



Global Impacts of the COVID-19 pandemic on the Seafood Industry





About Future of Fish

Future of Fish is an international non-profit that supports small-scale fisheries and communities impacted by overfishing to build sustainable livelihoods while also protecting fish, a critical source of protein for billions of people worldwide. www.futureoffish.org

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Disclaimer

The following report relied on a combination of literature reviews, in-depth expert interviews, and original data analyses. We thank Dr. Easton White for analyses of Global Fishing Watch data and Google Search Trends data and contributions to interpretations of this work. We validated our pattern-finding analyses using the literature and interview content as cross-references. Fishery systems are dynamic in nature, and subject to rapid and sudden change; the COVID-19 pandemic has only accelerated this volatility. We present this work as a synthesis of current conditions, acknowledging that research content spans several months in time. Future of Fish welcomes feedback to improve the findings

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Introduction

PURPOSE

For nearly two years, local, regional, and global fisheries and seafood supply chains have been forced to adjust and adapt to the unprecedented conditions brought on by the COVID-19 global pandemic. Across the diverse landscape that makes up the global seafood sector, fishers, communities, industry, and governments have developed an array of strategies, innovations, and coping mechanisms to ensure survival—of their families, communities, and businesses. Some of these responses have been more successful than others; some worked well at the beginning of the crisis but are now perhaps no longer as effective. Within this dynamic and rapidly evolving frontier, both vulnerabilities and opportunities have emerged. This study seeks to synthesize the complex conditions and outcomes to date, and provide an overview of the current landscape of change. Within that landscape we explore which trends or patterns emerged simply as stop gaps in a moment of crisis, and which shifts are likely to last in the long-term.

The impacts of COVID-19 span economic, social, and environmental dimensions of the seafood sector, and continue to evolve depending on factors such as on-going government response strategies, vaccination rates, and emergence and spread of new virus variants. Given these dynamic conditions, this research does not attempt to be a comprehensive nor predictive exercise; rather, the objective is to provide a summary of major themes and analysis of how these patterns may stick (or not) depending on different existing drivers and enabling conditions in the system. The result is a snapshot of impacts and trends that appear common across a diverse range of geographies, fisheries, and supply chains, as well as where we see distinction.

Our goal is to provide the global seafood community with distilled insights in the hopes that such analysis will inform strategies and solutions that can help the sector emerge from this shock more resilient, equitable, and supportive of responsible and sustainable fisheries across the globe.

APPROACH

This research included a series of separate analyses that synthesized data from published material, as well as extensive interviews with stakeholders within the global seafood trade. (Please see Appendix 1 for details on approach and analyses). We also looked at changes in fishing activity and consumer trends in seven countries: Canada, Chile, Indonesia, Mexico, Peru, Spain, and the USA; selected for diversity of geography and importance as producers, markets, or both, for global wild capture seafood trade. Additionally, we examined industrial fishing activity using data from Global Fishing Watch (GFW) and expanded upon previous studies analyzing Google search trends in order to explore changes in consumer search behavior as a proxy for consumer behavioral shifts in response to COVID-19.¹

Content from publications and interviews were analyzed for common themes and trends across the

1. Easton R. White et al., "Early Effects of COVID-19 on US Fisheries and Seafood Consumption," *Fish and Fisheries* 22, no. 1 (January 2021): 232–39, <https://doi.org/10.1111/faf.12525>; Joshua S Stoll et al., "Alternative Seafood Networks during COVID-19: Implications for Resilience and Sustainability," *Frontiers in Sustainable Food Systems*, March 31, 2021, 26, <https://doi.org/10.3389/fsufs.2021.614368>.

global landscape, which were then compared with findings from the GFW and Google trends analyses. This was followed by a foresighting analysis to examine the different enabling conditions and drivers that most influence these trends to assess durability. We also looked at how strategies within trends aligned with concepts of resiliency,² and conclude with a reflection and synthesis of recommendations from the literature and expert interviews that highlight where resources and efforts can be best directed to “build back better.” All data was accessed or created, and analyzed, between January 1, 2021 and October 15, 2021.



2. David C. Love et al., “Emerging COVID-19 Impacts, Responses, and Lessons for Building Resilience in the Seafood System,” *Global Food Security* 28 (March 2021): 100494, <https://doi.org/10.1016/j.gfs.2021.100494>; Béné, “Resilience of Local Food Systems”; Stoll et al., “Alternative Seafood Networks during COVID-19.”

Initial Impacts and Responses: 2020

Just as the COVID-19 pandemic has revealed major weaknesses in healthcare systems around the world, so too, has it highlighted significant structural and functional challenges of status quo food and trade systems across local, regional, and global scales.³ Understanding these deficiencies is critical to mapping how the seafood industry can emerge as a more resilient, responsible, and sustainable sector for the future.

INITIAL SHOCK: GLOBAL IMPACTS BEYOND SEAFOOD

Aside from the direct impacts on the health of individuals, the initial effects of the pandemic on the global seafood industry relate to impacts of government restrictions on movement and trade.⁴ Confinement measures caused most of the hotels, restaurants, and catering (HORECA) sector to collapse, and had a domino-like impact: the initial crisis created by lockdowns and travel bans was then further exacerbated by waning numbers in the tourism sector, ongoing global supply chain disruptions, and lack of available employees.⁵ Other knock-on effects include rapid growth of digital tools and services, declines in non-essential business activities, and reduced monitoring, control, and surveillance capacity (for more details on the pandemic and its impacts on the seafood sector through 2020, please see Appendix 3).

These second-order cascading effects are far more diverse due to the highly variable nature of seafood supply chains and the differential response of governments to continued COVID-19 outbreaks and corresponding different perceptions of risk from fishers to consumers; however, several studies have captured patterns in the initial impacts and responses.⁶ This “second phase” continued through Q4 2020 and into Q1 2021 and reflect a mixture of coping or “reactive” responses to the continued shock of COVID-19, and emergence of some more strategic responses that incorporate learnings in an attempt to adapt to perceived new conditions and opportunities.

3. Theo Notteboom, Thanos Pallis, and Jean-Paul Rodrigue, “Disruptions and Resilience in Global Container Shipping and Ports: The COVID-19 Pandemic versus the 2008–2009 Financial Crisis,” *Maritime Economics & Logistics* 23, no. 2 (June 2021): 179–210, <https://doi.org/10.1057/s41278-020-00180-5>; Love et al., “Emerging COVID-19 Impacts”; Stoll et al., “Alternative Seafood Networks during COVID-19.”

4. Nathan J. Bennett et al., “The COVID-19 Pandemic, Small-Scale Fisheries and Coastal Fishing Communities,” *Coastal Management* 48, no. 4 (July 3, 2020): 336–47, <https://doi.org/10.1080/08920753.2020.1766937>; Béné, “Resilience of Local Food Systems.”

5. Miguel-Ángel García-Madurga, Miguel-Ángel Esteban-Navarro, and Tamara Morte-Nadal, “Covid-19 Key Figures and New Challenges in the Ho-ReCa Sector: The Way towards a New Supply-Chain,” *Sustainability* 13, no. 12 (June 18, 2021): 6884, <https://doi.org/10.3390/su13126884>.

6. Pattaratjit Kaewnuratchadasorn et al., “Capturing the Impacts of COVID-19 on the Fisheries Value Chain of Southeast Asia,” *Fish for the People* (Southeast Asian Fisheries Development Center, 2020), http://repository.seafdec.org/bitstream/handle/20.500.12066/6557/fisheries_value_chain.pdf?sequence=1; FAO, *Impact of COVID-19 on Fisheries and Aquaculture*; Bennett et al., “COVID-19 Pandemic”; White et al., “Early Effects of COVID-19”; Love et al., “Emerging COVID-19 Impacts”; Stoll et al., “Alternative Seafood Networks during COVID-19.”

Summary of Impacts Through 2020 by Supply Chain Node

Production

- Fishers continued to experience drops in landings revenue
- Fear of contamination deterred fishers from fishing
- Expansion into direct-to-consumer (D2C) sales gained momentum
- Increase in illegal fishing activities

Processing/Distribution

- Continued outbreaks in plants
- Processors reconfigure operations to accommodate social distancing and retail demands
- Launch of healthcare services for workers
- Product flows redirected to support food security
- Uncertainty in supply and demand
- Experimentation with direct-to-consumer platforms

Markets

- Increased volume and diversity of retail seafood sales
- Increased growth in online grocery shopping
- Retail growth in ready-to-eat and convenient seafood options
- Uncertainty with local public markets continued
- Restaurant closures continued
- Hotel business remained low
- Growth of home dining options
- Expansion of physical dining spaces

Consumers

- Growing interest in frozen and shelf-stable products
- The appeal of healthy and convenient options
- Desire for multiple and more “exotic” selection
- At global-scale, global demand for seafood is down with some exceptions

COVID-19 as Accelerator of Existing Trends

In addition to creating major direct disruptions, another way in which the pandemic has affected the seafood industry is by accelerating trends that were already underway.



Interest in traceability and transparency

Momentum for increased adoption and implementation of digital systems to support traceability was already on the rise within the seafood sector prior to COVID-19, as evidenced by growth in initiatives such as the Global Dialogue for Seafood Traceability (GDST) and the USAID Oceans program focused on eCDT. The significant rise of Environmental, Social, and Corporate Governance (ESG) initiatives within the investment world has also contributed to growing interest by the for-profit sector in improved data systems and greater transparency—investment into health, safety, and improved supply chain management are increasingly prioritized.⁷ Overall, the pandemic spurred seafood industry and government use of digital systems in response to a number of factors.



E-commerce and food delivery

In 2019, e-commerce for groceries was catching on, but still relatively niche compared with other sectors.⁸ Thanks to the pandemic, consumers quickly became very comfortable and in some cases, expectant, on having the convenience and safety of online grocery shopping. In addition to rapid growth of Click and Collect (online ordering with in-person pick-up), the pandemic also accelerated an already robust restaurant and food delivery service sector. According to statista, “Between 2019 and 2020, the coronavirus (COVID-19) pandemic led to unprecedented growth in off-premise food services.⁹ In total, restaurant food delivery increased by 47 percent globally, with the United States, Russia, and Canada increasing at 95 percent, 89 percent, and 69 percent, respectively.”

7. Georg Kell, “The Remarkable Rise Of ESG,” Forbes, July 11, 2018, <https://www.forbes.com/sites/georgkell/2018/07/11/the-remarkable-rise-of-esg/>.

8. Daniel Keyes, “The Online Grocery Report: Coronavirus Is Accelerating US Online Grocery Shopping Adoption—Here Are the Market Stats, Trends and Companies to Know,” Business Insider, February 3, 2021, <https://www.businessinsider.com/online-grocery-report-2020>.

9. S. Lock, “Restaurant Food Delivery Growth in Selected Countries Worldwide between 2019 and 2020,” Statista, June 1, 2021, <https://www.statista.com/statistics/1238889/restaurant-food-delivery-growth-in-selected-countries-worldwide/>.



Demand for ready-to-eat and packaged food

Prior to COVID-19, consumers around the world were already turning to packaged and ready-to-go products, driven by busy schedules and a desire for easy meals.¹⁰ Increasingly, consumers have been focused on convenience and healthy options, and packaged, high-quality seafood is seen as attractive.¹¹ A desire to have quick and safe choices during the pandemic, as well as increased online shopping helped to accelerate trends favoring boxed, bottled, and canned goods in general.

“The story started before COVID. For 5 years we’ve been talking about this: you have to do ready-to-cook and retail. Then after COVID happened, the factories that had followed that suggestion, they smile because business has increased.... The market trends were there for value added and ready-to-eat, but COVID made it faster.” –Seafood Processor, SE Asia region.



Remote work and training

The trend towards increased acceptance and reliance on remote working conditions and virtual trainings is not unique to seafood, and was well underway prior to 2019. However, COVID-19 vastly accelerated the trend, including within the seafood sector, with growth in remote work in 2020 projected to continue into 2021 and beyond.¹² There is increasing ability to remotely monitor and manage operations or administrative activities, and for sales teams, having representatives in different time zones can be a great benefit. Within fisheries, one of the key examples of the complexity of this trend can be seen in the on-going debate regarding the continued suspension of observer coverage. While it’s widely accepted that electronic monitoring technologies can help fill the gap, there will always be some need for human observers. Determining the ideal balance between remote and in-person assessments, however, remains a rather contentious issue—one that will likely remain situationally dependent on geography, funding, and technical viability.

10. Jason Brill, “Packaged Food Market Trends to Grow Because of Changes in Consumers’ Buying Behavior,” Quality Assurance & Food Safety, October 5, 2021, <https://www.qualityassurancemag.com/article/packaged-food-market-trends-to-grow-because-of-changes-in-consumers-behavior/>.

11. Fortune Business Insights, “Seafood Packaging Market Size, Share, Growth | Industry Report, 2027,” Industry Report, December 2020, <https://www.fortunebusinessinsights.com/seafood-packaging-market-103399>.

12. Caroline Castrillon, “This Is the Future Of Remote Work In 2021,” Forbes, December 27, 2020, <https://www.forbes.com/sites/carolinecastrillon/2021/12/27/this-is-the-future-of-remote-work-in-2021/>.

CURRENT LANDSCAPE:

COVID-19's Continued Presence in 2021

For some segments of the seafood industry, the beginning of 2021 was a time of optimism, as news about effective vaccinations spread and individuals and businesses began to consider a “post-COVID-19” world. Government restrictions on both international and national travel were eased, tourism began to resume, and even cruise ships began to leave the docks. However, gross inequities in access to the vaccines and continued differences in government approaches to containing the virus meant that waves of COVID-19 outbreaks continued to circulate around the world, exacerbated by the Delta variant—a highly contagious and more fatal strain of the COVID-19 virus.

At the time of writing, as we enter the fourth quarter of 2021, a look at the continued effects of COVID-19 on the seafood industry (and the world in general) paints a picture of complexity and contradictions. A few seafood-specific highlights from 2021 include:

- Seafood companies well-positioned to take advantage of the surge in retail and online sales, and respond to demand for frozen products, have continued to experience record-breaking sales;
- Due to on-going logistics disruptions, seafood prices are high and supply is low for many species, including blue swimming crab, lobster, and tuna; due to continued disruptions to tourism, public markets, and restaurant closures, many small scale fishers are struggling with low prices and lack of markets.
- Restaurants in the USA and EU started to bounce back during Q1 and Q2, but inflation, labor shortages, and the effects of the Delta variant have stymied this nascent recovery.¹³ Quick service restaurants, which have fared well during the pandemic, continued to make gains in 2021.¹⁴
- Many small scale seafood processors and sellers continue to struggle with uncertain access to products and markets.¹⁵
- E-commerce continues to drive expansion of seafood sales, including seafood-focused online delivery companies, meal kits, and take-out from restaurants.
- COVID-19 cases continue to cycle and spike around the world, including in major seafood producing countries, such as Indonesia and Vietnam.¹⁶

13. Christine Blank, “Food Costs Hurting Restaurants, but Darden Won’t Raise Prices,” Seafood Source, October 1, 2021, <https://www.seafoodsource.com/news/foodservice-retail/food-costs-hurting-restaurants-but-darden-won-t-raise-prices>.

14. Christine Blank, “Restaurant Sector Performance Strong, but Labor and Pricing Pressures Persist,” Seafood Source, August 26, 2021, <https://www.seafoodsource.com/news/foodservice-retail/restaurant-sector-performance-strong-but-labor-and-pricing-pressures-persist>.

15. Joelle Philippe, “One Year after Covid-19, CAOPA Women Speak Out,” Coalition for Fair Fisheries Arrangements, March 11, 2021, <https://www.cffacape.org/news-blog/one-year-after-covid-19-caopa-women-speak-out>.


16. James McGinnis, “Crab Meat Prices Rising amid COVID, Decline in Male Crab Population,” Bucks County Courier Times, July 20, 2021, <https://www.buckscountycouriertimes.com/story/news/2021/07/20/crab-meat-seafood-prices-rising-covid-male-crab-population-decline/8017952002/>.


SEAFOOD SECTOR PATTERNS AND TRENDS


The seafood industry continues to adapt to the conditions brought on by the COVID-19 pandemic. While ongoing shocks, such as the emergence of the delta variant, require stakeholders to continue to react and deploy coping strategies, evidence of adaptation that indicates longer-term strategic shifts have started to emerge. We identified four global trends, which manifest differently across fisheries and supply chains around the world. Seafood actors are implementing a variety of strategies within each trend, generating different kinds of outcomes. Thus, none of the trends are inherently “positive” or “negative”—instead, they show where momentum is building in the system and where there is potential to create opportunity. However, without effective design and process, there is also potential to generate harm, such as by exacerbating inequities, or providing new incentives for perverse behaviors.


While there are many exceptions, Table 1 shows which strategies within each trend are more or less common among different fishery and supply chain “archetypes.” The five fishery/supply chain archetypes are characterized by industrial or small-scale, commodity vs. differentiated (premium) product, and export vs. domestic/local end markets in order to reflect the diversity of wild capture fisheries and trade at a high level.

Table 1: Trends by Fishery Archetype. Common strategies implemented by seafood system actors across the four global trends and the fishery archetypes where they manifest most. The four archetypes are: Industrial Commodity (e.g. Whitefish, reduction fisheries); Large-scale Premium (Tuna, crab, mahi)—note, these fisheries may be caught by large artisanal vessels or industrial vessels; Small-Scale Premium (export: lobster, octopus; domestic food service: grouper); Small-scale: local consumption

Trend	Key Strategies	Industrial Commodity	Large-scale Premium	Small Scale Premium	Small Scale Local Consumption
 Diversification	New Product Forms and/or Types		Accommodating retail: frozen, individual portion sizes	Accommodating retail; shifting to cheaper species for local market	
	Adding new role in supply chain			D2C sales	Microprocessing
	More Sales Channels	Add retail, especially for frozen, value-add	Add retail, meal-kits, to food service	Add retail, meal-kits, to food service	
	Alternative or Supplemental Livelihoods				Fishers taking on part time work in other sectors

 Buffers	Social Capital	Multiple trading partners help pivot to retail	Relied on network to shift to retail and D2C		
	Access to Resource		Quotas helped fishers adjust when to fish	Multiple gear and licenses	Ability to switch species
	Financial reserves	Cash for increasing inventory			Community savings clubs
	Inventory	Multiple sourcing options			

Trend	Key Strategies	Industrial Commodity	Large-scale Premium	Small Scale Premium	Small Scale Local Consumption
Seafood Goes High Tech 	Electronic Reporting/ Traceability		EM and VMS adoption	Traceability tech	
	E-commerce and social media for sales	grocery store expansion of online shopping	online sales via shopify or other websites	Social media for sales: Facebook, Instagram, and WhatsApp; online marketplaces	Social media for sales: Facebook, Instagram, and WhatsApp
	Automation, food safety	Automation and increased health and safety protocols	Automation and increased health and safety protocols		
	Virtual Meetings and Networks	Conferences and webinars online	Virtual RFMOs	Innovación Azul-virtual platform to share knowledge	Virtual participation in trainings and management

Domestic market 	Online D2C with third-party logistics		Niche online stores with national-level delivery	Online sales via third-party marketplace (eg Mercato)	CSFs expanding online ordering
	Government programs- food banks, trainings	Government purchases and training	Training on marketing and branding	Training on D2C and quality	
	Hyperlocal D2C			Fishers joining CSFs	Door-to-Door delivery by fishers
	Take-out; meal kits		Online meal-kit companies; restaurant home delivery (ready-to-cook)	Online meal-kit companies; restaurant home delivery (ready-to-cook)	Restaurant home delivery

The following section explores these trends in more depth. For each trend, we note the enabling conditions supporting the response, as well as larger system drivers that may help to reinforce or scale the strategy, and how it manifests across supply chain nodes.



TREND 1:

Diversification as Long-Term Strategy

What It Is:

Diversification strategies are occurring throughout the seafood sector, and look different across geographies and supply chain nodes. From the creation of **new D2C channels, to expansion in species or product forms** to innovative **preparations designed for cooking at home**, the industry has identified and quickly embraced diversification as a core element of long-term strategic survival and growth.

“COVID helped us realize we should not have all our eggs in one basket.” –EU Seafood Distributor

What It Looks Like:

Production: Fishers are **growing their portfolio of species**, providing **primary processing**, **exploring non-fisheries related income streams**, exploring **direct sales**, especially via social media platforms, and taking on **supplemental livelihoods**. Examples include:

- **In Chile**, some fishers began micro-processing to offer value-add products that they could then sell to restaurants, vendors, or directly to consumers. Others began to pursue *additional*, non-fisheries related income streams, working in construction or providing other services such as cleaning or gardening.
- **In Indonesia**, Blue Swimming Crab (BSC) fishers used their gillnets to target other in-demand species in the domestic market, such as squid, shrimps, and mixed finfish species. Other fishers diversified into farming or jewelry making to further supplement their income.
- **In Mexico**, fishers diversified both in products sold and by creating a new door-to-door direct sales system. When possible, fishers switched to low-value products (mainly finfish), leaving the high-value products untouched (e.g. lobster and penshell).
- **In the Caribbean**, fishers are subscribing to online marketplaces such as FarmFinder and WiFetch to reach new customers and expand sales.
- **In Brazil**, distributors are working with fishers to train their wives and other community members to process the products to help communities retain more value.

“My hope to all fishermen is that we don’t depend on one profession. Let’s add professions, divide time, and open land to alternative jobs such as farming and gardening. So that if COVID-19 hits us again, worse than it is now, there will be someone to support us in the future.” –Abdul Kadir, traditional fisherman from the Ujung Tinggi Village, Simeulue Regency, Aceh Province, Indonesia¹⁷

17. Small-scale Fisheries Hub, “SSF Hub Presents.”

Processing/Distribution: mid-chain companies continue to **expand their sourcing options, embrace retail, online, and food service clients**, and explore **direct online-sales** channels through partnerships and direct delivery services. Many processors also expanded product form (e.g. moving from whole/fresh to filleted/frozen) and value-add services. At a global scale, there is evidence of **increased demand for frozen products** driven by rising retail demand, the desire to have more control over inventory, and greater acceptance by consumers and chefs that frozen is high-quality, and safe. Example of adaptations include:

- **In the USA, Indonesia, and the UK**, processors and distributors are diversifying their sourcing options in response to uncertainty in supply and high prices, with an eye towards sourcing domestically to reduce dependence on unreliable imports.
- **In Indonesia, the USA, and Mexico**, processing services have expanded to meet specifications around individual portion sizes, ready-to-eat formats, and greater interest in frozen and shelf-stable products.
- **In North America and the EU**, traditional distributors and online-only seafood membership companies are both expanding their species offerings and geographic reach, in part driven by improved packaging and logistics.
- **In Chile**, processors expanded the products they handled, branching out to work with alternative suppliers/goods, including chicken and vegetables.
- **In Peru**, processors (predominantly those focused on the domestic market) sustained the fixed costs of their companies during the most critical stage of the pandemic by shifting to D2C, although only a handful of companies have continued this shift over time.

Markets: Retailers and smaller seafood vendors are all stocking up on new **value-add, frozen, and ready-to-eat products** and expanding their **online offerings**. Restaurants continue to grow their **home delivery and take-out services**, especially through partnerships with third party logistics providers. Examples include:

- **In the US and Canada**, a competitive e-commerce environment is driving food retailers to leverage online stores as a way to offer new brands, flavors, and specialty foods through third-party providers.¹⁸
- **In Chile**, seafood vendors have moved from fresh to value-add and packaged goods and new websites allow for online shopping with home delivery services, such as Ferias Online.¹⁹
- **In Thailand**, small-scale fishers are diversifying their offerings to include fresh, frozen, and processed products, and expanding their role to provide this processing where needed.
- **In the US**, restaurants are demanding more portioned products and look to domestic fisheries to make up for shortages and high prices of imports.

“Originally most restaurants preferred 2-3 or 3-4 fillets and cutting own portions. We are seeing [in this city] large restaurants moving to pre-cut portions. Maybe because there are not enough staff in kitchen to spend time to cut their own portions. More expeditious this way.” –US Distributor

18. Jeff Wells, “Kroger Goes for Endless Aisles with New Marketplace Strategy,” Grocery Dive, August 11, 2020, <https://www.grocerydive.com/news/kroger-goes-for-endless-aisles-with-new-marketplace-strategy/583260/>.

19. “Ferias Online,” FeriasOnline.cl, accessed October 18, 2021, <https://www.feriasonline.cl/>.

“We try to turn the crisis into opportunities by taking some fresh seafood, processing some, and freezing the rest....We transform the catch into sun-dried fish, salted fish, and crayfish chili paste.”

–Fisherwoman, Mayuree Thammachat, from Tambon Mairoot, Trat Province, Thailand²⁰

What’s Needed?

Key enabling conditions for diversification include biological, market, and regulatory factors. First, **availability and accessibility of alternative or additional species** depends on the ecosystem as well as the capacity for fishers to use the same gear and obtain permissions (licenses, quota, access to new fishing areas). It also depends on novel species having a ready, or at least willing, market and mid-chain companies having equipment (especially cold chain and appropriate packaging) to process and transfer the product. Ease of diversification is thus highly context-dependent. In terms of processing and sales, **regulations around food safety and who is allowed to process or trade products** can seriously hamper or help producers and distributors to diversify. In countries or states where governments quickly lifted restrictions or expedited dealer-license applications,²¹ fishers were able to more effectively take advantage of these new market opportunities. For distributors and retailers, existing online infrastructure (website, access to IT support) was important for making the leap to adding online sales and marketing channels. For all seafood actors considering diversification, **access to financing is key**—allowing for purchasing of new gear types, processing equipment, or marketing resources needed to expand into these opportunities and develop new revenue lines.

What’s Driving This Trend?

- Consumer demand for online food delivery is still climbing. Consumer expectations for the following also specifically push for diversification:
 - Multiple options in terms of how to buy (in-store, online, pick-up)
 - Convenience (ready-to-eat, value-add, individual portions; frozen)
 - Healthy and locally sourced
- Ongoing struggles and uncertainty in food service industry
- Technological developments for packaging that preserve quality in the mail, and eco-friendly packaging
- Increasing momentum around Diversity, Equity, and Inclusiveness, with diversification (often processing) offering livelihoods for family and communities in small scale fisheries
- Improvement in third-party logistics

20. Small-scale Fisheries Hub, “SSF Hub Presents.”

21. Washington Sea Grant, “COVID-19 Resources for the Seafood Industry,” Washington Sea Grant (blog), December 10, 2020, <https://wsg.washington.edu/covid-19-resources-for-the-seafood-industry/>.



TREND 2:

Investment in “Buffers” to Build Resiliency

What It Is:

Individuals and companies that successfully pivoted their business models to survive during COVID-19 often were generally those who had cashflow and access to **financial resources, physical assets (such as equipment, inventory, quota), or strong networks and diverse partnerships**. Today, we see seafood actors building up these buffers as a learning and long-term strategic investment to build resilience to future shocks. In addition, credit restrictions, such as those happening due to the COVID-19 crisis, make working capital management and cash flow management a driving force behind SMEs performance.²² SMEs are better positioned for recovery through a combination of cash management, investments and productivity-enhancing tools.

“We are all looking to hold more inventory in supply chains down road.”
–Global seafood distributor

What It Looks Like:

Production: Fishers continue to **rely on strong social capital** and community networks for D2C and online sales, while taking advantage of **investments into quota, and multiple licenses** to determine when, what, and how much to fish. Building up **financial reserves** via robust cash-flow management and investment into business planning and formal and informal savings initiatives is also gaining traction.

- **In Mexico**, strong fisher associations with an existing client base and access to both credit programs and government aid provided fishers with resources, partnerships, and networks that were invaluable to facilitating D2C and other new market channels.
- **In the United States**, fishers, learning from lessons of COVID-19, are developing more risk mitigation strategies, including creating more robust business plans and investing in building out training programs for young fishers.

“Always known business planning would be a component 5-6 years ago, but because of pandemic, we’ve doubled down on training young fishers; more than catching fish, it is building a business plan, and one that can withstand global health pandemic.” –Fisher Association Leader, USA.

22. <https://www.sciencedirect.com/science/article/pii/S0308597X21001949>

- **In the Philippines and Honduras**, small scale fishing communities were able to draw upon funds from community savings clubs to positively respond to the initial shock and continue to adapt, showing the importance of this buffer for resiliency.²³
- **In South Africa**, local communities are recognizing the value of supporting MPAs, which restore marine wildlife, and can provide critical food and livelihood during shocks.²⁴
- **In southern Europe**, small-scale fishers continue to take advantage of having invested in multiple gear types and licenses to shift species to those most suited for local domestic consumption.

“The Portuguese, Spanish, and Greeks, on average, have 4-5 licenses...so they have hooks and line, nets, and pots and traps. So even if operate with one mostly, they have other ones and they are used to shifting during the year when season is not great.” –Small Scale Fisheries Expert, Europe

Processing/Distribution: For processors/distributors, business buffers included not only access to local community sales, but elements such as: **stock on hand, investment into certifications for health and safety protocols, and the financial and logistical capacity** to both find new clients and adopt updated health and safety measures. Many smaller companies that lacked access to these buffers did not survive the pandemic.

- **In North America**, a large existing stockpile of tuna helped one company effectively meet consumer demand without raising prices, leading to significant profits at the start of the pandemic. Other tuna companies that initially struggled to obtain sufficient amounts of shelf stable goods have already adjusted to carrying extra stock in order to stave off potential future disruptions.
- **In the Bahamas**, investment into top food safety certifications had set in place the expectations, protocols, and managerial oversight that made transition to COVID-19-safe conditions a much smaller and easier lift.
- **In Canada**, local processors were able to use their working capital to expand live lobster storage and cold storage capacity. This allowed them to absorb lobster product traditionally exported to China and redirect to fast food and other domestic market channels that remained viable.
- **In the Caribbean**, one seafood processor has invested in innovations to capture and produce biogas to help reduce waste and increase margins, creating more buffer against future shocks.

Markets: Many of the buffers in the retail sector are related to the overall growth in e-commerce, with **investment into microfulfillment centers (including automation) and omnichannel sales strategies** that build capacity to respond to consumer expectations around in-person and online shopping needs. Grocery stores are also **stocking up more and earlier on supplies**. This trend is less-well represented in the food service sector; one exception is investment in robots and automation to buffer labor shortages.

- **In the United States**, grocery stores are stockpiling supplies, including frozen seafood such as shrimp, in anticipation of continued shipping delays and supply shortages.²⁵

23. Gabriela Polo, “When Nets Catch More than Fish,” Medium.com, Behavior Change for Nature (blog), May 5, 2020, <https://medium.com/in-rare-form/when-nets-catch-more-than-fish-3dad9eeec4c>.

24. Tanya Waterworth, “Rich Marine Biodiversity Provides in a Pandemic,” July 3, 2021, <https://www.iol.co.za/ios/news/rich-marine-biodiversity-provides-in-a-pandemic-b3fa9fea-626d-492e-93f6-276ee6f704c4>.

25. Hannah Towey, “Grocery Stores Are Stockpiling Food and Cleaning Supplies amid Rising Costs and Demand,” Business Insider, July 8, 2021, <https://www.businessinsider.com/grocery-stores-stockpile-food-cleaning-supplies-rising-prices-demand-2021-7>.

- **In Chile**, a sustainable seafood restaurant relied on their strong community network and inventory of frozen fish and wine to create ready-to-cook meals for home consumption; this buffer helped them through the initial pandemic squeeze and inspired their long-term shift to home-delivery food preparations.
- **Across the globe**, there is increasing investment into automation in order to alleviate hard-to-find labor shortages, particularly among the processing, restaurant, and retail sectors.²⁶

What's Needed?

Key enabling conditions to create effective buffers include investment in financial, social, physical, and technological capital, as well as improving cash-management and related internal controls. **Having flexibility and available capacity with equipment, marketing and IT teams and infrastructure, and access to supplies**, either through cold storage or multiple sources (network), all require significant financial resources. For individuals or smaller companies in particular, **additional financial assistance** may be necessary to build up the spare capacity to support such investments. The lowest-cost buffer strategies are generating financial reserves via cash-flow management to weather the storm and investment in building and maintaining strong social and business networks, which can create new trade channels as well as increase sourcing options.

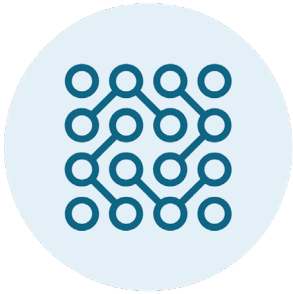
“Successful situations were where a company had very senior people in the marketing chair and they had the rolodex. They called their contacts. So having run a disciplined marketing operations in prior years was key.”
 –North American Seafood Consultant

What's Driving This Trend?

- Learning from past disruptions, such as natural disasters like hurricanes, that buffers are needed.
- Training and growing support from governments and financial inclusion programs in SMEs business continuity and effective cash flow management.
- Growth of savings clubs and Fair Trade as models that support fishing communities to build reserves.
- Growing interest in alternative seafood networks, which are made up of groups and individuals using currently under-utilized or nascent networks and distribution and delivery models to serve local and regional food systems.²⁷

26. Danielle Wiener-Bronner, “Dining out Is Back, as America Gets Vaccinated - CNN,” CNN, April 30, 2021, sec. CNN Business, <https://www.cnn.com/2021/04/30/business/opentable-restaurant-recovery/index.html>; Gary Scattergood, “Five Top Trends Set to Shape Asia’s Grocery Retail Sector in 2020,” [foodnavigator-asia.com](https://www.foodnavigator-asia.com/Article/2020/02/06/Five-top-trends-set-to-shape-Asia-s-grocery-retail-sector-in-2020), February 6, 2020, <https://www.foodnavigator-asia.com/Article/2020/02/06/Five-top-trends-set-to-shape-Asia-s-grocery-retail-sector-in-2020>.

27. Israel Ruiz-Salmón et al., “Thea Fishing and Seafood Sector in the Time of COVID-19: Considerations for Local and Global Opportunities and Responses,” *Current Opinion in Environmental Science & Health* 23 (October 1, 2021): 100286, <https://doi.org/10.1016/j.coesh.2021.100286>.



TREND 3:

Fisheries and Seafood Are Going High Tech

What it Is:

As traditional supply chains shut down and in-person activities and interactions became increasingly limited, the **already growing trend of leveraging technology** to improve management and consumer access to verifiably safe and traceable seafood surged. From an increased interest and need for onboard cameras and e-reporting to the use of online communication, purchasing, and payment platforms, **technological innovations and dependencies continue to develop and deploy rapidly.**

“Some of us invested in technology, and realized we can make as much or even more money by automating as much as we can--we’ll probably keep using this, you know, why would we...why go back?” –Chilean Processor

What It Looks Like:

Production: From electronic reporting platforms to online marketing to high-tech microprocessing, fishers are embracing technology to stay afloat, and in some cases, thrive.

- **In Chile and Mexico**, there has been an increase in the number of fishers using digital interfaces to submit data to the government. While this uptick is positive overall, the current lack of ability to verify any of the data entered due to continued restrictions and lack of sufficient enforcement agents will need to be addressed in the future.
- **In Barbados, Chile, and South Africa** use of online communication, marketing, and payment platforms for local D2C sales has driven large-scale adoption of technology among fishers and consumers.
- **In regions such as the Caribbean and the Indian ocean**, industry and management stakeholders are increasingly using online web-conferencing platforms such as Zoom to host meetings to discuss concerns and make management decisions, as well as deliver and receive trainings. For some fishers, this has increased access to information and improved ability to participate in management and business conversations.
- **Across the globe**, loss of in-person observers in valuable fisheries such as tuna has shown the vulnerability of this enforcement and monitoring approach both to industry and governments. Electronic monitoring (EM) systems are still being tested in terms of what aspects of observer programs this technology can adequately cover, but there is increased interest in having cameras on board to help to prevent complete loss of data during future disruptions in observer capacity.

Processing/Distribution: Growing consumer and government concerns around worker safety is driving innovations in multiple technologies such as GPS, AIS, eCDT, and AI to meet the need for more accurate information about worker contracts and conditions at sea. Technologies to improve **food safety and monitoring** have also jumped to the forefront especially in response to concerns around contamination on packaging and continued stringent inspection measures. Related to this are increased needs for **digital traceability systems** that can prove product pedigree, especially as logistical backlogs have increased reliance on third-party logistics providers, adding new partners that need to prove product quality and safety. Additionally, the increased **use of automation** in factories and **remote electronic monitoring and management** options to ensure worker satisfaction and safety is becoming increasingly common.

- **In Chile and Peru**, processors reported an uptick in the use of automation to decrease staff numbers and improve spacing to uphold social distancing in plants as part of ongoing health and safety efforts.
- **In regions such as North America**, innovations in high-tech packaging, including “active packaging” that can better handle the high water content of seafood products, are being driven by and reinforcing growth of online seafood sales.²⁸
- **Across the Globe**, technology providers are seeing increased interest and engagement among large, global seafood companies to deploy digital traceability technology. These clients are interested in obtaining information without having to be on the ground, especially to be able to continue audits and managerial oversight. Some have re-purposed their previous travel budgets to invest in these systems. There has also been an uptick in the application of DNA and mass spectrometry technologies for species identification, in an attempt to counteract rising levels of illegal substitution.

Markets: There has been precipitous growth in the use of **online grocery platforms**; a trend in place prior to COVID-19 that was rapidly accelerated by the pandemic. Demand for **home delivery or click-and-pick** has surged, and led to rapid increase in app use for both restaurant and retail sectors. This shift has created both new business models as well as a new customer base for many in the seafood industry.

- **In Indonesia**, the fishery online auction and marketplace platform, Aruna, saw revenue increase by 86 percent during 2020. They have since expanded their product offerings and partnerships, including relationships with e-commerce companies Tokopedia, Shopee, Bukalapak, and GrabMart and also launched a home delivery service, Seafood by Aruna, in 2020 to serve the domestic market.
- **In Asia**, it is predicted that online grocery platforms will lead global growth, reaching US \$295 billion by 2023 according to a recent study by IGD.²⁹
- **In Chile**, open air market vendors launched Ferias Online platform and began to deliver produce and seafood boxes to local communities.
- **In the US**, 76 percent of US consumers reported grocery shopping online for ease and convenience, versus 56 percent saying they do so to avoid the risk of COVID-19.³⁰ Over the past two years, Walmart³¹ was the most downloaded grocery app, followed by Target, Instacart, Sam’s Club, and Kroger.³² During the peak of the pandemic, online grocery sales increased between 20 - 30

28. Seafood Source Sponsored, Active Packaging for the Rising Ecommerce Demand, Webinar, 2021, <https://www.seafoodsource.com/webinars/active-packaging-for-the-rising-ecommerce-demand>.

29. Gary Scattergood, “Five Top Trends.”

30. Russell Redman, “Survey: Convenience Drives Online Grocery Shopping More than COVID,” Supermarket News, September 14, 2021, <https://www.supermarketnews.com/online-retail/survey-convenience-drives-online-grocery-shopping-more-covid>.

31. Catherine Douglas Moran, “Walmart Boosting Grocery with App Changes, New Partnership,” Grocery Dive, September 8, 2021, <https://www.grocerydive.com/news/walmart-boosting-grocery-with-app-changes-new-partnership/606245/>.

32. Katie Arcieri, “US Online Grocery Sales Growth Set to Reaccelerate as COVID-19 Concerns Grow,” S&P Global, August 24, 2021, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/us-online-grocery-sales-growth-set-to-reaccelerate-as-covid-19-concerns-grow-65856919>.

percent, although by the end of 2020, sales were at a steady 9 - 12 percent increase compared to pre-pandemic times.³³

- **In the Philippines**, USAID's Fish Right Program launched *Fish Tiangge*, an online marketplace that can connect 6,000 fisherfolks with buyers from more than 300,000 households.³⁴

What's Needed?

In order to support **sustainable and equitable growth** for actors across the supply chain, smaller companies in particular will need access to additional **investment capital** to effectively leverage the technology boom. In particular, there is an immediate need to **improve infrastructure** (including reliable electricity and internet connectivity) **and logistics, especially last mile delivery**. Access to **technical assistance and training in IT and marketing support** for many seafood SMEs (or individual entrepreneurs) is also foundational to ensure continued potential for market development and business growth.

"The government has helped financially. We want help with online promotion. In the fishing villages, we are not very good at such promotions. Our sales are limited to a small group of acquaintances. But we would like to expand this market and let more people see our products." - Fisherwoman, Mayuree Thammachat, from Tambon Mairoot, Trat Province, Thailand³⁵

Regarding management, enforcement, and food safety, electronic data systems, including verification mechanisms, need to be implemented and monitored to determine efficacy. This includes resources to support smart design and stakeholder engagement strategies, in addition to hardware and software installations, in order to support long-term adoption and effective application of data for management.

For additional information about this trend, please reference the Tensions section

What's Driving This Trend?

- Technology, and especially new "zoom culture" increasing engagement, including by fishers in policy and advocacy initiatives
- Consumer interest in product origin and safety, and thus need for traceability
- E-commerce boom
- Growth of low-cost digital infrastructure to support easy adoption of online marketplaces, reporting, and monitoring
- Growth of remote training and installation capacity by tech sector
- ESG and impact investing require greater transparency, traceability, and data

33. Bill Aull et al., "Making Online Grocery a Winning Proposition | McKinsey," July 2, 2021, <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/making-online-grocery-a-winning-proposition>.

34. U.S. Embassy in the Philippines, "United States and Philippines Partner to Support Fisherfolk During COVID-19," News&Events, U.S. Embassy in the Philippines, May 12, 2020, <https://ph.usembassy.gov/united-states-and-philippines-partner-to-support-fisherfolk-during-covid-19/>.

35. Small-scale Fisheries Hub, "SSF Hub Presents."



TREND 4:

Increased Focus on Local/Domestic Markets

What It Is:

Across the supply chain, forces are pushing seafood actors to reconsider the role of **domestic, and even hyper-local**, seafood markets as a growth opportunity and as a critical element of long-term resilience of food systems.

What It Looks Like:

Production: For fishers, the increased focus on local markets has in large part been **driven forward by the success of local D2C** initiatives over the course of the pandemic that meet consumer demand for **products that are affordable, convenient, safe, and healthy**. Critically, domestic market access **at scale** for fishers is largely dependent on **government support**, especially with safety to ensure fish markets are open and accessible, and growth of **online distribution channels** facilitating D2C across regional or national markets.

- **In Spain**, two campaigns were launched by the government to support local fishers and encourage domestic consumption: "Un país infinito en productos del mar y recetas" (A Country full of seafood and recipes) and "Yo consumo en la lonja de Cantabria" (I consume from the Cantabrian fish market) to encourage fish consumption at the national and regional levels, both of which launched in March 2021. The first was put forth by the Ministerio de Agricultura, Pesca y Alimentación as part of their larger November 2020 initial campaign launch, "Alimentos España, el país más rico del mundo" (Food from Spain, the most delicious food in the world).³⁶
- **In the US**, momentum from the Catch Together program helped catalyze partnerships between regional food banks and fishing associations, with continued conversations for longer-term engagement by the USDA underway.³⁷ Contributing to this momentum, the Local Catch Network has received half a million USD in funding from the USDA for the creation of the 'Scale Your Local Catch,' "the first nationwide training and technical assistance program to catalyze sustainable direct-to-consumer seafood operations."³⁸
- **In Central America**, fishers partnered with a distributor in order to be able to legally sell their fish to local restaurants, helping to fill market needs and building new domestic channels for their product.

"Restaurants are selling food for delivery--but, there was a fish shortage, because

36. IPAC, "El Ministerio de Agricultura, Pesca y Alimentación promueve el consumo de productos pesqueros en 'El país más rico del mundo' - En Portada - Noticias web y revista digital de acuicultura. Publicación," March 17, 2021, http://www.ipacuicultura.com/noticias/en_portada/78047/el_ministerio_de_agricultura_pesca_y_alimentacion_promueve_el_consumo_de_productos_pesqueros_en_el_pais_mas_rico_del_mundo.html.

37. Lela Nargi, "Covid Helped Connect Small Fishermen to the Emergency Food Network. Can the Link Last?," The Counter, June 24, 2021, <https://thecounter.org/pandemic-small-boat-fishermen-emergency-food-network-catch-together/>.

38. Jordan Richardson, "North American Local Catch Network Awarded \$500,000 USDA Grant to Catalyze 'Boat-to-Fork' Seafood Marketing in the United States," PRWeb, January 25, 2021, https://www.prweb.com/releases/north_american_local_catch_network_awarded_500_000_usda_grant_to_catalyze_boat_to_fork_seafood_marketing_in_the_united_states/prweb17626615.htm.

*fishers are not legally allowed to sell to them directly. We got fishers special permits saying they were employed by us, which allows them to fish and sell.” –
Central American Distributor*

Processing/Distribution: Similar to fishers, many processing plants pivoted to **local markets**, creating products for home delivery and **redirecting sales from export to local grocery stores or fast-food restaurants**. As demand for local seafood products has increased, some processors are continuing and expanding their domestic strategies.

- **In Indonesia**, conversations are underway to explore how fulfillment centers can help large and medium seafood processors scale distribution across the archipelago and tap into the enormous domestic seafood market that exists there.
- **In the Caribbean**, processors have increased direct-sales via online ordering and delivery, while also building out partnerships with local restaurants catering to local residents.
- **In North America**, wholesalers catering to high-end food service have built out online, direct-to-consumer sales channels and partnered with logistics companies to provide overnight, coast-to-coast delivery of high-quality, frozen seafood.

Markets: Restaurant and retail market channels are leveraging consumers’ association of seafood with healthy, and local with safe, to push more domestic seafood products, especially given continued uncertainties and high prices of foreign imports.

- **In China**, the government is providing marketing and branding support as well as training to help domestic seafood companies meet growing demand, while also making foreign access to its market more difficult.³⁹
- **Restaurants in the Caribbean** are targeting locals for brunch, and have fishers bring catch directly as a “Sea to Slate” initiative that promotes fresh, local product and meets growing consumer interest in knowing where the fish is from.
- **Across the globe**, strong and continued growth of online marketplaces such as Mercato, WiFetch, and Tokopedia (now GoTo after merger with Gojek), provide “storefronts” to small-scale and local seafood sellers, connecting them with customers using a third-party delivery service. These services are now available around the world, from Barbados to Indonesia.

What’s Needed?

Of all of the trends identified, the shift towards a domestic market may be the most complex, especially in those fisheries primarily focused on export markets, and where existing domestic demand for seafood is limited; although recent consumer interest in diverse seafood options and forms (including frozen), as well as the desire to support local businesses has helped build **strong networks that facilitate new trade channels**. Robust local markets also require **accessible local processing options that fit needs and price points** and a likely expansion into **multiple sourcing options** to meet varied demand. **Infrastructure**—from cold storage to roads—to support more regional distribution from fishing centers to urban centers is necessary. Access to **reliable logistics for cross-country distribution**, especially

39. Mark Godfrey, “Pandemic Accelerates Major Shifts in China’s Seafood Marketplace,” Seafood Source, April 27, 2021, <https://www.seafoodsource.com/news/supply-trade/pandemic-accelerates-major-shifts-in-china-s-seafood-marketplace>.

last-mile delivery, is also critical for moving larger volumes of domestic catch, as is access to stable purchasing from large buyers, such as government food programs.

What's Driving This Trend?

- Continued shipping delays and high costs of imported seafood
- Growing nationalism that seeks to promote domestic products
- Consumer perception of local/domestic as “safer” and desire to support local businesses
- Government investment in marketplaces, campaigns, and food purchases that support domestic products
- Growing research on benefits of local food systems for long-term resilience

CURRENT STATUS OF SEAFOOD PRODUCTION, DISTRIBUTION, AND DEMAND

The complexity and diversity of seafood supply chains is reflected clearly in the diversity of responses we heard in our interviews and stories covered by news media. Constantly in flux, some of the responses we heard in March-May were already beginning to be contradicted by July and August. The impact of the delta variant and continued discrepancies in vaccine rollouts and government mandates around social gatherings and mask-wearing, created a mosaic of contexts around the world. Thus, while there are emergent trends, there is also still a patchwork of complex and diverse outcomes from the pandemic. Here, we aim to capture the dominant conditions and continued disruptions that exist across the seafood supply chain.

Production

Around the world, we can find today places where prices at the dock are at rock bottom, due to lack of tourism, loss of other local markets, or inability of local residents to afford seafood due to loss of income. But we also see record-breaking prices that are sky-high, driven by increased demand but limited supply. We see fishing activity that is back to pre-COVID-19 levels, and places where boats and crew are still in holding patterns due to quarantines and travel restrictions. We see fishers selling their product back into traditional supply chains, and fishers that are embracing more diverse sales channels, including direct-to-consumer models. Overall, 2021 is proving to be a year of continued innovation on top of some moves back towards doing things as they were done in pre-COVID-19 times.

For many fishers, the first half of 2021 saw a return to activity that was similar to pre-COVID-19 “normal” conditions. Industrial fishing activity has resumed in many parts of the world, with exceptions in some of the distant fishing fleets where continued travel and port restrictions have limited access to migrant labor (see Labor section below). However, starting in July, renewed cycles of COVID-19 outbreaks associated with the delta variant are creating complications.

Continued shutdowns within processing plants and travel restrictions in communities seeking to prevent outbreaks, combined with climate change and other biological factors, have resulted in short supply of some species, such as tuna in Indonesia and blue crab in the Chesapeake. Ongoing logistic challenges have drastically increased the cost of international shipments while creating additional uncertainty around the future of seafood exports.

*“The countries catching and producing Tuna are all...very slow in getting access to vaccinations. When the boats come back from fishing, the fishermen have to quarantine for 2 weeks, meaning: Few fishermen want to go out at all because of the added danger of Covid and having to quarantine. Very few workers want to come in to work to process the fish that is brought in due to danger of Covid.”—
Gordon Food Service Market Update September 2021⁴⁰*

40. “Market Update: September 17, 2021,” Gordon Food Service, accessed October 15, 2021, <https://www.gfs.com/en-us/market-updates/2021/09/17>.

In Alaska, salmon harvests swung wildly from record-high sockeye catches in Bristol Bay to almost nothing for the chum run on the Yukon River.⁴¹ Low supplies combined with continued high cost of shipping have pushed prices up for many species, including Alaskan halibut and black cod⁴² and crustaceans such as lobster (up 30 percent), and blue crab (up 67 percent), helping fishers recover from losses incurred in 2020⁴³ But, higher prices and reduced enforcement due to COVID-19 restrictions is also encouraging illegal activity in some locations, which could have long term negative impacts on fisheries.

“We see many countries that are suffering with regional management problems in their marine areas, especially with regard to IUU and pirate fishing. This is because the capacity of fisheries managers and management authorities was severely affected.” –Manas Roshan of the International Collective in Support of Fishworkers (ICSF)⁴⁴

Small scale fishers in particular continue to struggle to overcome the continued slow-down of the HORECA sector and loss of tourism markets in regions as diverse as the Maldives, Indonesia, USA, and Caribbean. Many continue to turn to digital platforms to support direct-to-consumer sales (see Distribution section). Additionally, they have been confronted with increased competition from industrial fleets. For example, in the hake fishery in Chile, industrial fleets formerly exported most of their frozen product; since COVID-19, they have increased their sales into local retail and open-air markets—the latter of which is the main market for artisanal fishers. Similarly, small scale tuna fishers in the Maldives reliant on air freight to ship fresh product were unable to compete with industrial fleets that could freeze, store, and later ship product to foreign markets during the initial lockdowns in 2020. And once those markets have been lost, it can be difficult for fishers to regain their foothold.

In terms of fishing effort, the response has been highly variable across geographies. For many small-scale fisheries, fishing effort is reduced as low prices are discouraging fishers to go out or forcing them to take on debt.

An analysis of Global Fishing Watch (GFW) data from 2019 compared with 2020 across seven different countries helps to reveal the varied impact of COVID-19 on fishing effort around the world. GFW data generally consists of information on large vessels (generally over 24 m); however, in Chile, Peru, and Indonesia, governments are sharing VMS data from smaller fleets, in addition to larger vessels. Unfortunately, data from 2021 is not yet available from GFW. Table 2 provides a summary of the change in fishing effort inside and outside of each country’s EEZ between 2019 and 2020. Table 2 provides a summary of the change in fishing effort inside and outside of seven different countries’ EEZ between 2019 and 2020.

41. Victoria Petersen, “Record Salmon in One Place. Barely Any in Another. Alarm All Around.,” The New York Times, August 12, 2021, sec. Food, <https://www.nytimes.com/2021/08/12/dining/wild-alaskan-salmon.html>.

42. Laine Welch, “Bristol Bay Salmon Fishery Is Generating Big Revenue This Year, but Most of the Money Will Leave Alaska,” Anchorage Daily News, October 4, 2021, sec. Fish Factor, <https://www.adn.com/business-economy/2021/10/04/bristol-bay-salmon-fishery-is-generating-big-revenue-this-year-but-most-of-the-money-will-leave-alaska/>.

43. Patricia Cobe, “A Perfect Storm Is Rocking the Seafood Supply Chain,” Restaurant Business, August 6, 2021, <https://restaurantbusinessonline.com/food/perfect-storm-rocking-seafood-supply-chain>.

44. Small-scale Fisheries Hub, “SSF Hub Presents: Fisher Voices on COVID-19, Session 1,” <https://www.youtube.com/watch?v=yDnD3IJW7pA>.

Table 2. Summary of change in effort for different countries inside and outside of Exclusive Economic Zone (EEZ) between 2019 and 2020. Indonesia had new data coming online in 2020 that makes comparisons with 2019 non-applicable. However, we can use these maps as a baseline against which to monitor future change, and to see how fishing activity was distributed within and outside the EEZ.

Country	Inside EEZ	Outside EEZ	Observations
Canada	+11%	+14%	Overall, most effort was within EEZ and fishing effort increased both inside and outside of EEZ in 2020 compared with 2019
Chile	-15%	+140	Chile shares both AIS and VMS data for 2019 and 2020. Increase in activity outside the EEZ is from non-VMS vessels moving farther out in 2020 compared with 2019.
Indonesia	N/A	N/A	For Indonesia, 2020 is the first time VMS data was shared, so comparison with 2019 is artificially inflated. Instead, the 2020 data serves as a baseline against which future comparisons can be made. Large scale industrial fishing tended to occur farther offshore than small-scale fisheries but stayed within the Indian Ocean basin. Small scale fleets stayed closer to shore and fished in both the Indian and Pacific.
Mexico	-12.5%	-70%	Mexico's fleet fished mostly through the Eastern Tropical Pacific, where activity was down within and especially outside the EEZ.
Peru	+2%	+2.5%	The Peruvian fleet in general stays mostly within its EEZ; there was little change in effort observed between 2019 and 2020 which corroborates information from interviews and news reports that industry and government pushed for a return to "normal" rather early on in the pandemic. Fishmeal and fish oil production continued without too much disruption, but the human cost was significant, with multiple cases of deaths and illness within the fleet.
Spain	-5.7%	+6.5%	Fishing activity by Spanish vessels occurred worldwide, and vessels appear to have traveled further from home during 2020 compared with 2019. Effort within Spain's EEZ declined in 2020, but to a lesser extent than seen in Mexico or Chile.
USA	+46%	-8.6%	Fishing activity by US vessels continued to cover large areas, especially across the Pacific, in 2020, but a significant portion of the fleet moved closer to home, increasing activity within the EEZ.

Overall, every combination of increase or decrease in effort inside and outside of the EEZ, along with very little change at all, can be found in this small sample of countries from around the world. This analysis helps capture the dynamic and contradictory responses different regions and fisheries have had to COVID-19, depending on government response, end markets (export vs. domestic), and fisher behavior in response to perceived health risks.

Processing and Distribution

Processors and distributors continue to struggle with high levels of uncertainty in terms of supply and demand for many geographies and supply chains. In Q3 of 2021, Vietnam went into lockdown with the worst outbreaks the country had yet experienced, forcing shutdowns for seafood processors and limiting exports.⁴⁵ Indonesia is also experiencing continued shutdowns. In August, a major Chinese port was closed due to a worker testing positive. Delays due to processing facility shutdowns, labor shortages (including for truck drivers), and lack of shipping containers continue to drive up prices, especially for imported products.⁴⁶ In response, distributors are turning to domestic suppliers to source products. In the USA, wholesalers looked to Hawaii and the east and west coast to meet restaurant demand over the summer, but slower logistics and low supplies left many struggling to fulfill orders.⁴⁷

Demand for fresh and live product overall remains low, though imports from China are starting to increase for some species, such as lobster. For distribution reliant on air freight, reduced travel and tourism mean fewer flights, which limits market access—handline tuna from the Maldives is one example. At the other extreme, for LMICs, continued restrictions on movement have significantly limited women seafood processors from obtaining product and gathering in public markets to smoke and dry fish, threatening livelihoods and food security across dozens of countries around the world.⁴⁸

"We, women professionals in the African artisanal fisheries sector, have never experienced a crisis that has affected our activities as profoundly as the Covid 19 pandemic." –Statement issued by the African Confederation of Artisanal Fisheries Organizations (CAOPA) on International Women's Day, March 2021.⁴⁹

In addition to the loss or significant reduction of regular public markets, small vendors and producers continue to suffer due to festival closures. These events are normally important drivers of trade, yet continue to be unreliable sources of income in 2021.

For the majority of wholesalers and distributors, digital retail—especially online sales from grocery stores, meal kits, and direct-to-consumer businesses, continues to serve as the dominant market channel. To service the demands of this growing sector, processors continue to focus on frozen, canned, and single-serving or ready-to-eat products, investing in new equipment and building out new teams to support emerging client needs.

"Demand for value-added processed products, the ready to eat and cook, has increased rapidly. Many people work from home and need safe and easy food. If I want to cook the fish, I don't want the whole round fish (like we used to provide to food service); but I will buy marinated fillet. This is the situation. This is happening all over the world." –SE Asian seafood processor

45. Toan Dao, "Vietnam's Seafood Industry Reeling from COVID-19 Outbreak," Seafood Source, July 19, 2021, <https://www.seafoodsource.com/news/supply-trade/vietnams-seafood-industry-reeling-from-covid-19-outbreak>.

46. "Gordon Food Service."

47. Patricia Cobe, "Perfect Storm."

48. International Organisation for Women in the Seafood Industry, "WATCH."

49. Joelle Philippe, "CAOPA Women Speak Out."

This focus on shelf-stable and ready-to-eat products has also spurred a surge in innovative product packaging, as companies look to provide solutions for seafood sent through the mail.⁵⁰ In addition to product health and safety, quality and appearance are critical for online seafood sales, and are driving innovations in new packaging technologies specifically designed to meet unique needs of seafood—namely, high water content and the need for cold chain integrity. A small, but growing, subsector of innovative packaging is focused on eco-friendly and biodegradable materials, especially those that can compost in non-commercial landfills.

Finally, in an effort to retain the new customers gained through online sales, some distributors are opening small brick and mortar shops that serve as places of connection, and local fulfillment hubs that can support product delivery to a growing local market. Examples of this approach exist in the USA, Mexico, and Chile. In all cases, stores serve as community connection hubs to bring customers in, who later use associated online ordering platforms to procure products when convenient or necessary (such as when COVID-19 numbers start to rise and trips to the store are reduced). This strategy reflects larger trends in grocery and retail around omnichannel business strategies for improved customer service and marketing.⁵¹

Markets/ Demand

The explosion of online sale platforms supports new opportunities for seafood trade, within traditional retail and beyond. In the US, for example, dozens of companies now offer nationwide fish and seafood delivery, often overnight.⁵² The online seafood delivery space has grown so fast, 2021 started to see new “best seafood delivery companies” lists, to help customers navigate all the options.⁵³ This growth is not limited to the US, as online seafood delivery companies have popped up all over the world, including Malaysia,⁵⁴ Singapore,⁵⁵ Canada, and the United Arab Emirates.⁵⁶

To help assess the landscape of online seafood sales, we looked across seven countries to see how patterns in online searches for seafood may have shifted over the past 18 months (Figure 1 a-g).

50. Seafood Source Sponsored, “Case-Ready Seafood Packaging Trending in 2021,” Seafood Source, April 30, 2021, <https://www.seafoodsource.com/case-ready-seafood-packaging-trending-in-2021>.

51. Karen Goulart and Jason Sparapani, “What Is Omnichannel? - Definition from WhatIs.Com,” TechTarget-SearchCustomerExperience, October 2020, <https://searchcustomerexperience.techtarget.com/definition/omnichannel>.

52. Rachel Trujillo, “28 Fish and Seafood Delivery Services That Ship Nationwide,” Food Network, June 17, 2021, <https://www.foodnetwork.com/how-to/packages/shopping/articles/fish-seafood-delivery-services>.

53. David Watsky, “Best Seafood Delivery Services in 2021,” CNET, August 12, 2021, <https://www.cnet.com/health/nutrition/best-seafood-delivery/>.

54. Our Delivery Area- My Seafood Mart,” Shopping, My Seafood Mart, accessed October 18, 2021, https://myseafoodmart.com/index.php?route=information/information&information_id=7.

55. Clarice Chua, “8 Fresh Seafood Delivery Services for Busy Singaporeans With No Time To Shop After Work,” Business, TheSmartLocal - Singapore’s Leading Travel and Lifestyle Portal (blog), May 27, 2021, <https://thesmartlocal.com/read/seafood-food-delivery-singapore/>.

56. Chef Middle East At Home, “Seafood- Chef @ Home,” Shopping, Chef Middle East At Home, accessed October 18, 2021, <https://chefmeathome.com/collections/seafood-products>.

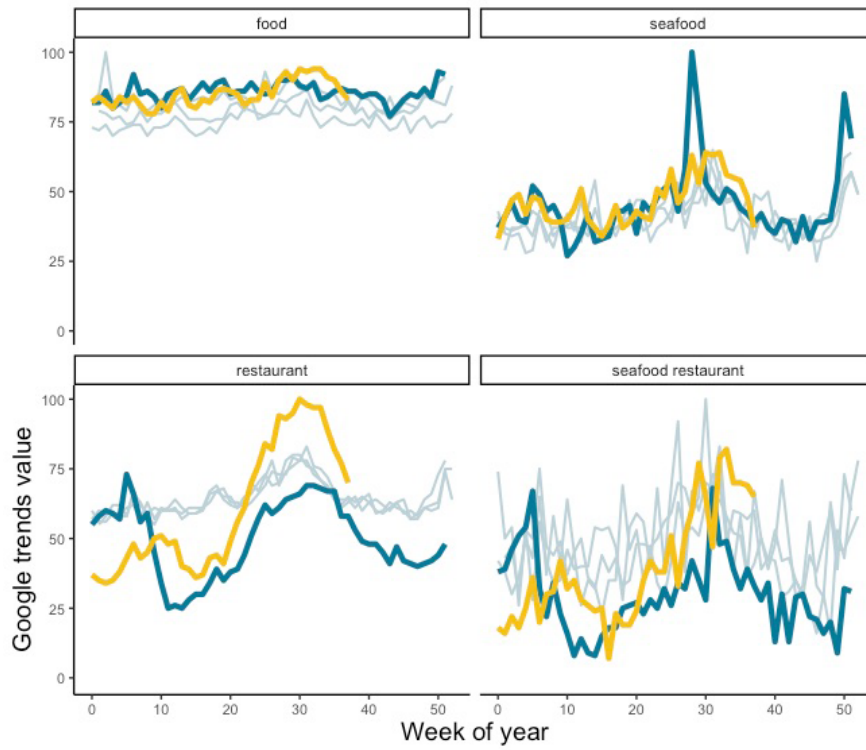


Figure 1a. Canada: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

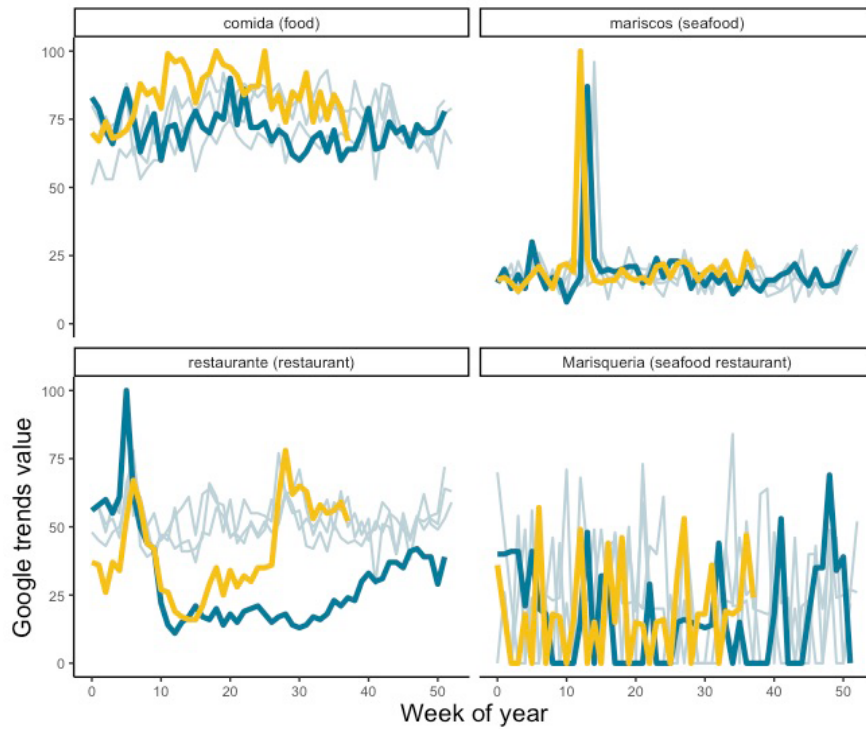


Figure 1b. Chile: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

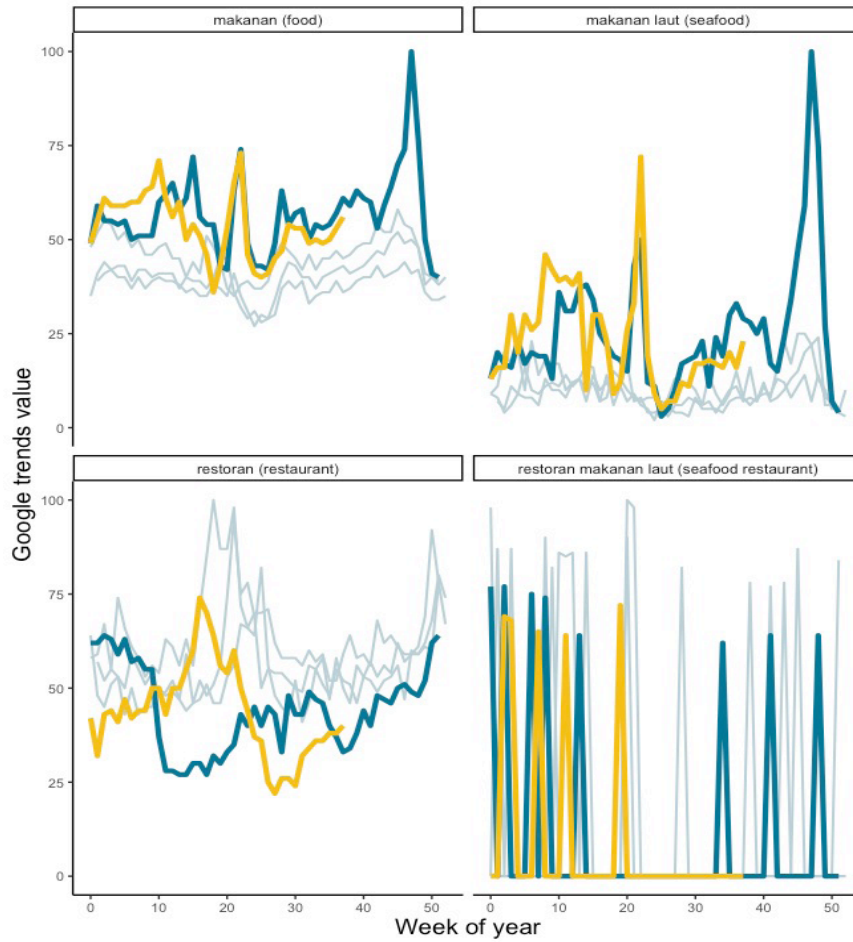


Figure 1c. Indonesia: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

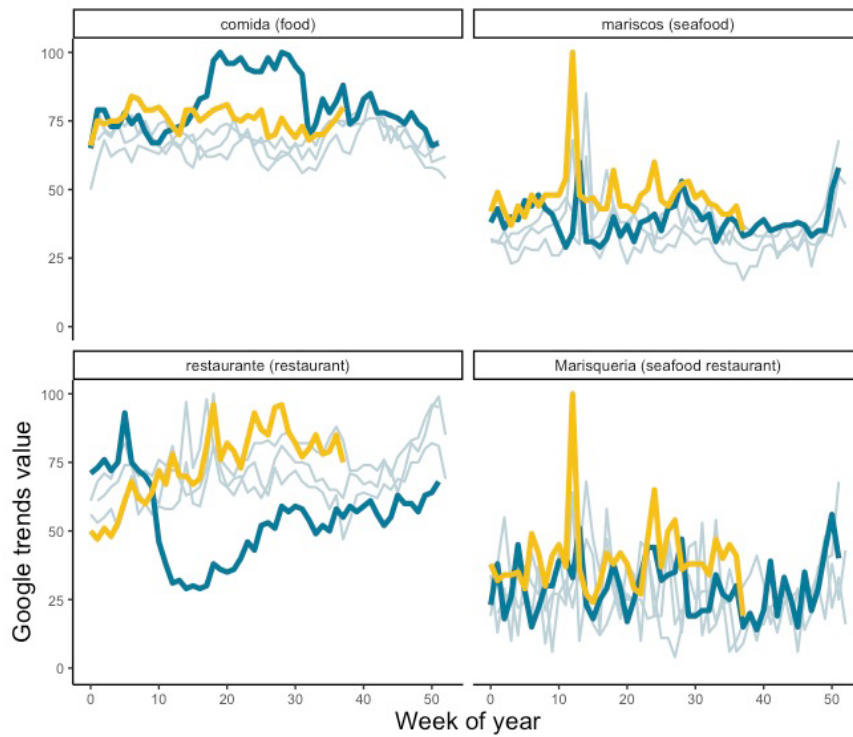


Figure 1d. Mexico: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

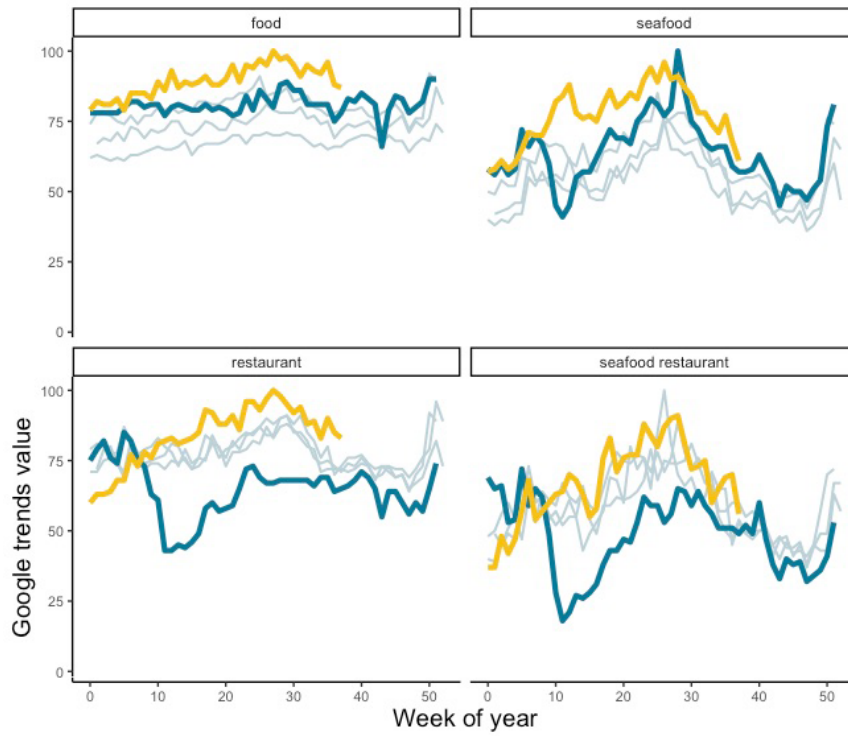


Figure 1e. United States: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

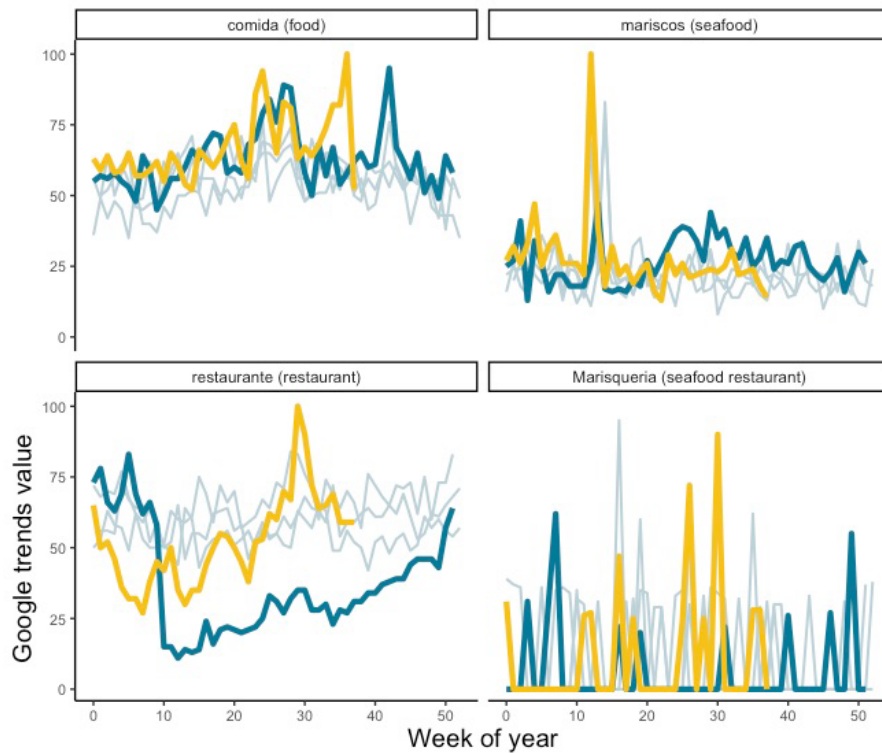


Figure 1f. Peru: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

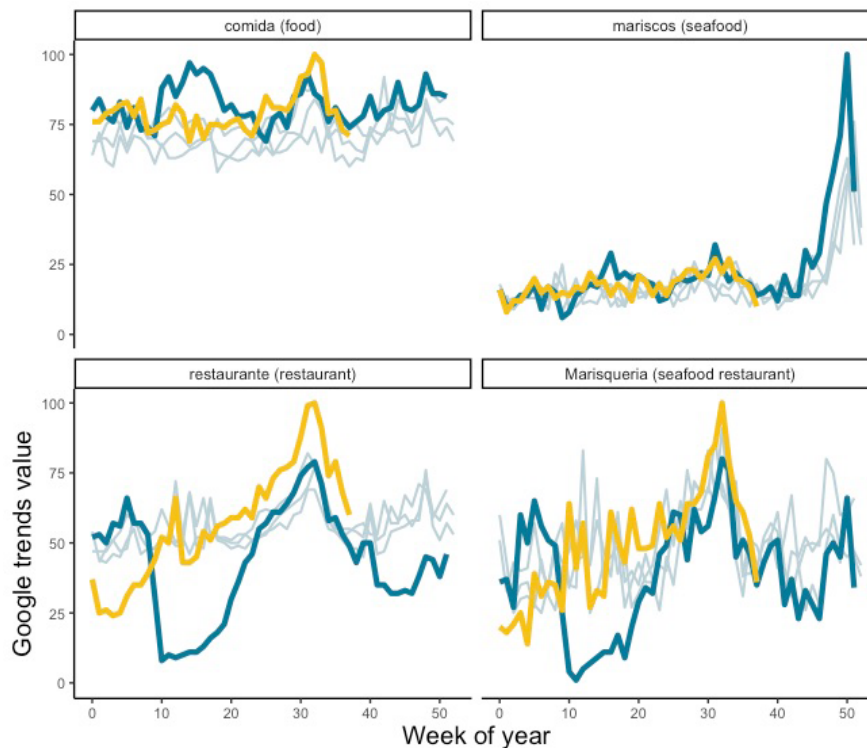


Figure 1g. Spain: Results of google search trend analysis comparing frequency of search for terms in 2021 (yellow), 2020 (turquoise), and 5 years prior (light blue)

The frequency of searches for the term “food” was higher in 2021 and 2020 than in-before COVID-19 in all seven countries, though in Mexico and Indonesia, 2021 was slightly lower than 2020. In contrast, “seafood” remained higher in 2021 than before COVID-19 in the USA, Canada, Mexico, and Indonesia. In Spain, Chile, and Peru, searches for “seafood” did not change much over the course of the pandemic.

Searches for “restaurant” remained higher in 2021 for the USA, Canada, Spain, and Mexico, with Chile and Peru returning to pre-COVID-19 levels. The term “seafood restaurant” was up in the USA and Canada in 2021 compared with pre-COVID-19, and just slightly higher in Mexico in 2021 than before COVID-19.

Retail continues to benefit from the increased sales of seafood, absorbing market share from the food service industry. Growing acceptance of frozen—by consumers and chefs—is helping to drive some of the momentum in online sales and home delivery seafood growth. In Chile, for example, vendors are now selling frozen hake products for the first time, compared with the traditional whole fresh that had always been expected by consumers. Similarly, in Mexico, consumers that used to shun frozen products are expressing increased demand.

“But now with pandemic, the best way to buy is frozen, because only go once a week and they can keep it. And people realized the fish was great...That is a change that is going to stick. So much easier to buy frozen seafood fillet...” –
Seafood Distributor, Mexico

Markets are also being affected by continued government support aiming to boost domestic consumption by increasing marketing and branding of local seafood companies, directly purchasing domestic product for institutional food programs, and/or providing training to increase competitiveness of domestic seafood companies. In the USA, the USDA is expanding training and support for community-supported-fisheries (CSF) models via the Local Catch “Scale Your Local Catch” program.⁵⁷ In Peru, the Rapipez platform was created to connect consumers with local fish, similar to several marketing websites launched by individual states within the USA.⁵⁸ Likewise, governments are also supporting domestic consumption by purchasing seafood for institutional food programs, such as jack mackerel in Chile and continued solicitations by the USDA for US seafood.

Finally, restaurants around the world continue to ride waves of uncertainty. In the EU and USA, Q1-Q3 saw demand up and a return to “normal” in terms of permission to open at full capacity, but record-high prices, labor shortages, and supply shortages continue to undermine this recovery, as do new outbreaks and fears around the delta variant.⁵⁹

Overall demand for seafood remains mixed. Growing consumer interest in healthy eating has helped increase seafood demand in some regions of the world (USA, Spain) but only where it is also affordable.⁶⁰ Loss of income, continued closure of public markets, and in some cases, higher prices mean many consumers are not currently purchasing seafood due to cost and accessibility issues, increasing risk of malnutrition and food insecurity.



57. Local Catch Network, “Scale Your Local Catch,” Business, Local Catch Network, accessed October 20, 2021, <https://localcatch.org/scale-your-local-catch/>.

58. Virgil Group, “Seafood Market Diversification.”

59. Christine Blank, “Food Costs Hurting Restaurants.”

60. European Commission-Oceans and Fisheries, “Eurobarometer: EU Consumers Stay Loyal to Fish and Seafood despite COVID-19 Crisis,” September 9, 2021, https://ec.europa.eu/oceans-and-fisheries/news/eurobarometer-eu-consumers-stay-loyal-fish-and-seafood-despite-covid-19-crisis-2021-09-09_en.

LABOR AND FUNDING DISRUPTIONS AND INNOVATIONS

Labor and finance are cross-cutting sectors that impact all aspects of the seafood trade, from catch to final consumption. Here, we provide summaries of some of the major initiatives and current conditions within these two influential aspects of trade.

Labor

The pandemic continues to create acute labor challenges, as well as exacerbating chronic labor-related issues, such as gender inequality, within the seafood sector and beyond. Risks to worker safety and health in particular are an ongoing issue. Landing sites, processing plants, and seafood markets continue to create high-risk environments for fishers and seafood workers, but shutdowns or restrictions lead to loss of income and threats to local food security.⁶¹ Formal market closures in particular lead to increased crowding at temporary (and less-regulated) markets that are set up near closed locations. Innovative technologies such as drone surveillance are being applied to help monitor and enforce social distancing in landing sites and common market areas.⁶²

“Most women carry out non-vessel based activities, including gleaning, processing and marketing, but the number of women in leadership positions is low. The women in these sectors have had to bear the brunt of the economic impacts of COVID-19 and are further exposed to the virus in their essential roles. In addition to their employment commitments, the majority of women have taken up a disproportionate amount of domestic work and unpaid care. This is rolling back the progress that has been made towards gender equality and economic security for women.”⁶³

In addition, support for migrant workers at sea remains a critical need, as fisher crews remain stuck on board vessels under extended contracts and have to undergo often multiple rounds of quarantine before being able to return home. Efforts such as the Marshall Islands mass-vaccination initiative—where any crew member from any nationality can receive a vaccine—is one new model currently underway to help address some of these issues but more help is needed to get workers home and reduce the heavy work burden many are facing.⁶⁴

61. Joelle Philippe, “CAOPA Women Speak Out”; Toan Dao, “COVID-19 Spike Forces Singapore to Close Major Seafood Port,” Seafood Source, July 20, 2021, <https://www.seafoodsource.com/news/supply-trade/covid-19-spike-forces-singapore-to-close-major-seafood-import-port>.

62. *ntific Reports* 10, no. 1 (December 2020): 22407, <https://doi.org/10.1038/s41598-020-79898-4>

63. FAO, “International Women’s Day | Fishing for Gender Equality in a COVID-19 World | Gender | Food and Agriculture Organization of the United Nations,” FAO News, March 8, 2021, <https://www.fao.org/gender/news/detail/en/c/1380642/>.

64. Giff Johnson, “Marshall Islands Expands Pacific-First Covid Vaccines for Fishermen,” Radio New Zealand, August 20, 2021, <https://www.rnz.co.nz/international/pacific-news/449599/marshall-islands-expands-pacific-first-covid-vaccines-for-fishermen>.

Processing plants have instituted a number of new operating protocols, including: 1) repositioning processing lines or adding new lines to allow for greater social distancing; 2) providing healthcare services such as on-site testing, education about vaccinations, and space for quarantine should positive cases be detected; 3) developing transportation and housing services to help reduce risk of contagion, and 4) enforcing hand-washing, mask wearing, and other preventative measures to protect workers. Investment into automation is also allowing some plants to operate at full production capacity with fewer staff, as seen in Chile. While this solution reduces health risks to workers, longer-term implications of automation for job security are starting to be of concern.

Several processing plants and distributors have also moved to partial or fully remote-work options for staff that provide administrative or even managerial support. We heard from several mid-chain companies that the move to remote work options has helped not only increase safety among staff that are in-person (fewer people on-site) but also has led to increased sense of safety for employees that are not yet comfortable with returning to the office.

Both associations and seafood companies are recognizing the need to provide a sense of security, safety, and social support for their employees to not only ensure staff continue to show up, but to also have high-functioning teams. The social and psychological toll of the pandemic on workers inside and outside of the seafood industry is very real, and continues to require solutions.

Downstream, global labor shortages are causing disruptions that affect seafood trade for both the retail and food service sectors.⁶⁵ A number of factors are contributing to this labor crisis—which spreads far beyond the seafood industry. Long hours, difficult working conditions, and low wages for more than just these last 18 months have burned out individuals, from fishing crews to long-haul drivers to food workers to restaurant chefs and kitchen staff.⁶⁶ Government unemployment benefits have provided opportunities for folks to rethink their professions, and many individuals used the pandemic to reskill or upskill. Employers are having to pay higher wages and some are creating other incentives—such as hiring bonuses—to attract workers.

Funding and Finance

The COVID-19 pandemic has triggered the flow of trillions of dollars around the world. These financial resources —from both public and private sources—have significant influence over the long-term trajectory of individual businesses, as well as the seafood sector as a whole. This section provides a high-level overview of the current funding and financial landscape as a critical context for understanding potential trends and patterns in seafood industry response.

In terms of public funding, a vast majority of funds supported emergency relief, much of it in the form of wage payments. For example, the Government of Canada⁶⁷

65. Urner Barry's Reporter- Market Prices, News, and Analysis," accessed October 15, 2021, <https://indd.adobe.com/view/360e340b-3a8f-4981-b45b-770abc3d5d97>; Christine Blank, "Sysco Hits Slowdown Due to 'Unprecedented' Labor Shortage," Seafood Source, August 9, 2021, <https://www.seafoodsource.com/news/premium/foodservice-retail/sysco-hits-slowdown-due-to-unprecedented-labor-shortage>.

66. www.foodmanufacturing.com/labor/news/21759649/fed-up-by-pandemic-us-food-workers-launch-rare-strikes; Riley Redfern, "I Lost My Job As a Pastry Chef — Why I Don't Want It Back," Insider, August 18, 2021, <https://www.insider.com/lost-job-as-a-chef-never-want-to-go-back-2021-8>.

67. Grant Thornton LLP, "COVID-19: Financial Support for Fisheries and Aquaculture Businesses," May 2020, <https://www.grantthornton.ca/globalassets/1.-member-firms/canada/insights/ns-fisheries/covid-19---financial-support-for-fisheries-and->

developed a program with a range of seven different support measures depending on the financial need of the fishery or aquaculture business, each program has been developed with public and private entities increasing the liquidity flow to the sector and reducing risk of investment of commercial banks.

However, government and development funds, while critical, also have been limited—and in many cases flawed—in their effort to alleviate the critical pain points affecting global economies. In many countries fishers and seafood supply chain companies were eligible to receive funding but at a global scale, and especially in LMICs, the enormous number of informal workers and businesses in the seafood sector mean that significant portions of the industry have been unable to access this relief. In addition, support for projects such as cold storage or working waterfront upgrades, which could lend long-term resiliency, have not been part of the fisheries and seafood-related funding packages to date. And, on a global scale, only a small fraction of funds has gone into projects that support the environment—a “green recovery” has not yet materialized.⁶⁸ See a more detailed discussion in the Challenges section.

In terms of global finance, the pandemic has increased awareness about the need for impact, sustainable and responsible investment and, as a consequence, has accelerated the Environmental, Social and Governance (ESG) agenda, including the growing importance and adherence to the UN Principles for Responsible Investment. In fact, at a global level, there has been a +40 percent growth in Assets Under Management in 2021 of ESG funds and Impact Investing funds respectively, which are also generally faring better during the pandemic. Despite the momentum of responsible and impact investment, for this range of capital to enter in the fisheries and Blue Economy space, risk-mitigation mechanisms are required, with Blended Finance approaches currently gaining attention as a strategic tool for the sector.

Additionally, the lack of capital flow evidences that current investment approaches are likely not enough to support COVID-19 resilience and recovery for a vibrant seafood industry; instead, there is need for different approaches to multilateral development cooperation that require considerable human and financial resources for recovery, resilience, and adaptation. Related production sectors have similar needs, sparking some interesting new innovations that have been gaining momentum and may be applicable or beneficial to the fisheries and seafood space moving forward, including:

- **Blue Bonds:**⁶⁹ Seychelles launched the world’s first sovereign blue bond⁷⁰ raising a total of \$15 million last year. After its success, The Nature Conservancy (TNC) is now planning to mobilize \$1.6 billion through their global Blue Bond Program, consolidating as a means of financing Blue Growth. In particular, a post-COVID-19 new multilateral cooperation agenda will serve as a contribution to meet capacity building needs of developing and non-developing countries in their transition to develop public Blue Economy strategies.
- **Nature-Based Solutions Finance:** There is a global consensus on the need of

aquaculture-businesses.pdf.

68. Fiona Harvey, “Trillions of Dollars Spent on Covid Recovery in Ways That Harm Environment,” *The Guardian*, July 15, 2021, sec. Business, <https://www.theguardian.com/business/2021/jul/15/trillions-of-dollars-spent-on-covid-recovery-in-ways-that-harm-environment>.

69. Maram Ahmed, “Blue Bonds: What They Are, and How They Can Help the Oceans,” *World Economic Forum*, June 6, 2019, <https://www.weforum.org/agenda/2019/06/world-oceans-day-blue-bonds-can-help-guarantee-the-oceans-wealth/>.

70. The World Bank, “Seychelles Launches World’s First Sovereign Blue Bond,” Text/HTML, World Bank, October 29, 2018, <https://doi.org/10/29/seychelles-launches-worlds-first-sovereign-blue-bond>.

financing Nature-Based Solutions as a key strategy to fight against the biodiversity loss and the effects of climate change. However, the amount of funding currently dedicated to this effort is completely insufficient. According to UNEP,⁷¹ a total investment of \$8.1 trillion is required between now and 2050, while annual investment should reach \$536 billion annually by 2050. Structural transformations are needed to close the \$4.1 trillion finance gap between now and 2050, including common frameworks for assessment and investment in Nature-Based Solutions, as well as monitoring and evaluation of proven benefits to better make the case for public and private investment.

- **Transformation Finance:**⁷² This concept proposes “system change/ transformation finance” as a new and distinct form of finance to address global ecological, social, political and health crises. It is based on a new paradigm in the decision-making process, where there is a fundamental shift in the relationship between financiers and proponents in favor of a co-creation and equitable relationship that reflects a complex action logic.
- **Stakeholder Capitalism:**⁷³ A growing movement that seeks long-term value creation by taking the needs of all stakeholders and society at large into account, leading to shareholders increasingly playing an ESG compliance or event activist role on corporate boards. Increasingly, investors are seeking to resolve the question of who should pay for the benefits created from otherwise free access to resources and nature services (e.g. protecting kelp forests to help sequester carbon), and how to compensate the individuals involved in protection and conservation efforts.

The pandemic has highlighted the social and environmental risks linked to financial investments, which has, in turn, accelerated blue economy and ocean finance momentum. This is evidenced by the imminent (at the time of writing this publication) UN Biodiversity (COP15) and Climate Change (COP 26) Conferences of the Parties, where Ocean Action is in the spotlight, along with the importance of emerging investment needs in nature and communities as stewards for the recovery and protection of biodiversity.

71. “World Needs USD 8.1 Trillion Investment in Nature by 2050 to Tackle Triple Planetary Crisis,” UN Environment, June 2, 2021, <http://www.unep.org/news-and-stories/press-release/world-needs-usd-81-trillion-investment-nature-2050-tackle-triple>.

72. Steve Waddell, “An Investigation into Financing Transformation,” Catalyst 2030- Working, June 2021.

73. Diego Bustamante and Joe Myers, “Stakeholder Capitalism and ESG in Latin America: New Leadership, Challenges and Opportunities,” World Economic Forum, June 24, 2021, <https://www.weforum.org/agenda/2021/06/latin-america-stakeholder-capitalism-esg-covid-19-pandemic/>.

Looking Ahead

ASSESSING DURABILITY OF TRENDS

While we cannot predict exactly how COVID-19 will leave its mark on the seafood sector, we can assess the factors and drivers that reinforce certain strategies, or enable them to take hold in different contexts, increasing the likelihood that these trends will persist. These include enabling conditions and drivers that help launch and progress a trend, as well as challenges that may limit forward progress.

Enablers and Drivers

We define enabling conditions as those that build the capacity for resilience—the potential to respond in a positive way to a shock. Drivers are defined as the larger conditions, often from outside the seafood system, that influence how actors and institutions may respond based on the momentum that is already in place. Note that stressors, such as climate change or political upheaval, can serve as drivers for existing trends and also can trigger shocks that push a trend forward (see section on COVID-19 as Accelerator of Existing Trends for example) or derail momentum.

During interviews, we asked industry stakeholders to identify key enabling conditions—resources, context, factors—that allowed them to begin to shift from crisis mode to a more strategic and longer-term response to the pandemic. We also asked what kinds of external or additional forces were influencing strategic decision-making during the pandemic. See summary Table 4 for key enablers and drivers for each of the trends on page 44.

Global Stressors at Play

External and internal stressors continue to influence how the seafood industry is responding to COVID-19, as well as the outcomes associated with those responses. In some cases, the stressor has nothing to do with COVID-19, and instead is simply another force that is influencing the future of fisheries and seafood trade. In other instances, there are COVID-19-related disruptions that continue to affect the capacity of the seafood industry to push towards a “new normal.” Table 3 provides a summary of these forces, which must be held in mind when evaluating the current conditions.

Table 3. Global stressors influencing current and future outcomes for the seafood industry.

Stressors	Impact	Examples
Political Upheavals	Increased Uncertainty	Seafood industry experts in the EU and UK noted that it would be impossible to “distinguish long-term changes due to COVID-19 vs. due to Brexit.” <i>“A repercussion stemming from Brexit has been a decline by almost a third in the export of Spanish canned goods to the UK.”⁷⁴</i> Brexit and COVID-19 are both contributing to labor shortages that are threatening seafood processors/exporters. ⁷⁵ In Peru, the new administration has triggered leadership turnovers across multiple key fisheries agencies, further destabilizing ongoing efforts at formalization.

74. FAO-Globefish, “InfoPesca Internacional” (Montevideo, Uruguay: FAO, May 2020), <https://www.infopesca.org/sites/default/files/complemento/publiclibreacceso/3856/INFOPESCA%2067.pdf>.

75. Sam Butler, “Seafood Exporter’s Plea to Executive on Chronic Shortage of Our Workers,” MSN, June 9, 2021, <https://www.msn.com/en-gb/money/other/seafood-exporter-s-plea-to-executive-on-chronic-shortage-of-our-workers/ar-AAO8XRO>.

Trade Wars, especially with China	Increased Uncertainty	Tariffs on Alaskan salmon exports to China have led to about half a billion dollar loss over the past 4 years and more recently disrupted millions of dollars of trade with Australia for rock lobster. ⁷⁶
Disruption of global Shipping	Increase cost of seafood Increased interest in domestic trade	For example, a container used to cost \$2000 USD to ship from Asia to USA, now the same service costs \$10,000.
Labor Crisis	Increased uncertainty Increased cost of seafood	Some fishing vessels continue to struggle to secure enough crew. Retail and food service are short-staffed, resulting in closed seafood counters and reduced hours.
Climate Change & Biodiversity Loss	Increased uncertainty Increased multilateral interest in ocean conservation	New report ⁷⁷ by University of British Columbia researchers details multiple impacts of marine heat waves on fish stocks around the world, including a projected 10 percent drop in Ecuador's annual catch. The UN's Biodiversity (COP15) and Climate Change (COP 26) Conferences of the Parties are building on the Special Report on the Ocean and Cryosphere in a Changing Climate (IPCC, 2019) to leverage the importance of the Ocean in Climate Change and biodiversity loss, especially managing and investing in marine ecosystems such as mangroves, seagrass meadows, and saltmarshes as the most effective sequestering carbon natural solutions that will underpin entrepreneurial and economic opportunities post-COVID-19.

At a high level, the impact of these stressors is to either increased uncertainty—of markets, supply, or ability to continue to operate—or increase cost, or both. Seafood prices are currently at an all time high across many categories, due largely to one or more of the following factors:

1. High cost of shipping
2. Low supply due to natural/biological conditions, or continued COVID-19 impacts such as processing plant closures
3. Labor crisis, which continues to threaten the ability of supply chain companies to come back online at full capacity, despite having social distancing and health measures in place.

An example of these compounding effects is exemplified by the September 2021 Market Outlook by US Distributor, Gordon's Food Service:

*"Frozen Tuna, Swordfish: Really hard to come by with poor fishing in Vietnam at about 40 percent of last year's catch at this time. Situation is getting worse, not better. This item is an example of the container delays, decreased fishing boats, & decreased production workers that we have been seeing from many overseas commodities due to the pandemic. The US supply chain has attempted to start back up to full speed, while other countries are still feeling the impact much more than we are. We will see impact from the pandemic until at least 2022 from what our partners are telling us."*⁷⁸

76. Laine Welch, "Bristol Bay Salmon Fishery Is Generating Big Revenue This Year, but Most of the Money Will Leave Alaska."

77. Stefan Labbé, "Ocean Heat Waves Could Wipe out Half of Pacific Salmon Catch by 2050," North Shore News, October 1, 2021, <https://www.nsnews.com/highlights/ocean-heat-waves-could-wipe-out-half-of-pacific-salmon-catch-by-2050-4478805>.

78. "Gordon Food Service."

Understanding how these forces are impacting particular countries, seafood sectors, and fisheries is important when considering what trends are likely to stick, and which responses can help build resiliency, both to COVID-19 impacts as well as against future supply chain disruptions and market shocks.

Challenges

In addition to, and in many cases correlated with, the global stressors identified in Table 3, several challenges continue to negatively impact both individuals and companies in the seafood supply chain. We focus here on the challenges that were common among diverse actors and occurred in multiple geographies, and thus appear to be key barriers to large-scale recovery or positive response.

The socio-emotional toll is very real. The continued burden of extended time at sea for fishing crews due to complication with crew shifts is perhaps one of the clearest examples of this challenge. Fishers are overworked, depressed, and desperate to get home. Yet, stories of exhaustion and concerns about personal safety extend across the supply chain, from processing plant workers to restaurant kitchen staff. In addition, at the management level, efforts to diversify and adapt to new markets have created additional workloads, without the staff to cover it, leaving many seafood business managers and owners overwhelmed.

“Used to be you had 5 hard decisions to make in a day; now you have way more. Like 25!” –International Seafood Distribution company owner

Poor design and implementation of government relief funds. There are several different aspects of this challenge. First, many seafood actors are informal, and thus, unable to access relief that requires formal registration or proof of citizenship. Second, information about relief funds and access to apply for them often required access to a computer/internet, and literacy, both of which are lacking, especially in the small-scale fishing sector; while information regarding how the funds would be taxed left many fishers wary to engage in the programs.

“Government offered a bail out package, it seemed, but the requirements showed it wasn’t really a loan. You had to have auditors 4 times a year and that is so expensive. So it was impossible. So much red tape, none of the 6 large processors took it.” Seafood supply chain expert, Caribbean region.

In some cases, such as in Chile, the relief funds in general were in the form of access to retirement accounts—so people could draw upon their own savings without penalty, but also without any plans for how these funds will be replenished.

Third, governments tended to deploy funds equitably. At first glance, this may appear to be an appropriate strategy, but COVID-19 had wide-ranging degrees of impact on different fisheries and supply chains, due to timing of events and the nature of the fishery. This, combined with access issues, meant that those who needed the funds most were often not the ones to receive them, including women fish sellers. For example, in Mexico, a fisherwoman noted that, “Normally the subsidies are for those who participate in the extraction.” Another added “Most of the fishers are men, and because we don’t fish, they [the

government] don't take us into account."⁷⁹

Fourth, there is a growing need for these limited public funds to be invested in systemic solutions, which can help build resilience against the compounding effects of multiple stressors simultaneously—a condition that is rapidly becoming the norm for fishers from the USA Gulf Coast to Fiji:

"Since the borders closed in Fiji, these groups are earning very little (enough for daily needs) and do not have any social security or safety nets they can fall back on. Because they have limited access to land and other resources, they cannot easily shift livelihoods to compensate for how less profitable small-scale fisheries are right now, or to earn additional income to repair boats and gear damaged by Cyclone Harold."⁸⁰

A lack of long-term vision and holistic strategies mean an opportunity for investing in initiatives that could help build resilience while also addressing COVID-19-related pain points has been missed.

Digital access is a major barrier and digital dependencies create vulnerability. The majority of resilience and diversification efforts enacted across the seafood supply chain were supported through technological platforms ranging from Zoom to WhatsApp to online sales platforms. Those without access to reliable WiFi and/or the technological capacity to shift at least a portion of their services online are particularly vulnerable to supply chain disruptions and less likely to have survived the pandemic.

"Another consequence of remote meetings— certain places around the world where WiFi internet is not as good as other places. These places have been penalized via that infrastructure, for example, where folks from Africa are really struggling to be heard because of connection or time zone issues. That is a real challenge." –Industry Association Leader

Management and enforcement efforts continue to be compromised. Due to lockdowns, travel restrictions, and budget cuts, many monitoring, evaluation, and enforcement activities that require verification on the ground have faltered during COVID-19. Activities ranging from onboard observers to dockside inspections have been slowed or halted altogether, leading to increased opportunity for IUU. In addition, cancelled scientific surveys mean gaps in data sets and greater uncertainty in models which inform management decisions. The long-term impact of the loss of this data is yet unknown. Finally, virtual meeting formats, while better than nothing, have meant shorter agendas and reduced productivity, leading to delays or compromised quality of management decisions.

"Because of virtual formats and nature of these meetings for different time zones, the times are compressed [compared with in-person]. Instead of 8-9 hr days with

79. COBI, "Gender Equality at Sea? An Analysis During the COVID-19 Pandemic," Monthly Report (COBI- Comunidad y Biodiversidad, August 3, 2020), <https://cobi.org.mx/wp-content/uploads/2020/08/COBI-Gender-and-COVID19-3-August.pdf>.

80. Wildlife Conservation Society, "Study Looks at Impacts of COVID-19 and Cyclone Harold on Fishers in Fiji," Phys.org, March 29, 2021, <https://phys.org/news/2021-03-impacts-covid-cyclone-harold-fishers.html>.

opportunity for discussion, there were 4 hr restrictions. So 50 percent reduction in discussion time.” –Industry Association Leader

Safety is still not assured for people or products. Both worker safety as well as product safety is still difficult to track and ensure. At sea, some fishers are still being forced to fish in order to meet continue demand or due to lack of any other options for livelihood; simultaneously, new supply chain actors who have become involved in D2C or diversification efforts (e.g. to supply packaging, logistics, cold storage, etc.) still need to be effectively integrated into existing traceability systems in order to ensure quality and validity. Meanwhile, outbreaks in public markets and processing plants continue to threaten the well-being of fish vendors and seafood workers around the world.

Shipping seafood through the mail is still in its infancy. The knowledge and resources to support reliable food delivery, nevermind *seafood* delivery, is still nascent. Innovation, while happening, is struggling to keep up with increased demand. In particular, a lack of acceptable existing food insurance options for commonly utilized third-party carriers is a major barrier. Companies who have shifted their business plan are now being forced to learn about both logistics and insurance on the fly in order to retain the new customer base built during COVID-19.

“One of the greatest threats to this industry and the broader innovative food system work is it relies on current shipping providers. They don’t provide assurances or insurance for lost product...they won’t take accountability or liability for these shipping scenarios. And this is why Amazon does their own deliveries now. Obviously they can do that because they are huge and have funds. But for others reliant on logistics companies, they are failing us.” –Online Seafood Distributor

Loss of income means people can’t afford seafood. While home cooking efforts have thrived during the pandemic, loss of income and financial instability for many has meant that seafood may be out of reach. For many consumers, seafood subscriptions and delivery boxes, while convenient, have become too expensive; given the high prices brought on through shipping and supply shortages, even cheaper seafood options are now no longer affordable. This not only creates risks of malnutrition and food insecurity, but also reduces livelihoods for fishers who cannot move their product.

“There are many people cancelling membership because their income has been affected by COVID. We are trying to make contact with them now, to invite to come back, but people said I just can’t afford.” –Latin American CSF

Labor shortages, high consumer demand, shipping delays, and poor catch are combining to create low supply and high costs. This combination of factors continues to disrupt supply chain shipments, slow the reopening of the HORECA sector, decrease the availability of seafood for local as well as international markets, and drive prices up from processor through consumer. The mass reopening of restaurants and lifts on travel bans in the second quarter of 2021 further exacerbated shortages, as a flood of demand met a market still reeling from COVID-19 impacts.

Durability of Trends

The four trends identified in this analysis—**Diversification as a long term strategy; Investment in Buffers, Seafood Going High Tech, and Increased Focus on Domestic Markets**—all have drivers that point to continued momentum, as well as challenges that could significantly stymie growth. They all also depend on certain enabling conditions in order to manifest. Table 4 summarizes these factors for each of the four trends.

Table 4. Summary of Enabling Conditions, Challenges, and Drivers for emergent trends in the seafood sector. Trends are patterns in responses from global actors and institutions across the supply chain. Enabling conditions build the capacity for resilience—the potential to respond in a positive way to a shock. Challenges are barriers blocking positive progress—these are by definition, moveable barriers. Drivers are larger forces, often from outside the seafood system, that influence how actors and institutions may respond based on the momentum that is already in place.

Trend	Enabling Conditions	Challenges	Drivers
Diversification as long-term strategy	<p>Management conditions that support flexibility, including ease of switching to new target species or expanding roles in the supply chain (i.e. selling fish in addition to catching it)</p> <p>Investment capital</p> <p>Infrastructure to support new logistics or product forms</p> <p>Reliable cold chain</p> <p>Innovation in packaging that supports seafood through the mail</p> <p>Biological: availability and access to new and different species</p> <p>Local processing options that fit need, price points, and were accessible</p> <p>Consumer willingness to try new products</p>	<p>Retail's higher bar makes diversification or pivots difficult</p> <p>Digital access is a major barrier and digital dependencies create vulnerability</p> <p>Shipping seafood through the mail is still in its infancy</p> <p>Regulations or lack of training/capital to facilitate fishers' transition to new species or new roles in the supply chain</p>	<p>Consumer expectations for:</p> <ul style="list-style-type: none"> all options in terms of how to buy (in-store, online, pick-up), convenience (ready-to-eat; value-add; individual portions, frozen) Healthy, local <p>On-going struggles and uncertainty in food service industry</p> <p>Technological developments for packaging that preserves quality; eco-friendly packaging</p> <p>Increasing momentum around Diversity, Equity, and Inclusiveness, with diversification (often processing) offering livelihoods for family and communities in small scale fisheries</p> <p>Consumer demand for online food delivery is still climbing⁸¹</p> <p>Improvement in third-party logistics</p>
Building Buffers	<p>Working capital and cash flow management to have finance reserves and liquidity to invest</p> <p>Multiple sourcing options</p> <p>Strong networks that facilitated new trade channels</p> <p>Capacity to leverage online/social media for marketing and trade</p> <p>Available facilities, equipment</p>	<p>Labor shortages, high consumer demand, shipping delays, and poor catch are combining to create low supply and high costs</p> <p>Digital access is a major barrier and digital dependencies create vulnerability</p> <p>Retail's higher bar makes diversification or pivots difficult</p> <p>Loss of income means people can't afford seafood</p>	<p>Learning from past disruptions, such as natural disasters like hurricanes, buffers are needed</p> <p>Growth of savings clubs and Fair Trade as models that support fishing communities to build reserves</p> <p>Growing interest in alternative seafood networks (ASN)</p>

81. Acosta, "COVID-19 Shopper Insights."

<p>Seafood Going High Tech</p>	<p>Investment capital</p> <p>Infrastructure—reliable electricity, internet connectivity, and speed</p> <p>Access to training and IT support</p> <p>Capacity to leverage online/ social media for marketing and trade</p> <p>Reliable options for logistics, especially for last mile</p>	<p>Digital access is a major barrier and digital dependencies create vulnerability</p> <p>Management and enforcement efforts continue to be compromised</p> <p>Safety is still not assured for people or products</p>	<p>Growth of “zoom culture” for online conferences and virtual communication increasing engagement, especially by fishers in policy and advocacy initiatives</p> <p>Consumer interest in product origin and convenience</p> <p>E-commerce boom</p> <p>Growth of low-cost digital infrastructure to support easy adoption of online marketplaces, reporting, and monitoring</p> <p>Growth of remote training and installations</p> <p>ESG and impact investing require greater transparency, traceability, and data</p>
<p>Focus on Domestic Markets</p>	<p>Local processing options that fit need, price points, and are available</p> <p>Multiple sourcing options</p> <p>Strong networks that facilitate new trade channels</p> <p>Consumer interest or willingness to try new species/ products</p>	<p>Digital access is a major barrier and digital dependencies create vulnerability</p> <p>Retail’s higher bar makes diversification or pivots difficult</p> <p>Labor shortages, high consumer demand, shipping delays, and poor catch are combining to create low supply and high costs</p> <p>Loss of income means people can’t afford seafood</p> <p>Shipping seafood through the mail is still in its infancy</p>	<p>Continued Shipping delays and high costs of imported seafood</p> <p>Growing Nationalism</p> <p>Consumer perception of local/domestic as “safer”</p> <p>Government investment in marketplaces, campaigns, and food purchases that support domestic fisheries</p> <p>Growing research and development interest in the benefits of local food systems for resilience</p>

To assess durability, we then considered three key factors:

- 1. Likelihood of enabling conditions:** we reviewed how dependent specific strategies within a trend are on different enabling conditions and considered how common and feasible those conditions are across geographies, fisheries, and supply chains.
- 2. Strength of drivers:** we evaluated the different drivers within and outside the seafood system and considered how strong a driver is, and how many drivers are working to push a trend forward.
- 3. Risk management and resiliency:** we focused here on answering the question of how likely these trends are to mitigate risk and confer resiliency. We considered *theoretical* principles of risk management strategy potentially linked with food system resilience.⁸² The assumption is that strategies and innovations that are proven to build capacity for positive, effective responses to shocks are more likely to persist.

Using this framework, we assessed which trends were most likely to persist over and considered the likelihood of their spread across geographies and different fisheries contexts. Because strategies around investing in networks and partnerships are quite different from strategies to build physical or financial buffers, we pulled partnerships and networks out from this trend to assess the durability of this strategy. Similarly, we looked at durability of direct-to-consumer (D2C) models as a distinct strategy, within the larger diversification trend, in order to evaluate durability. More detailed analysis of the D2C trend can

82. Béné, “Resilience of Local Food Systems.”

be found in FoF's report, "*The Future of Direct-to-Consumer Strategies for Seafood.*"

Figure 2 provides a visualization of where the four major trends (light blue) and two sub-trends (darker blue) fall along the two axes of enabling conditions and drivers. Each quadrant in the figure represents a different context under which specific strategies may or may not persist, depending on the type of resources and effort put into the system.

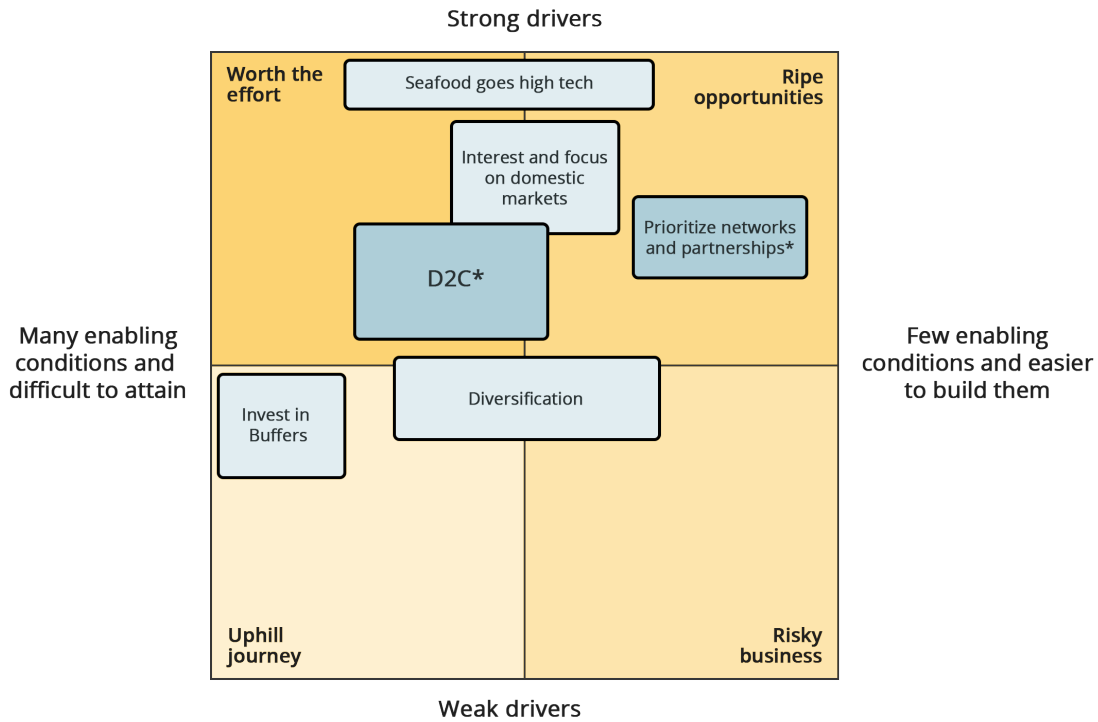


Figure 2. Diagram of how different trends map according to enabling conditions vs. drivers. **Upper Left: Worth the Effort.** Strategies in this category require significant support to get started, but are able to leverage existing momentum in the system to quickly scale and thus, spread the benefits. **Upper Right: Ripe Opportunities:** strategies in this space require less upfront investment, or leverage existing assets in the system, and pull upon both internal and external drivers to scale. This is where we see proliferation of different types of strategies within a trend, as well as high levels of replication of solutions across geographies. **Lower Right: Risky Business.** Strategies here are easy to start up, but currently lack strong drivers to support growth and scale. They may be important for resiliency at a niche level, or could reflect nascent movements that are just beginning to build momentum. This is a space to watch for the next potential trend. **Lower Left: Uphill Battle.** Strategies in this area require help getting off the ground, as well as scaling. Strategies to empower women and youth, create local infrastructure, and other long-term resiliency-building efforts often live here, where momentum and resources lag behind need.

Based on this analysis, the following three trends ranked as the most durable:

- Seafood Goes High Tech
- Prioritization of Partnerships and Networks, and
- Focus on Domestic Markets

These had the highest (and same) overall scores in our analysis for durability and scale. Overall, these trends required fewer enabling conditions, and enabling conditions that were more likely to be present or attainable while also having significant momentum in the space.

For Seafood Goes High Tech, the continual decline in cost of new technologies and push for greater digital access are drivers that should help to support scaling of successful strategies that incorporate

technological solutions, especially around better data and communications. Increased demand around new technologies for improved cold chain and packaging, especially to service the growing demand for food delivery, is also driving uptake of technology and likely to continue, as they are not dependent on seafood alone but are part of larger e-commerce and food distribution patterns. Finally, continued pressure for traceability—as a tool for risk mitigation, business improvements, and/or meeting regulatory requirements, will continue to drive digital transformation in the sector. Enabling conditions for strategies around technology adoption can be difficult, such as the need for high-speed internet and reliable electricity, but are becoming more accessible around the world. Other enabling conditions are more simple to achieve, such as downloading apps on a smartphone.

For Partnerships and Networks, the most significant need is leadership and organizational capacity to engage—when missing, this lack of capacity can be a significant barrier. The use of virtual platforms, however, is helping to build connectivity and can serve to reinforce this trend. Increased interest and agency among fisher communities to work together and organize is evidenced by the rise of platforms such as the Small Scale Fisheries Hub; Too Big To Ignore initiative, and increased participation of Caribbean fishers in management and policy forums through the use of zoom. The growth of industry-led pre-competitive platforms as well as associations such as Local Catch Network in the USA, or social impact networks such as Innovación Azul in Mexico, provide the infrastructure to support continued growth of this trend.

For Domestic Markets, one of the biggest current drivers (with an uncertain future) is government investment in programs designed to support and increase consumption of domestic seafood. This includes marketing campaigns, online marketplaces, and efforts to buy local fish for food banks and programs targeting food insecure populations. Such institutional food partnerships are needed to move large volumes of product efficiently. Consumer behavior is also reinforcing this strategy, as values around health, safety, and a desire to support local businesses continue to influence decision-making from China to the UK.⁸³ Two of the biggest threats to this trend include price competition from imports, as well as lack of infrastructure for reliable distribution across shorter distances.

“There is a need to think about infrastructure for future of food systems. We have invested so much public money to build infrastructure for global trade...for our food systems to be regional and local requires infrastructure investment- hard and soft. Public access for small boats, microcanning, technology...we built it to go long, and now need to do it to go short.” –Small Scale Fisheries Expert.

These same barriers (infrastructure and distribution) could negatively impact the Direct-to-Consumer trend, which was ranked similarly to Diversification. For both Diversification and Direct to Consumer, more sophisticated, scaled models require significant resources for development of assets such as online marketing teams, new logistics, or new equipment to meet new market specifications. But these trends can also include low-lift strategies, such as fishers partnering with their wives to process and sell fish directly to consumers or local grocers or market vendors. The wide range of strategies is in part what makes these trends more likely to persist—there are many potential models for diversification or D2C that can be adapted and applied depending on context.

Diversification and Domestic Market trends positively reinforce each other as well. For example, small-scale fishers that were solely reliant on high end markets (e.g. tourism or export) saw the vulnerability of

83. “Why the Local Shopping Trend Will Be Even Bigger in 2021 | News,” Speciality Food Magazine, May 6, 2021, <https://www.specialityfoodmagazine.com/news/local-shopping-trend-2021>.

this approach and are looking to add new, lower-priced species to their portfolios to meet demand from the domestic market.

“The fishers are receiving a good price with the export market and they are not looking to change the terms of that relationship, but they do want to improve the market for lesser-value species of finfish...I think COVID scared them...they are looking to diversify to be more resilient to those shocks. Showed how vulnerable they were.” –LatAm NGO

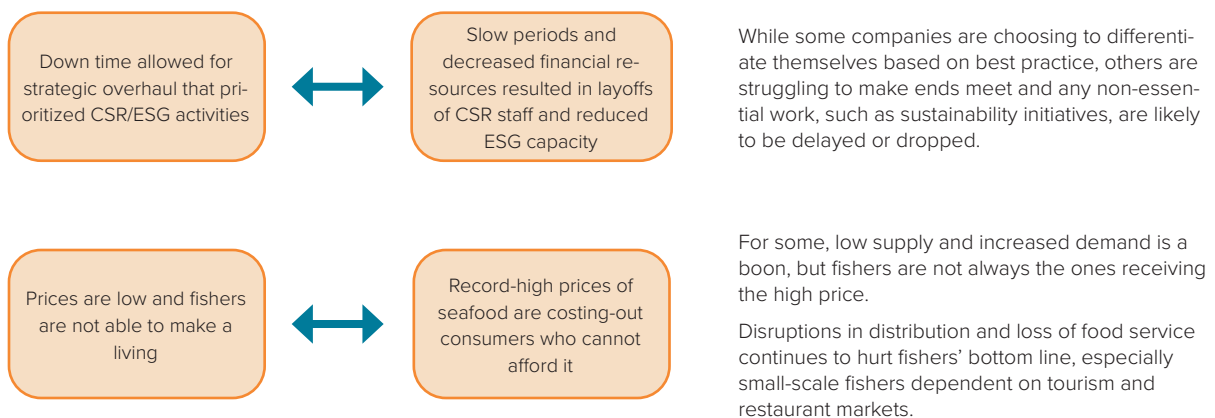
The growing demand for frozen is supported by both Diversification strategies and D2C trends—especially for online sales. Around the world, application of new technologies to improve cold storage and cold chain logistics are underway, driven by multiple forces, including efforts to reduce food waste, improve food security, and for D2C, expand to larger geographic areas. One of the biggest drivers for frozen that we see shifting is consumer preference. Prior to COVID-19, frozen seafood was considered poor quality, or simply, “just not eaten.” But, with consumers wanting to reduce the number of trips to the grocery store or relying on seafood subscriptions through the mail, they began to try and start to accept frozen as a high-quality product, a trend seen from Latin America to the USA to Europe.

The trend **Investment in Buffers** ranked lowest on our durability assessment, mostly because the majority of response strategies and solutions require significant capital—inventory, or enough profits to put some reserves aside for building up cold chain or other capacities. However, while challenging, creating buffers for small-scale fisheries and other vulnerable sectors of the supply chain is not impossible, (e.g. see Rare’s Fish Forever work⁸⁴) and likely one of the more important trends to study in order to determine how to better leverage excess capacity or resources to the greatest effect.

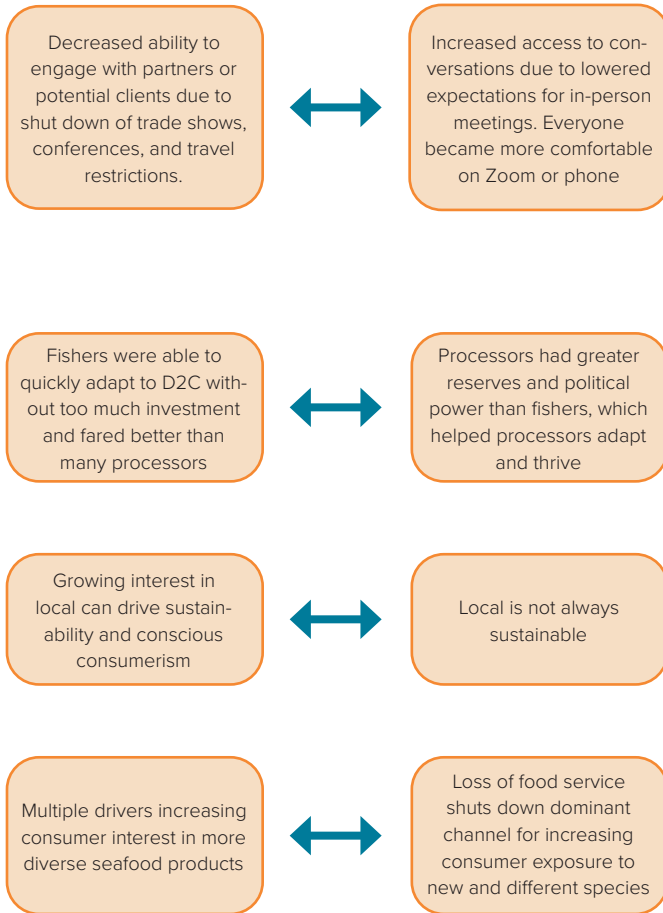
TENSIONS

In addition to patterns that show movement of a system along a particular direction, say towards greater seafood demand, the global seafood system also remains highly contradictory, with initiatives or forces acting in opposite directions in terms of how they push or pull on the system. This makes predicting long-term durability very difficult at this stage. Figure 3 provides highlights of some of the most pronounced contradictions that were revealed through our analysis—these tensions point to opposing responses within the seafood sector.

Figure 3. Tensions point to opposing forces or states in the system; these contradictions can be useful in identifying drivers for change and how different strategies emerge based on underlying enabling conditions.



84. Rare, “Fish Forever,” Rare (blog), accessed October 18, 2021, <https://rare.org/program/fish-forever/>.



There is an opportunity to build on the new “virtual communication norm” to increase access by under-represented groups to engage in policy, management, and business innovation.

Virtual meetings cannot fully replace in-person collaboration.

Old trade relationships remain important, but there is opportunity to expand and cultivate clients like never before.

Digital Access is a key enabling condition for resiliency, but also a key limiting factor

Fishers used networks/community; processors had logistics and financial resources. Fishers are more nimble, less constricted. Processors need to build in flexibility using different tactics.

There is a risk of demand driving overfishing of some domestic fisheries; there is opportunity to leverage demand to push for improved management and best practice in the supply chain.

Restaurants and chefs play a critical role in setting seafood trends and educating consumers. How the loss of this exposure may or may not be countered by the growth in home cooking (supported by shows, online shopping exposure, and meal kits) remains to be seen—especially in the USA.

BUILDING RESILIENCY

Food system literature defines resilience to mean “the capacity over time of a food system and its units at multiple levels, to provide sufficient, appropriate, and accessible food to all, in the face of various and even unforeseen disturbances.”⁸⁵ With over two billion people in the world dependent on wild capture seafood as a primary protein source, and millions more dependent on the seafood trade for their livelihoods, a thriving, equitable, and sustainable seafood industry is critical to long-term food security for the planet, healthy ocean ecosystems, and economic stability for coastal communities around the world. The COVID-19 pandemic, while devastating, presents an opportunity for new innovations and models to take hold and “build forward better” to meet these goals.⁸⁶

We considered how emergent trends in the seafood industry align with concepts of food system resilience discussed in the literature over the past two years.⁸⁷ Specifically, we looked at how trends reflected or included reactive and/or more preventative responses.

85. Love et al., “Emerging COVID-19 Impacts.”

86. Love et al., “Emerging COVID-19 Impacts.”

87. Love et al., “Emerging COVID-19 Impacts”; Bénédicte, “Resilience of Local Food Systems”; Bennett et al., “COVID-19 Pandemic”; Stoll et al., “Alternative Seafood Networks during COVID-19.”

React, Respond, Learn, Adapt

Today, many seafood actors continue to deploy a variety of coping strategies designed to either negate or adapt to ongoing impacts caused by the virus. In some cases, emergent trends are helping these actors to engage in “positive responses” and reduce the likelihood of “negative responses”, thus helping to build system resilience. For example, in the Caribbean, small-scale fishers first began to embrace technology to be able to market fish online, due to the high degree of uncertainty regarding public market openings and closures. This coping strategy has now begun to evolve into a potentially longer-term strategic solution that may confer greater resiliency—these same fishers are now adopting new technologies allowing them to receive digital payments, facilitate transactions online, and organize via virtual platforms with other fishers. The first response helps fishers integrate with more formal financial systems, which could lead to better access to relief funds and loans to deal with future shocks, such as due to hurricanes. The second provides foundation for ongoing advocacy, which could also help with conferring greater resilience to future shocks.

On the other hand, in Chile, the introduction of electronic reporting systems was a response by the government to keep data flowing while officers were restricted from going in the field. However, without a means of verification, the opportunity for fraudulent data entry has increased.

Increasing reports of inaccurate data indicates that siloed electronic system deployment is an inefficient strategy, highlighting the need for continued learning and adaptation. The food system resilience “action cycle,” refined by Love et al., 2021, articulates how “actors and institutions respond to and prepare for disruptions and ongoing environmental, political, and economic stressors using reactive and preventative actions.”⁸⁸ Figure 4 shows how the four trends in the seafood industry reflect reactive and/or preventative responses and Figure 5 provides an example of how different existing strategies fall out along the action cycle.⁸⁹

Figure 4. Emergent trends in Seafood and fit within the food system resilience action cycle.



Diversification as long-term strategy

Reactive into Preventative: Initially a reactive strategy, new trade relationships and investment into diversified products are proving valuable and are perceived as critical to future risk mitigation throughout the supply chain. Fishers investing in microprocessing equipment or wholesalers hiring teams to support expanded sales channels are examples of diversification as a more preventative strategy. This includes investment in analyses that are informing which specific markets (value-add vs. frozen) to invest in specifically.

In particular, the ability to shift to direct-to-consumer models was critical for survival in the early stages of the pandemic. This trend is both reactive and preventative: processors and distributors also picked up on this trend as an early response to move inventory and to make up for losses due to food service shutdowns and international trade disruptions. Learnings from these early experiments have shaped larger strategic investments into direct-to-consumer models, which are still expanding and may reflect longer-term, positive capacity building for resilience.

Reactive into Preventative: Growing global demands for frozen seafood drove an immediate response from processors and distributors: for those already trading in frozen seafood, the capacity to increase sales in this category allowed for quick and positive response early on in the pandemic. For others, the shift to frozen required investment into infrastructure and teams and was based on lessons learned from watching the success of competitors (especially in their capacity to meet retail demands) and from the noticeable shift in consumer (and chef) acceptance of frozen as high-quality and safe. Actors noted frozen as a way to have more control over trade (able to store inventory) and access more types of markets (D2C, retail, and food service). However, a shift to frozen also meant that small-scale fishers who had built premium fresh markets were now either left without any market or had to accept much lower frozen-market prices, which had significant impacts on livelihoods.

88. Love et al., “Emerging COVID-19 Impacts.”, modified from Tendall et al, 2015.

89. Béné, “Resilience of Local Food Systems.”



Investment into Buffers

Preventative: based on learnings from the pandemic, actors are better managing their working capital and investing in building inventory, social capital, and cash reserves to mitigate impact from future shocks. Investment into quota, such as through ITQs, and associated market-development is another example of a buffer that lends resilience capacity.

Reactive into Preventative: Networks have proven invaluable for helping fishers and seafood workers respond constructively and effectively to the pandemic and strengthening these ties will likely serve to build greater resiliency. The use of technology to support virtual meetings has helped increase capacity for fishers, seafood workers, and seafood companies to organize and participate in learning exchanges. New programs, such as Local Catch's Scale Your Catch is an example of network-based solution that aims to "reduce the learning curve for fishing communities by leveraging the collective experience of the Local Catch Network and partnering organizations through workshops, networking and mentorship opportunities, and digital tools."⁹⁰



Seafood Going High Tech

Preventative: Technologies are providing better data, improved communication and connectivity, and smarter, more efficient operations, which all help build capacity for positive response. Learnings regarding how to mitigate for unintended consequences (i.e. increases in inequities due to variable access or increase of fraudulent data due to lack of verification systems) are needed for these strategies to result in greater resilience.



Focus on Domestic Markets

Reactive into Preventative: the abrupt shutdown of international markets caused many suppliers to quickly pivot to domestic retail markets in order to move inventory and stay afloat. Today, these new trade relationships are proving profitable and companies continue to experiment and invest in the models, teams, packaging, and technology (incorporating learnings) to serve domestic markets, citing uncertainty with foreign exports and a desire for diversified strategies as drivers behind this response, which may help build resilience capacity at enterprise, community, and food-system levels.

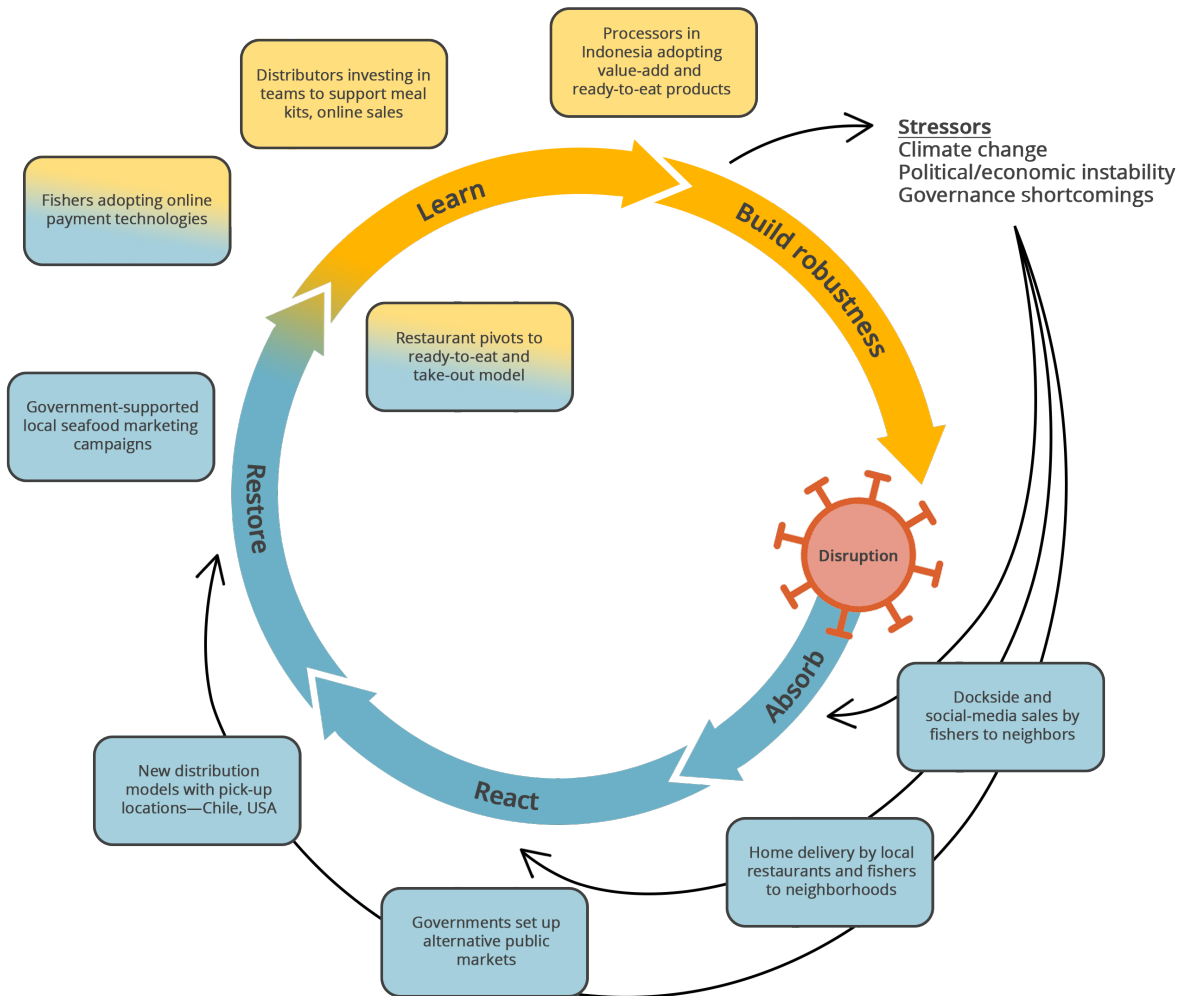


Figure 5 provides an example of how current trends in the seafood sector reflect different types of responses that can coexist within the seafood system. Adapted from Love et al. 2021.

The Role of Impact Investment in Supporting Resilience

The investment community has a unique opportunity to support transition from the reactive to positive preventative responses; frameworks for doing so are already being proposed. For example, The Global Impact Investment Initiative (GIIN) recently launched the R3 Coalition to facilitate COVID-19 related impact investments, and note three phases of investment needs post-COVID-19: response, recovery, and resilience.⁹¹ The response phase funding should be largely grant or government aided emergency funding. Investors, in contrast, should provide bridging loan facilities and relax terms in order to provide investees breathing room to recover operations and infrastructure. Ultimately, the great challenge will come in the resilience phase, which will focus on system change investments that leverage technology, social inclusion, innovations, and collaborative system solutions; likely requiring high-risk capital and new investment approaches.

91. Amit Bouri, "GIIN Response to COVID-19 | The GIIN," GIIN- Global Impact Investing Network, accessed October 18, 2021, <https://thegiin.org/covid19>

Effects on Social Responsibility and Sustainability Initiatives

Healthy oceans and fish stocks, and healthy social conditions within the supply chain, are both critical to building resiliency. First, healthy ecosystems provide more buffers, and greater options for diversification and substitution, during difficult times. Second, improved social conditions allow for stronger cooperation, healthy competition, and access to support services—all of which can serve to increase resilience capacity. Unfortunately, despite the benefits that improved sustainability and social responsibility could bring, these elements are not necessarily emerging as part of the strategic response of actors to the pandemic. Instead, we found a significant Tension regarding the impacts of COVID-19 on the movement for greater social and environmental responsibility.

Prior to COVID-19, several factors were creating momentum for greater social and environmental traction in the sector: the growth of ESG and new blue economy-focused impact investment funds coming online; continued buyer commitments in North America and EU; growing consumer interest in product origin driving traceability; and damning exposes about human rights and labor violations in seafood supply chains, with corresponding initiatives to turn that tide (RISE Platform, Monterey Framework, Triple Impact FIP movement). For some seafood actors, the pandemic has offered a chance to step back and reassess strategies, and emerge with stronger commitments and engagement.

“Our [sustainability] team actually grew. We hired a circular economy director, coastal ecosystem director, and a climate change manager all coming out of the pandemic. So you can see that futuristic vision.” –International Hospitality Business

For others, COVID-19 was a devastating blow that continues to push their business to the limits, leaving little room for consideration of anything but making it through the day. Under such a “survival mode” conditions, sustainability and social responsibility take a back seat, and layoffs often include Corporate Social Responsibility staff.

“Seafood sustainability is not the priority. The losses from COVID, if I need to buy farm salmon to get something on the menu at the right price point to just save my business and pay whoever I can get to show up for work, that is what I have to do.” –US Seafood Consultant

The result is a global stage riddled with both set-backs and opportunities for advancing sustainability and social responsibility objectives throughout the industry.

Set-backs to Sustainability and Social Responsibility Movement

- *Lack of enforcement and significantly reduced monitoring due to travel and movement restrictions has created growing concerns regarding*
 - Worker safety at sea and in processing plants (lack of observers, lack of audits);
 - Challenging conditions and threats to livelihoods of small scale fish vendors
 - Increased rates of illegal fishing and overfishing

- *Layoffs of CSR staff within seafood companies, as well as staff reductions within NGOs, mean fewer human resources dedicated to problem-solving* and pushing initiatives forward during 2020 and into 2021
- *High price of seafood currently undermines certifications*—due to increased demand, some fishers and distributors are receiving premiums without being certified, eroding the value proposition of these models.
- *Loss of food service disproportionately affects small scale fishers* who built businesses differentiating on values of local, quality, and responsible sourcing rewarded by chefs.
- *Logistics disruptions and high shipping costs* are forcing companies to find new sourcing options, which may not always be sustainable.
- *Enormous price sensitivity*, especially in food service, is affecting the ability to push sustainable products that come with premium prices.
- *Direct-to-Consumer and home-delivery growth is creating a packaging and waste crisis*, especially in Asia where most packaging is single-use plastics and styrofoam. These models also may be increasing the carbon footprint of the seafood sector significantly.
- *The value of traceability systems is secondary to personal relationships* -- the ability to immediately access new markets through neighbors, or the capacity to pick up the company rolodex to contact a trusted supplier was repeatedly identified as being of more value for most fishers, companies, and vendors than the ability to track their products through the supply chain.

“Broadline distributors have really struggled...They love what we [sustainable seafood company] are all about. But, post-COVID with so many customers getting out of debt from leases, etc. they need to get lower price. They have to do that because that is what customers need. Huge price sensitivity.” –US Distributor

Opportunities for Advancing Sustainability and Social Responsibility

In contrast to conditions that block or slow social and environmental initiatives, the following conditions have helped to support these efforts:

- *Consumers care about employee well-being.* Growing consumer demand for companies to not only provide safe and hygienic products, but also provide safe and healthy work environments for their employees.⁹²
- *Companies are doubling down on commitments to social and environmental criteria as a differentiator.* The burgeoning direct-to-consumer space is getting crowded—significant competition for online subscriptions and sales means companies must look to more than price and quality to compete.
- *Online sales provide greater opportunity for education and engagement* with consumers, which could help build demand for more responsibly sourced products
- *Potential increase in accountability*, as companies embracing social media and online sales may be more susceptible to public scrutiny by consumers, who turn to social media to both reward and criticize brands.
- *Greater demand for eco-friendly packaging by committed seafood companies* is helping to spur

92. McKinsey & Company. August 2020. Perspectives on Retail and Consumer Goods.

innovation—scaling these solutions requires continued demand and uptake to push down pricing.

- *Increased domestic market exposure to MSC and other certified products* that were rerouted to local markets could support greater market penetration long-term.
- *Traceability and transparency are buoyed* by: 1) increasing demand by consumers to know where their products are from, in order to ensure their product is safe; 2) higher bar set by retail sector than food service in terms of requirements.
 - *“Now companies are looking at steps in the supply chain as places where they are vulnerable, so there is an increased willingness of Asian suppliers to meet standards of the North American market, which are hard. Everyone is raising standards.” International distributor*
- *Companies looking to streamline to stay afloat are reconsidering their “waste”* and driving innovation in recycling and byproduct development.
- *Growing consumer demand for environmental information*, and to a smaller extent, ethical and social information.⁹³

93. European Commission-Oceans and Fisheries, “Eurobarometer.”

Conclusion

The impacts of COVID-19 on individuals, families, communities, businesses, and local economies has been devastating. For the seafood industry, certain aspects of the sector made them particularly vulnerable, including: a dependence on complex global supply chains for distribution, a highly perishable product, a reliance on small-scale operators and migrant workers to support production, and crowded processing operations. Yet, the learnings gained and on-going need for adaptive response offers an enormous opportunity for improving how the global seafood industry can build back better—defined by the UN as more sustainable, inclusive, and resilient.⁹⁴

Several studies have already started to put forward recommendations for how the research, development, industry, and civil-society communities can work to help turn the challenges of COVID-19 into the change that is needed to ensure an environmentally sustainable, socially responsible, and economically viable wild capture seafood industry. Across these different studies, a common refrain is clear: there is urgent need for resources and response efforts **to support long-term strategic planning and adaptation**, over short-term coping. This means organizations must invest in building robust plans and strategies that are ready for activation, should a shock occur.

"Fish and other aquatic animals are a nutritious source of food, one that tends to be more affordable than meat or poultry. When we think about how to recover from this pandemic there needs to be more investment and support given that this sector is an important source of livelihood for so many people" –Ben Belton, senior scientist at WorldFish⁹⁵

In addition, these studies and our interviews included recommendations under the following themes:

- 1. Bridging the Digital Divide** is key to advancing business, social, and environmental benefits across the sector. From small scale to industrial fisheries, individual fish sellers to multinational corporations, the ability to leverage digital systems for communication, business planning, marketing, sales, and to access reliable, relevant information is vital for business success as well as improved management.

"The use of digital technologies, as well as access to the internet, has become essential for accessing medical information and for risk and disaster prevention measures, particularly under current confinement conditions. We suggest

94. United Nations Sustainable Development Group, "UNSDG | Policy Brief: The Impact of COVID-19 on Food Security and Nutrition," Policy Brief (United Nations, June 2020), <https://unsdg.un.org/resources/policy-brief-impact-covid-19-food-security-and-nutrition>, <https://unsdg.un.org/resources/policy-brief-impact-covid-19-food-security-and-nutrition>; Love et al., "Emerging COVID-19 Impacts"; Bennett et al., "COVID-19 Pandemic."

95. SciDev.Net, "Fishers Caught in COVID-19 Net, Sink into Poverty," Phys.org, March 2, 2021, <https://phys.org/news/2021-03-fishers-caught-covid-net-poverty.html>.

supporting the use and access to these technologies, as well as strengthening the capacities of fishing communities in the use of digital tools. Digital strategies should also be combined with non-digital means to ensure that people not familiar with, or unable to access, technology are not left behind” -Gender Equality at Sea, COBI⁹⁶

2. Strengthen local seafood systems: build infrastructure and provide resources to help small scale fishers, processors, and distributors diversify to better serve domestic markets and more effectively connect fishing hubs with nearby communities.⁹⁷ This includes safeguarding working waterfronts⁹⁸ and investment into physical and technological resources to support improved efficiencies, quality, and markets for local seafood trade.

“In terms of market access, the fishing sector is more resilient if it diversifies products, distribution and sales channels, customers, and markets” –Lecciones de una pandemia, EDF⁹⁹

3. Create effective social safety net programs to support small-scale fish producers and traders. This includes conducting research and designing and implementing programs.¹⁰⁰

4. Invest in social capital and networks: The emergence of networks and coalitions was a trend pre-COVID-19, but has proven invaluable for lending resilience at individual, institutional, and system levels. Continued use of digital platforms can help build participation and effectiveness of networks among enterprises and individuals, if digital access issues are addressed.

“It has helped us, as a cooperative, to stand together, to define each of our roles, and better organize the cooperative.” –Processing plant worker, Mexico, cited in COBI’s Principles for the New Normal in small-scale fisheries report.¹⁰¹

5. Improve women’s access to new opportunity areas: COVID-19 hit women especially hard. There is urgent need to understand and design solutions that not only alleviate the immediate crisis many women seafood workers face, but also build strategies that help reposition women to better take advantage of new opportunities, including:

- a. Skills in digital technologies, including e-commerce and online marketing¹⁰²

96. COBI, “Gender Equality at Sea?”

97. Cristina Pita, “Life and Livelihoods: The Impact of COVID-19 on Small-Scale Fishing Communities,” International Institute for Environment and Development, June 8, 2021, <https://www.iied.org/life-livelihoods-impact-covid-19-small-scale-fishing-communities>; Stoll et al., “Alternative Seafood Networks during COVID-19.”

98. Philip Loring, Hannah Harrison, and Emily De Sousa, “Coastal Routes Radio,” Soundcloud, Social FIShtancing, accessed October 18, 2021, <https://coastalroutes.org/podcasts>.

99. Environmental Defense Fund Mexico, “Lecciones De Una Pandemia: Poniendo a prueba la resiliencia del sector pesquero mexicano” (Environmental Defense Fund Mexico, n.d.), <https://mexico.edf.org/sites/mexico.edf.org/files/Lecciones%20de%20una%20pandemia-Revisi%C3%B3n%20final%20v.1.5.pdf>.

100. Love et al., “Emerging COVID-19 Impacts”; Cristina Pita, “Life and Livelihoods”; FAO, Impact of COVID-19 on Fisheries and Aquaculture.

101. COBI, “Principles for the New Normal in Small-Scale Fisheries,” Monthly Report (COBI- Comunidad y Biodiversidad, December 7, 2020).

102. Kaewnuratchadasorn et al., “Capturing the Impacts of COVID-19.”

- b. Microprocessing and value-add
- c. Support relief measures and business investments that realistically consider the economic, social, and environmental effects of the pandemic on all members of society, particularly vulnerable groups¹⁰³

6. Continue to focus on increasing value, not volume. Alternative seafood networks and models that train and empower fishers and local communities to capture more value from the resource can help incentivize best practices on the water and distribute the benefits of the fishery to more members of the community, including women and youth.¹⁰⁴

7. Leverage consumer trends to grow demand for (responsible) seafood. From the USA to Chile to Europe to Asia, consumers are changing the way they shop, cook, and consume their meals, including seafood. The following trends all can be leveraged to build awareness and consumer demand for responsible seafood:

- a. Growing interest in sustainability, including impacts of food production on climate change and ocean ecosystems.¹⁰⁵
- b. New research on the health benefits of seafood and increased desire for healthy meal options.
- c. Convenience—consumers want easy, fast, and portable.
- d. Interest in supporting local businesses

8. Unlock Finance for small scale fisheries via radical systemic approach: Current financing is not enough; new approaches that build catalytic vehicles, similar to what is happening in other sectors such as with Climate KIC or 1000 Landscapes, is necessary.¹⁰⁶ Such an approach would allow enough funding from public, impact, and private finance to tackle the two needed types of investments:

- a. Enabling Investments** that are related to enabling conditions of the fishery and set the foundation of systems change, including formalization and governance, regulatory frameworks and financial readiness and capacities. These require high-risk grant and catalytic resources;
- b. Return Investments** related to direct investments in investable entities or projects funding innovations, operations, CAPEX and infrastructure, which have a focus in return of investment and targets Impact or even ESG and commercial investors and potentially catalyzing them via blended finance approaches.

As Nicole DeHoratius, adjunct professor of operations management at the University of Chicago's Booth School of Business, recently noted: *"We might be able to buffer against one type of risk or two types of risk, but it's the fact that all these challenges are happening at the same time."*¹⁰⁷

103. COBI, "Gender Equality at Sea?"

104. Kaewnuratchadasorn et al., "Capturing the Impacts of COVID-19."

105. Alyssa Wooden, "Food Trends for 2021 Focus on Diverse Cuisines, Home Cooking and Sustainability," John Hopkins Center for a Livable Future, January 14, 2021, <https://clf.jhsph.edu/viewpoints/food-trends-2021-focus-diverse-cuisines-home-cooking-and-sustainability>; Ruiz-Salmón et al., "Fishing and Seafood Sector in the Time of COVID-19."

106. <https://www.climate-kic.org/>; <https://landscapes.global/>

107. Jon Healey and Samantha Masunaga, "When Will Supply Chains Be Back to Normal? And How Did Things Get so Bad?," Los Angeles Times, October 14, 2021, sec. Business, <https://www.latimes.com/business/story/2021-10-13/the-global-supply-chain-is-a-mess-what-does-that-mean-for-you>.

And herein lies the heart of the issue—COVID-19 has impacted almost every facet of our lives from the personal to the professional, at home and abroad. The complex variety of interdependent factors at play impacting actors across the seafood supply chain cannot be addressed individually; rather, systemic, collaborative responses at both the local and global levels will require additional financial investment to ensure longevity and growth.

There should also not be any assumptions made that things will ever “return to normal”. COVID is far from over, particularly for the majority of producer nations, and there is no way to predict the likelihood or ferocity of future variants. Even once this particular crisis has passed, there is no avoiding the impacts to come of climate change; we are heading for a world with increased levels of resource scarcity, loss of income and food for local fishers and farmers, forced migrations, global political instability, and supply chain disruptions.

While the business impacts of COVID-19 have been devastating for many, this high pressure situation has also led to the creation of new, resilient innovations and models. The path to build forward better requires we ensure more resilient systems are created—we must continue to test and increase our understanding of what elements build resiliency and then act on that knowledge.

APPENDIX 1:

Approach

This research included a series of separate analyses that synthesized data from published material as well as extensive interviews with stakeholders within the global seafood trade. We compiled publications from 2020 and then periodically scanned for news media, white papers, and academic publications from Jan 1, 2021 through Oct 10, 2021 that focused on seafood and the pandemic. We also attended or watched recorded sessions of relevant webinars and virtual conferences. Select content was more deeply analyzed depending on fit with specific geographies, fisheries, and supply chains as well as credibility of source, in order to fill gaps and ensure a high diversity of impacts and contexts.

As other reports have noted,¹⁰⁸ social media and 24 hour news cycles provide variable degrees of reliable information; this, combined with a constantly evolving situation, makes comprehensive and accurate assessments a challenge. We therefore complemented the literature and online content review with in-depth, informal interviews with 65 stakeholders from around the world. These individuals represent a range of expertise and perspective (Table A1).

Table A1. Interviews conducted with seafood actors and experts from March 1, 2021 through October 15, 2021.

Category	Geographies represented	Number of Interviewees
Fishers	Peru, Chile, USA, Indonesia	8
Fisher or Industry Associations	USA, Global	3
Processors/Distributors	Chile, Peru, Indonesia, USA, Canada, Mexico, Caribbean, Central America, UK, Ireland, Pacific Islands	23
Direct-to-Consumer (Primary business)	Brazil, Chile, Indonesia, Peru, USA	9
Markets (restaurants, hospitality)	USA, Chile, Peru, Mexico,	4
Government, NGOs, researchers, and seafood industry consultants/ experts	USA, Indonesia, UK, China, EU, Canada, Peru, Mexico	18
Total		65

Interviews helped to validate themes and patterns, and in particular, focused on understanding the “why” behind specific responses, as well as the continued challenges and external drivers of change that are influencing strategic decisions. Interviewees were also asked to share their thoughts on the future of the industry given current conditions. Interviews were conducted between Mar 1 and Oct 15, 2021.

We also looked at changes in fishing activity and consumer trends in seven countries: Canada, Chile, Indonesia, Mexico, Peru, Spain, and the USA. We selected these based upon diversity of geography, and importance as producers, markets, or both, for global wild capture seafood trade. We examined industrial fishing activity using data from Global Fishing Watch (GFW). The data consists of vessel movements and inferred fishing behavior based on machine learning algorithms. We expand upon previous studies that analyzed Google search trends, to explore changes in consumer search behavior as a proxy

108. Christophe Béné, “Resilience of Local Food Systems and Links to Food Security – A Review of Some Important Concepts in the Context of COVID-19 and Other Shocks,” *Food Security* 12, no. 4 (August 2020): 805–22, <https://doi.org/10.1007/s12571-020-01076-1>.

for consumer behavior shifts in response to COVID-19.¹⁰⁹ We extracted search trend data from Google Trends (<https://trends.google.com>) in the Food and Drink category for keyword web search terms of “food” and “seafood; “restaurant” and “seafood restaurant”, “food delivery”, and “seafood delivery” with equivalent terms in for each country. Country-specific language was verified by experts from each country. We compared daily search patterns of the past five years.

Content from publications and interviews were parsed into different categories: initial impacts; initial response; outcomes—current conditions and strategies; on-going challenges and needs; and future reflections. This pattern-finding analysis helped us identify common themes and trends across the global landscape, which were then compared with findings from the GFW and Google trends analyses.

We ran a foresighting analysis to examine the different enabling conditions and the drivers that most influence these trends to assess durability. We also looked at how strategies within trends aligned with concepts of resiliency, based on proposed frameworks within the literature.¹¹⁰ Finally, we explored tensions in the system to gain additional insight into how certain trends may shift over time depending on the evolution of a few dominant forces on the system. We conclude with a reflection and synthesis of recommendations from the literature and expert interviews that highlight where resources and efforts can be best directed to “build back better.”

109. Easton R. White et al., “Early Effects of COVID-19 on US Fisheries and Seafood Consumption,” *Fish and Fisheries* 22, no. 1 (January 2021): 232–39, <https://doi.org/10.1111/faf.12525>; Joshua S Stoll et al., “Alternative Seafood Networks during COVID-19: Implications for Resilience and Sustainability,” *Frontiers in Sustainable Food Systems*, March 31, 2021, 26, <https://doi.org/10.3389/fsufs.2021.614368>.

110. David C. Love et al., “Emerging COVID-19 Impacts, Responses, and Lessons for Building Resilience in the Seafood System,” *Global Food Security* 28 (March 2021): 100494, <https://doi.org/10.1016/j.gfs.2021.100494>; Béné, “Resilience of Local Food Systems”; Stoll et al., “Alternative Seafood Networks during COVID-19.”

APPENDIX 2:

Resources

Multiple organizations have taken on the burden of curating publications and content related to COVID-19 impacts on the seafood industry, particularly for small-scale fishers. Due to the dynamic nature of this space, we recommend readers check in with the following sources for the most current content:

1. [*Blue Ventures COVID-19 Resource Library*](#)
2. [*Sustainable Fisheries Partnership COVID-19 Resource Library*](#)
3. [*Too Big To Ignore COVID-19 Resource Library*](#)
4. [*FAO COVID-19 Resource Library*](#)

The following list is a selection of some of the key publications that we incorporated into our analysis. For a full list of resources, including all the citations contained within this report, please email: hello@futureoffish.org with the subject line “Resource List Request for COVID Impact Report”.

Key Resources:

Bassett, Hannah R., Jacqueline Lau, Christopher Giordano, Sharon K. Suri, Sahir Advani, and Sonia Sharan. “Preliminary Lessons from COVID-19 Disruptions of Small-Scale Fishery Supply Chains.” *World Development* 143 (July 2021): 105473. <https://doi.org/10.1016/j.worlddev.2021.105473>.

COBI. “Gender Equality at Sea? An Analysis During the COVID-19 Pandemic.” *Monthly Report*. COBI- Comunidad y Biodiversidad, August 3, 2020. <https://cobi.org.mx/wp-content/uploads/2020/08/COBI-Gender-and-COVID19-3-August.pdf>.

———. “Principles for the New Normal in Small-Scale Fisheries.” *Monthly Report*. COBI- Comunidad y Biodiversidad, December 7, 2020.

———. “The Environmental Impacts of COVID-19: Perspectives from Fishing Communities.” *Monthly Report*. COBI- Comunidad y Biodiversidad, November 16, 2020.

———. “The Technological Revolution and the Digital Divide in Times of the COVID-19 Pandemic.” *Monthly Report*. COBI- Comunidad y Biodiversidad, October 5, 2020.

FAO. *How Is COVID-19 Affecting the Fisheries and Aquaculture Food Systems*. Rome: FAO, 2020. <https://doi.org/10.4060/ca8637en>.

———. *Summary of the Impacts of the COVID-19 Pandemic on the Fisheries and Aquaculture Sector*. FAO, 2020. <https://doi.org/10.4060/ca9349en>.

———. *The Impact of COVID-19 on Fisheries and Aquaculture Food Systems, Possible Responses*. FAO, 2020. <https://doi.org/10.4060/cb2537en>.

Love, David C., Edward H. Allison, Frank Asche, Ben Belton, Richard S. Cottrell, Halley E. Froehlich, Jessica A. Gephart, et al. “Emerging COVID-19 Impacts, Responses, and Lessons for Building Resilience in the Seafood System.” *Global Food Security* 28 (March 2021): 100494. <https://doi.org/10.1016/j>

gfs.2021.100494.

Ruiz-Salmón, Israel, Ana Fernández-Ríos, Cristina Campos, Jara Laso, María Margallo, and Rubén Aldaco. "The Fishing and Seafood Sector in the Time of COVID-19: Considerations for Local and Global Opportunities and Responses." *Current Opinion in Environmental Science & Health* 23 (October 1, 2021): 100286. <https://doi.org/10.1016/j.coesh.2021.100286>.

Stoll, Joshua S, Hannah L Harrison, Emily De Sousa, Debra Callaway, Melissa Collier, Kelly Harrell, Buck Jones, et al. "Alternative Seafood Networks during COVID-19: Implications for Resilience and Sustainability." *Frontiers in Sustainable Food Systems*, March 31, 2021, 26. <https://doi.org/10.3389/fsufs.2021.614368>.

Sustainable Fisheries Partnership Foundation. "Impacts of COVID-19 in Target 75 Fisheries. Summary of Preliminary Findings." Honolulu: Sustainable Fisheries Partnership Foundation, 2020. <https://globalmarinecommodities.org/en/publications/impacts-of-covid-19-in-target-75-fisheries/>.

APPENDIX 3:

Effects of COVID-19 through 2020

The COVID-19 pandemic has impacted every economic sector, in every country around the world. Table A2 summarizes some of the broader impacts beyond seafood that occurred during the first six months, many of which remain ongoing today.

Table A2. Summary of some of the major non-seafood-specific impacts and effects of the pandemic during 2020.

Impact	Short-term Effect (March-June 2020)	Medium-term Effect (through 2020)
Food service industry crash	<ul style="list-style-type: none"> Restaurant temporary closures Hoarding and retail rush for shelf-stable goods 	<ul style="list-style-type: none"> Restaurants operating at limited capacity; uncertainty high regarding opening/ closures Expansion of product offerings within retail (absorption of some traditional food service products) and increase in frozen/ shelf-stable offerings Increase options for home delivery and online shopping Restaurants reconfigure to support outdoor dining; expand take-out and delivery options Continuation of 'work from home' paradigm forces second wave of restaurant closures in highly urban areas
Tourism crash	<ul style="list-style-type: none"> Reduced air travel Reduced hotel stays Loss of premium local markets 	<ul style="list-style-type: none"> Governments begin developing "safe-travel" programs Air freight significantly reduced Demand for high-end seafood products remains low within some producing countries Household income reduced especially for tourism-dependent economies Increase in domestic tourism in Developed Countries
Logistic failures ¹¹¹	<ul style="list-style-type: none"> Imports reduced or significantly delayed; Exports diverted to domestic markets where possible Local food gluts and waste due to lack of cold storage and closure of local markets 	<ul style="list-style-type: none"> Price increase of goods Limited supply of goods Increased food insecurity

111. Ian Twinn et al., "The Impact of COVID-19 on Logistics" (International Finance Corporation-World Bank Group, June 2020).

Non-essential business initiatives put on hold	Temporary loss of innovation and experimentation	Some businesses use slow-down to rethink strategy Business innovation focused on responding to COVID-19 conditions rather than growth or larger ESG opportunities
Governments unlock financial resources	Push for immediate cash relief to those who have lost income	Continued government relief efforts in varied forms ¹¹² Employees not returning to pre-COVID-19 jobs
Travel bans	Delayed timelines for audits, certifications, inspections; Reduced enforcement of trade-related activities where it continues Migrant workers stranded	Labor crisis ensues with restrictions on migrant workforce affecting some fisheries (tuna in Pacific; Alaskan salmon) Conferences and trade shows move to virtual formats, including governance and management convenings (i.e. RFMOs)
Digital Surge	Video conferencing services like Zoom see 10X increase in usage in Developed Countries' work and education sphere	Digital divide is felt more acutely than before
Lack of workers/ employees	Increased product prices Insufficient supply Reduced MCS capacity	Many jobs remain unfilled Increased prices for consumers Increase in potential for IUU and loss of monitoring/scientific data
Trade Restrictions	Changes in food consumption patterns (?) Creation of new local markets	

Within the seafood sector, disruptions from COVID-19 and responses have been highly variable, depending on geography, supply chain node, and government actions. The initial impacts and responses for each node of a generic seafood supply chain are summarized in Table A3. Information is based on the literature and interviews with industry stakeholders.

Table A3. Initial impact (shock) from the pandemic, and corresponding response-- these are the common, immediate reactions; some of these responses have proven to be on-going strategies.

Supply Chain Node	Initial Impacts	Initial Response
Fishers and crew	Movement restrictions and lockdowns Outbreaks on vessels Inability to come to port or inability to return home	<ul style="list-style-type: none"> Stopped fishing due to: <ol style="list-style-type: none"> 1. restrictions on movement 2. fear of contagion 3. lack of markets (shut down of public markets, tourism market) 4. low prices (due to lack of markets) Start selling via word of mouth and social media to hyper-local markets

112. Industrias Pesqueras, "Subpesca promete más ayudas COVID para los pescadores artesanales de Chile," August 3, 2021, <https://industriaspesqueras.com/noticia-66973-sec-Portada>.

First Receivers/ Processors	Movement restrictions and lockdowns	<ul style="list-style-type: none"> • Decreased prices to fishers • Closed plants/ facilities • Inventory overflow leading to product spoilage and low prices • Reduced labor • Increased production for canned/ shelf-stable products (tuna) • Pivot to supply retail market
Distributors/ Wholesalers	Movement restrictions and lockdowns Asian markets collapsed Food Service collapsed	<ul style="list-style-type: none"> • Pivot to supply retail market • Sourcing shifts away from fresh to frozen and shelf-stable • Expand domestic market trade relationships • Expand sourcing to secure steady supply
Retail	Capacity limits Massive demand for shelf-stable products	<ul style="list-style-type: none"> • Limit hours and capacity • Close fresh counters • Increase orders for canned tuna and frozen seafood products such as fish sticks
Restaurants	Closures Support community response	<ul style="list-style-type: none"> • Serve as community meal kitchens • Begin to offer home deliveries and take out
Consumer	Movement restrictions and lockdowns Temporary job loss	<ul style="list-style-type: none"> • Start hoarding retail/grocery items • Reduce spending on dining out • Reduce consumption of food • Support local D2C opportunities

From these initial responses, a wave of ripple effects then occurred. These second-order or cascading effects become far more diverse due to the highly variable nature of seafood supply chains and the differential response of governments to continued COVID-19 outbreaks and corresponding different perceptions of risk from fishers to consumers. This “second phase” continued through Q4 2020 and into Q1 2021 and reflected a mixture of coping or “reactive” responses to the continued shock of COVID-19, and emergence of some more strategic responses that incorporate analyses and learnings in an attempt to adapt to perceived new conditions and opportunities.

HIGHLIGHTS FROM 2020 GLOBAL IMPACTS AND RESPONSES BY SUPPLY CHAIN NODE (RIPPLE EFFECTS)

Production

- **Fishers continued to experience drops in landings revenue** through fall 2020.¹¹³ For example, for Hawaii’s longline fleet, which sells iced, high-quality pelagics such as ahi, ono, and mahi mahi, low prices continued through Q1 of 2021; tuna fishers in Indonesia also continued to report low prices. In Peru, many fishers stopped operating due to lack of demand, with some SSF reporting a dip of up to 66 percent in sales prices. Small scale fishers dependent on tourism, such as throughout the Caribbean, also suffered from continued restrictions on travel.

113. Virgil Group, “Seafood Market Diversification in the Post-Pandemic Era,” May 2021.

- **Fear of contamination deterred fishers from fishing**; while this effect was seen in developed countries, it was especially pronounced in coastal communities where healthcare is limited and risk of contagion was high, such as Chile.¹¹⁴
- **Expansion into direct-to-consumer (D2C) sales gained momentum** around the globe, with significant increases seen in delivery services and online sales platforms. In countries such as South Africa, new seafood sales platforms such as Fish With a Story¹¹⁵ thrived in pandemic times. For additional information on D2C trends, please see Future of Fish's report "*Direct-to-Consumer (D2C) Strategies for Seafood.*"
- **Increase in illegal fishing activities** has been fueled by decreased enforcement and loss of livelihood (more people turning to fishing for food and income).¹¹⁶

Processors

- **Processors continued to navigate uncertainty with outbreaks in plants** continuing to occur through 2020 in both developed and developing world. For some processors, such as in Chile and Poland, operations continued to advance without any interruption; in places like the US Pacific Northwest, India, and Thailand, plants had to shut down due to outbreaks. SE Asian countries, many of them headquarters for tuna processing, continue to battle outbreaks in processing plants into Q3 of 2021.¹¹⁷
- **Reconfiguration of operations** to accommodate social distancing and the continued increase in demand from retail, including expansion of facilities; new equipment and packaging that meets single-serve or ready-to-eat products; and increase in canned goods production.¹¹⁸
- **Launch of healthcare services for workers** including on-site testing, and providing housing and transportation to reduce exposure risk.
- **Redirecting product flows to support food security**: Some countries, such as Costa Rica and Cambodia, banned or limited export of seafood products as a way of managing food insecurity risk, forcing processors to restructure their supply chains.¹¹⁹

Wholesalers/Distributors

- **Uncertainty in supply and demand**, especially with processing shut downs and delays at ports. Those with more diverse networks, especially in terms of having multiple sourcing options, fared better.
- **Experimentation with direct-to-consumer platforms** often via websites supported by platforms such as Shopify.

114. Virgil Group, "Seafood Market Diversification."

115. Abalobi, "Fish With A Social & Ecological Story – Rethinking the Way We Eat Fish," Fish With A Story, accessed October 19, 2021, <http://fishwith-astory.org/>.

116. MPA News Staff, "MPAs, COVID-19, and the Coming Financial Crisis: What Impacts Are Practitioners Already Seeing, and How Are They Responding? | MPA News," MPA News (blog), May 7, 2020, <https://mpanews.openchannels.org/news/mpa-news/mpas-covid-19-and-coming-financial-crisis-what-impacts-are-practitioners-already>.

117. ATUNA, "Vaccinations in Three Major Asian Processing Nations Still Very Limited," ATUNA News, August 18, 2021.

118. Piotr Rucinski and Jolanta Figurska, "Poland: Fish and Seafood Market Brief," Attaché Report, Global Agricultural Information Network (GAIN) (Warsaw, Poland: United States Department of Agriculture - Foreign Agricultural Service, June 11, 2021), <https://www.fas.usda.gov/data/poland-fish-and-seafood-market-brief>; NOAA Fisheries, "NOAA Fisheries Updated Impact Assessment of the COVID-19 Crisis on the U.S. Commercial Seafood and Recreational For-Hire/Charter Industries," n.d., 6.

119. Edward Oteng Asante, Genevieve Kuntu Blankson, and Gabriela Sabau, "Building Back Sustainably: COVID-19 Impact and Adaptation in Newfoundland and Labrador Fisheries," Sustainability 13, no. 4 (February 19, 2021): 2219, <https://doi.org/10.3390/su13042219>.

Retailers

- **Increased sales of seafood** continued through 2020, but experienced a dip during the summer when restaurants began to open back up. The second wave of COVID, especially in the EU and UK, forced consumers back to in-home dining, supporting continued retail sales through fall of 2020 but with extreme volatility.¹²⁰ For retailers across multiple countries, seafood sales remained stronger than pre-COVID-19 conditions, including in the UK, USA, Poland, and Portugal.

Increased growth in online shopping, especially via platforms such as Instacart, which brought in \$15.7 billion in online food and beverage sales in 2020¹²¹ and sites such as Mercato and FreshDirect, which support smaller, independent grocers and online “storefronts” to sell products online to local clientele, helped to drive this trend. In the US, e-commerce seafood sales tripled to reach \$1 billion in 2020.¹²² In Latin America, e-commerce growth was highest of all regions in the world, at over 36 percent.¹²³

Continued interest in ready-to-eat and convenient seafood options (see consumer trends below)

Uncertainty with local markets continued as different waves of COVID-19 led to changes in access to public markets, where many consumers purchase seafood around the world. This uncertainty extended to festivals, which can be important sources of revenue but were mostly cancelled during 2020.

The O Grove Seafood Festival in Galicia, Spain was canceled in 2020 due to the pandemic. This gastronomic festival has been running for close to 60 years and was previously declared a festival of National Touristic Interest. In recent years, more than 200,000 visitors have attended the event, so one can imagine the cancelation dealt a palpable blow to Galicia's regional seafood sector.¹²⁴

Restaurants/Food Service

- **Restaurant closures**, many permanent, continued through 2020 and into 2021. As of March/April 2021, over 110,000 restaurants had closed in the USA.¹²⁵
- **Reduction in numbers of consumers eating out** meant reduced revenues even for those businesses that did remain open. For example, at the end of Q1 2021, over 40 percent of US consumers interviewed stated they “definitely avoided eating out.”¹²⁶
- **Hotel business remained low**, especially in terms of banquets and other catered events.
- Continued use of **home dining options** for consumers, such as special grab-and-go menus or cook-at-home meals
- **Expansion of physical dining spaces** remains a focus as restaurants continue to build or expand outdoor extensions to accommodate additional diners while maintaining social distancing

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Consumers

- **Growing interest in frozen and shelf-stable products** continued through 2020. As consumers continued to face unemployment and financial uncertainty, interest in lower-cost seafood products with longer shelf life has increased.¹²⁷
- **The appeal of healthy and convenient options** remained strong. Despite the reopening of restaurants, consumers still looked for at-home alternatives that were quick and healthy.¹²⁸ From Mexico to Chile, small and large retail outlets and restaurants looked to meet this demand by adjusting their offerings.
- **Desire for multiple options** marked consumer attitudes towards food shopping, including seafood. As food service began to come online in the fall of 2020, many consumers continued to explore online seafood shopping options, including meal kits, take-out from local restaurants, and “click-n-pick” grocery store shopping, in addition to in-person trips to the grocery store and eating out at restaurants.
- **At global-scale, demand for seafood is down with some exceptions.** In a fall 2020 study, 53.1 percent of Chinese consumers self-reported they reduced their seafood consumption.¹²⁹ In the EU, seafood consumption also dropped within households in Poland, Italy, and Spain. In low and middle income countries (LMICs), individuals struggling with reduced income can no longer afford fish, and fishers and fish vendors are struggling to sell their products.¹³⁰ In the US, the loss of food service has not been fully made up for by greater demand from retail but consumers did increase online searches for seafood delivery, takeout, and recipes and turned to alternative seafood networks (local distribution) during the initial months of the pandemic.¹³¹

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