods are not nearly adequate to deliver that demand.

Thus, the protein industry will not only need to continue innovating on meat production methods, but continue developing a variety of protein sources to feed the population. And with concerns ranging from meat shortages to ethical production to healthy eating trends, many predict we'll see more alternative protein globally, as well as seafood in places like the U.S. where there is not currently a major market.



"The fact that we're so reliant on other countries for our nation's food, with products getting stuck at borders and increased testing, etc., has opened many people's eyes and may bring about some change, but it will be slow."

NICOLE HOULE

Account Director, Griffith Foods





*Repairing  
the Global  
Supply Chain  
with Reliable  
Partnerships*



## The global protein industry continues to reassure us of one thing: change is inevitable.


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An ever-fluctuating market, global protein trade will become increasingly complex as new regulations are enacted, consumer behaviors change, and new waves of illness arise.

**Processors who successfully navigate the supply chain will be those who:**

1. Remain flexible in sourcing ingredients and exploring new avenues (e.g. alternative protein)
2. Innovate to solve the biggest issues facing the industry, including labor-intense processing and inefficient shipping
3. Look to consumer and market trends to proactively address changing demand

*Most of all, processors must be able to move nimbly, decreasing the number of players and roadblocks involved by trusting in partners who make the world smaller with a reliable network of associates across every facet of the industry.*



# MarketLink™: Globally Local

The supply chain is undeniably complex, especially for companies who wish to process in one country and sell in another. But the right partner can make all the difference. Our secret ingredient? Collaboration.

[MarketLink™](#) was designed to make customers' lives easier by providing access to deep market insights, regulatory expertise, and a powerful network of global partners. A program of Griffith Foods, MarketLink™ is designed to better link markets around the world with more agile supply chain practices that ensure customers can move production nimbly throughout the globe — without worrying about regulatory concerns or taste disparity when developing offshore.

The MarketLink™ sampling process is rapid. By working on the development in the destination country, Griffith Foods eliminates unnecessary exporting and air shipments which help preserve sample integrity, reduce costs, and minimize the overall carbon footprint. The approved formula is then sent to the source country for processing and production, maintaining the intended flavor profiles and increasing production efficiency by eliminating time zone challenges and cultural/language barriers.

With a global presence in more than 30 countries, MarketLink™ provides the opportunity to change how people everywhere experience food.

“Griffith Foods is one of the best partnerships Thai Union has ever had. Wherever I go, Griffith is right there with me. Our partnership shows the end customer that we have the best companies in the world working together to make the best products.”

SCOTT SOLAR

Thai Union



# Griffith Foods is the Preferred Partner for Protein Product Development

With over a century of food industry expertise, Griffith Foods is the ideal partner, offering deep product development knowledge, global insight, and purpose-driven support for your next endeavor.

We are far more than a supplier —  
we're your partner, providing you with:



## Collaboration

Your goals are our goals, and we won't stop until they're achieved. No matter your challenge, we're there at every step of the journey to help you succeed.



## Insights

We're on the front lines of the industry, regularly conducting testing and cultivating data and consumer insights you can actually use.



## Speed

We understand that when it comes to meeting the demands of your customers, there's no time to waste. Our size and global presence allow us to nimbly deliver as your needs and processes change.



## Purchasing and regulatory expertise

Our global reach means we can help you make the best purchasing decisions, sourcing the most sustainable, high-quality ingredients from suppliers around the world. And with locations on four continents, we have the expertise to help you meet the regulatory, labeling, and compliance nuances of various markets — without halting your progress.





Creating Better Together <sup>TM</sup>

Join us as we help pioneer the next generation of  
culinary innovation at [griffithfoods.com](http://griffithfoods.com)

