

Opportunities in Alternative Seafood

June 25, 2020



Overview

1. **Why alternative seafood and the current market** - The Good Food Institute
 - Introduction to GFI
 - Projected global seafood demand
 - Advantages of plant-based and cultivated seafood
 - The current state of the alternative seafood market
2. **Future consumer trends** - Changing Tastes
 - How will we eat seafood in the U.S. in the next 3-5 years?
 - Data from consumers, menus, and foodservice purchasing decision-makers

Introduction to GFI and alternative proteins

A hand holding a small green seedling against a teal background. The seedling has two leaves and a small bud. The background is a blurred image of trees and foliage, overlaid with a solid teal color.

Our Mission

Harnessing the power of food innovation & markets to accelerate plant-based and cultivated meat, eggs, and dairy to create a sustainable, healthy, and just food system.

How will we feed 10 billion people by 2050?



Sustainably



Efficiently



Safely

Three categories of alternative seafood

PLANT-BASED PROTEINS

Sophie's
KITCHEN



FERMENTATION



CULTIVATED MEAT



The Good Food Institute

Accelerating the shift to a sustainable, healthy, and just food system through three key areas of work:



Science and Technology

Advancing and open-sourcing the foundational science of plant-based and cultivated meat



Corporate Engagement

Consulting with the world's biggest food companies to help them capitalize on opportunities in the plant-based market and supporting startups to drive innovation



Policy

Advocating for fair regulation of plant-based and clean meat and lobbying for governmental investment in sustainable protein R&D



GFI officially earned GuideStar's 2020 Platinum Seal of Transparency - obtained by less than 1% of nonprofits - reflecting our commitment to maximum impact, efficiency, and inclusion.

We act as a force multiplier, bringing the expertise of our departments to the rest of the world.



UNITED STATES
BRAZIL
INDIA

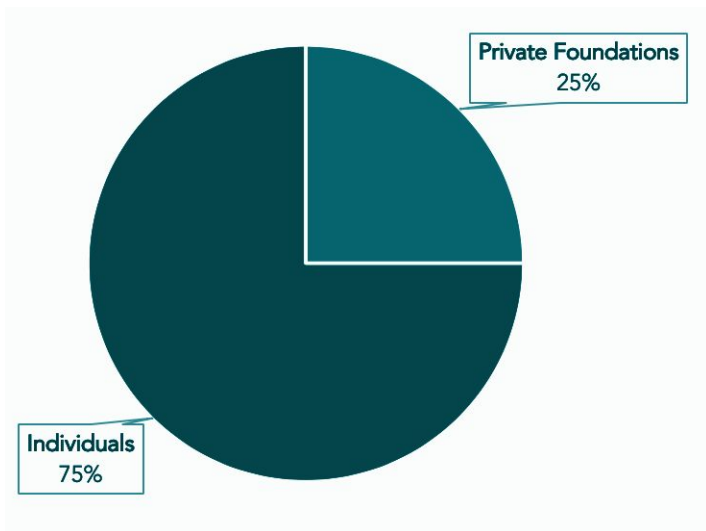
ISRAEL
EUROPE
ASIA PACIFIC

90+ staff in 6 countries

How GFI is funded

GFI is 100% powered by philanthropy.

Our 2,800+ donors include:



We accept corporate support:

Event sponsorship:



- Kellogg's MorningStar Farms
- Beyond Meat
- EY

Supporting GFI's Research Grant Program:



Funds critical alternative protein open access research and connects researchers to private sector partners.

Keep up with the news from GFI



Sustainable Seafood Initiative newsletter
(launching this summer)

<https://go.gfi.org/seafood-newsletter>



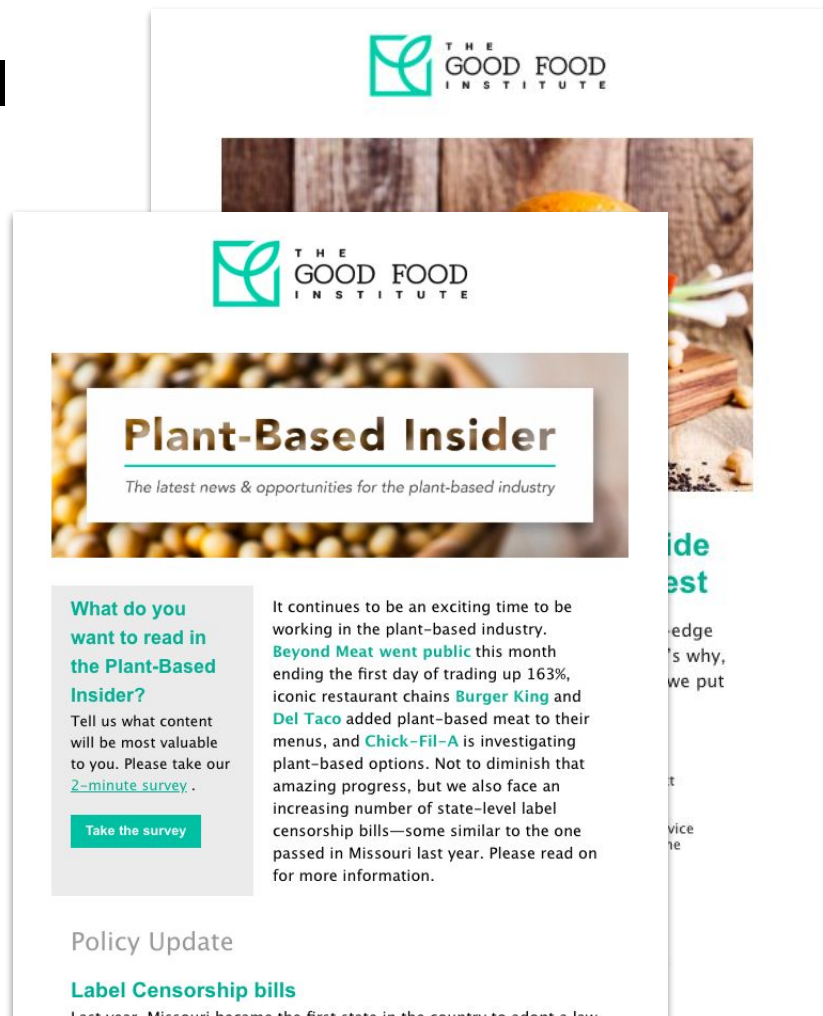
Plant-Based Insider

<https://www.gfi.org/insider>



GFI e-news

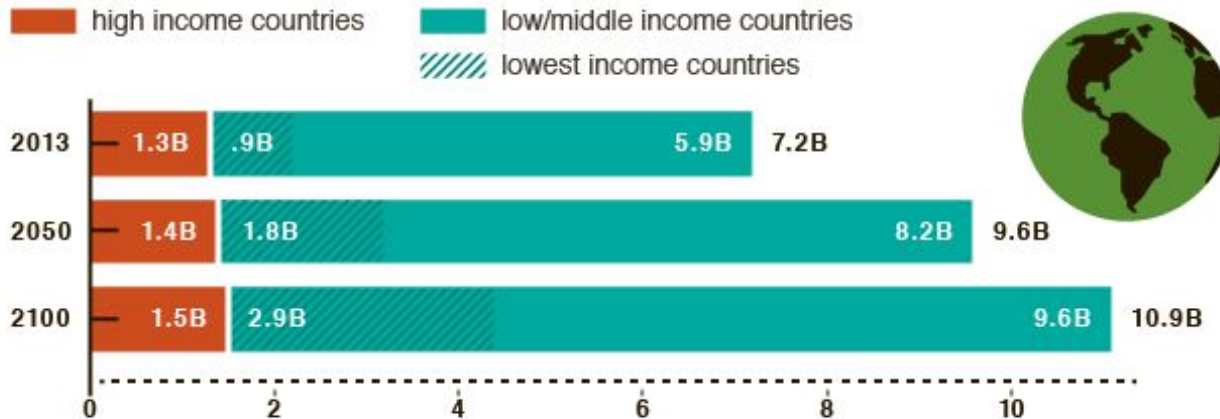
<https://www.gfi.org/e-newsletter>



Global seafood demand is on the rise.

Projected population growth

High population growth is projected in low- and middle-income countries.



Source: UN-DESA, 2013

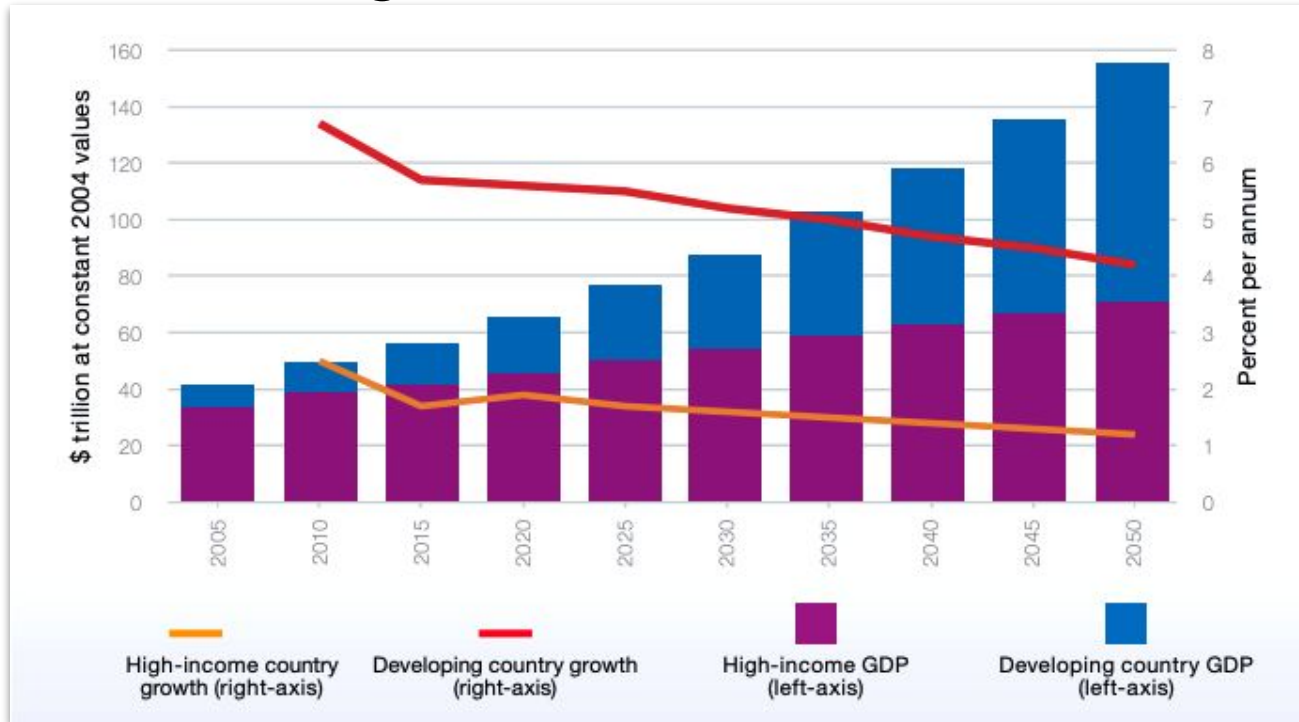
Big Facts
ccafrs.cgiar.org/bigfacts



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Projected income growth

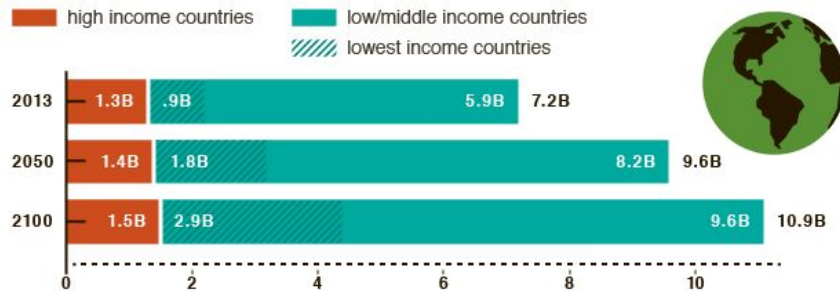


Source: Simulation results with World Bank model, 2009

Growing global demand for seafood

Global demand for seafood is projected to be 30% higher than 2010 levels by 2030.

High population growth is projected in low- and middle-income countries.



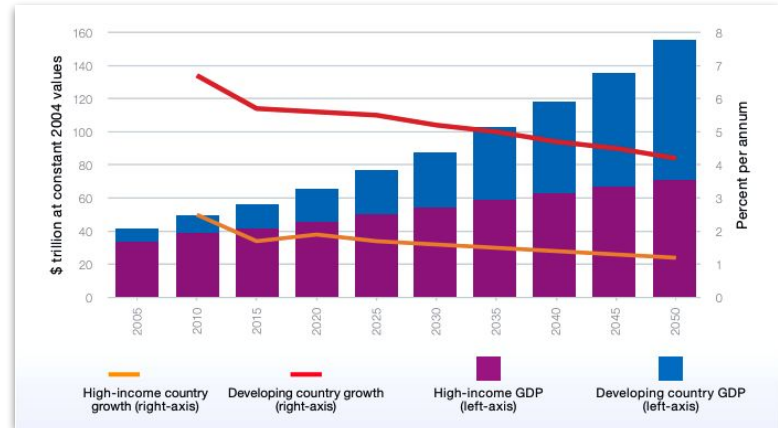
Source: UN-DESA, 2013

Big Facts

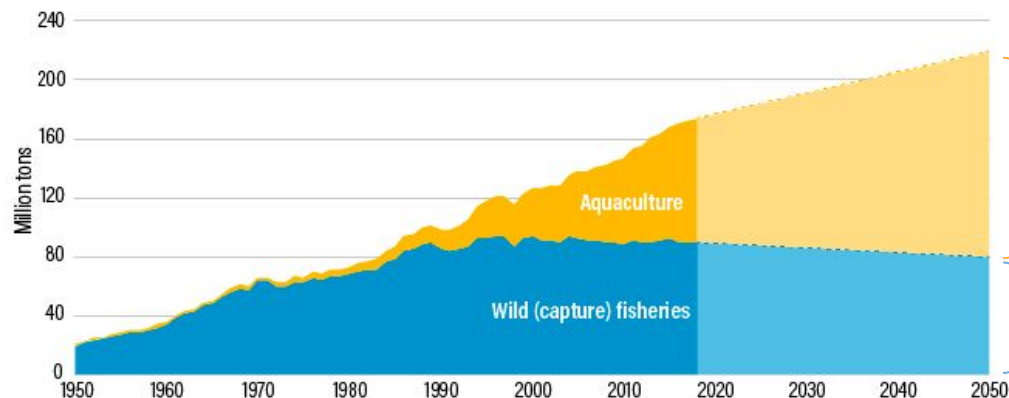
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RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Projected seafood demand



How will we meet increasing demand?

Aquaculture growth is only anticipated to keep pace with increased demand for 17 countries, while around 170 countries will be left with substantial unmet demand (2017 FAO study).

Marginal increases in wild-caught seafood

Sources: Historical data, 1950–2016: FAO (2017b) and FAO (2018).
Projections to 2050: Calculated at WRI; assumes 10 percent reduction in wild fish catch from 2010 levels by 2050, linear growth of aquaculture production of 2 Mt per year between 2010 and 2050.

 WORLD RESOURCES INSTITUTE

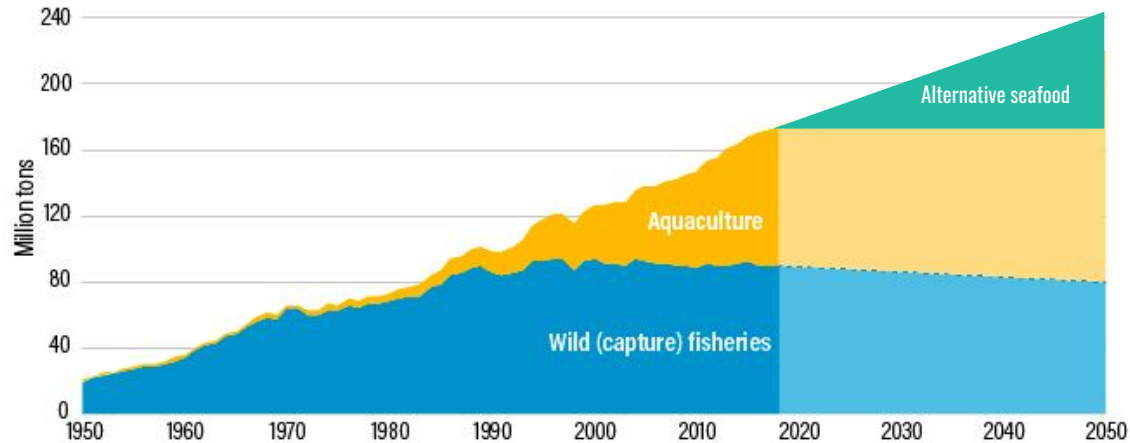
FISH TO 2030

Prospects for Fisheries and Aquaculture

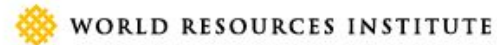


AES
Agriculture and
Environmental Services

Another supply source: alternative seafood



Sources: Historical data, 1950–2016: FAO (2017b) and FAO (2018).
Projections to 2050: Calculated at WRI; assumes 10 percent reduction in wild fish catch from 2010 levels by 2050, linear growth of aquaculture production of 2 Mt per year between 2010 and 2050.

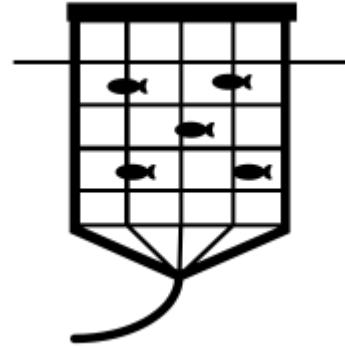


Advantages of alternative seafood production

Demand for seafood is largely met through two production systems



**Wild-capture
fishing**

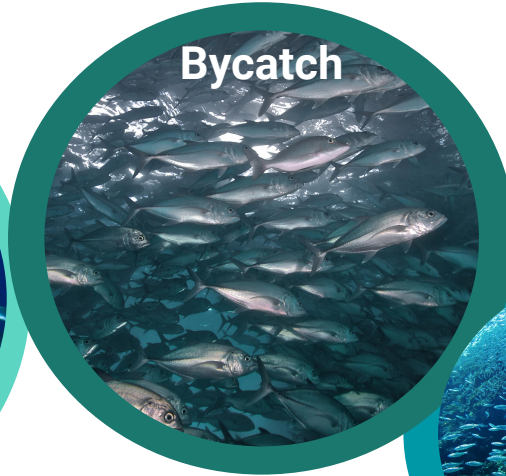


Aquaculture

Alternative seafood eliminates concerns with wild-caught seafood



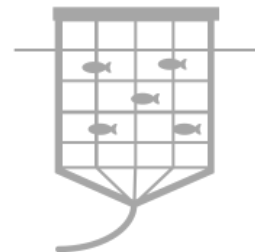
Limited stocks



Bycatch



Habitat damage



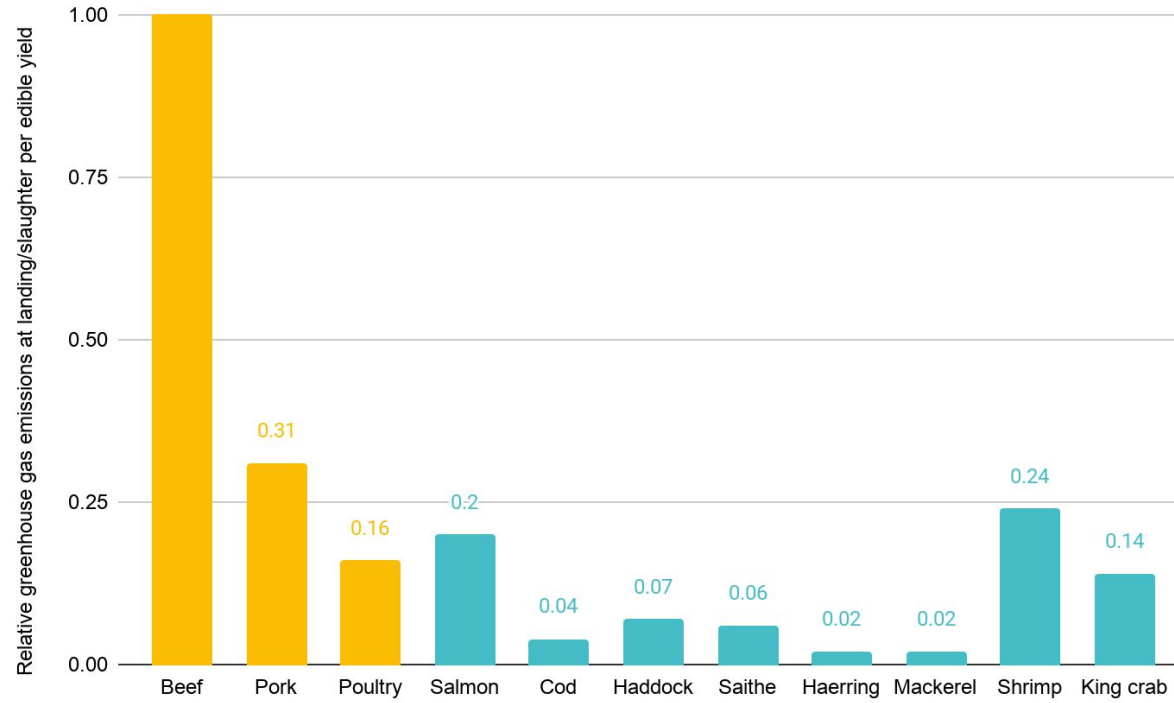
FAIRR report shows aquaculture investment risks



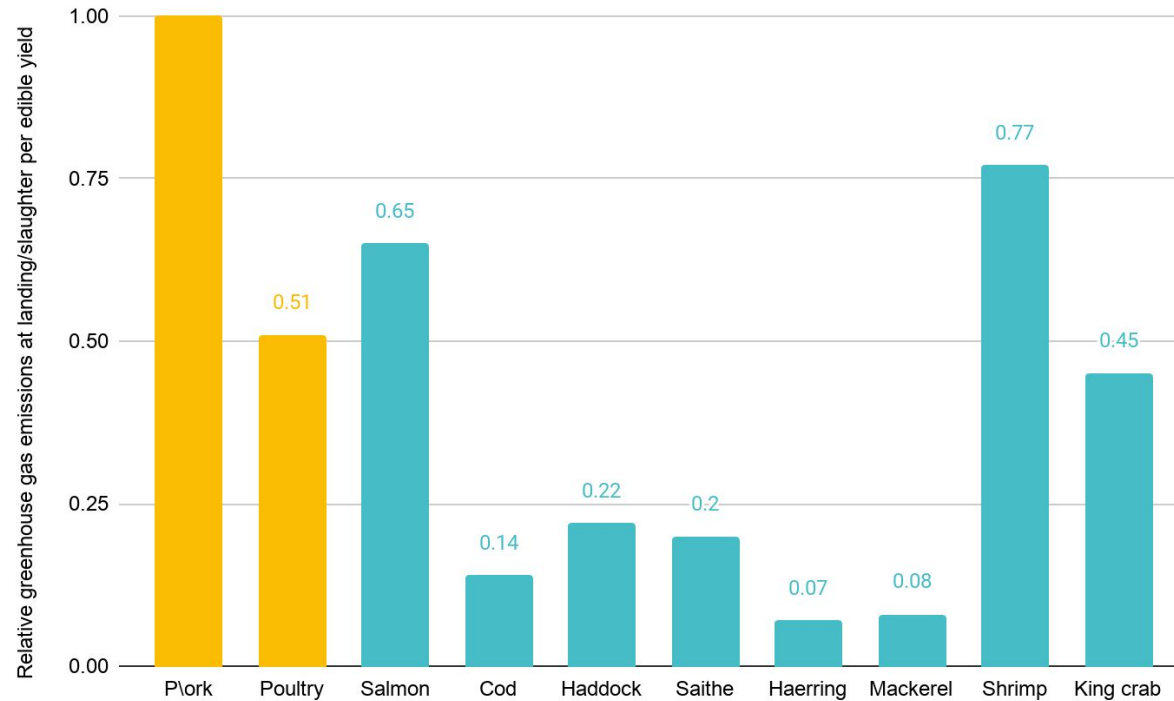
This slide is reproduced courtesy of the FAIRR initiative, a global investor network focused on risk and opportunity in protein supply chains.

For more information please see www.fairr.org

Greenhouse gas emissions of seafood



Seafood emissions relative to pork



Efficiencies of alternative seafood supply chains

Because alternative seafood can be more **demand-driven** than conventional seafood, producers are able to:

Respond quickly to changes in demand



Locate facilities close to demand centers



Only produce what consumers want



Reduce waste



The current landscape

Three categories of alternative seafood

PLANT-BASED PROTEINS

Sophie's
KITCHEN



FERMENTATION



CULTIVATED MEAT



Plant-based seafood

Using plant-derived ingredients to replicate the flavor and texture of seafood



*Often thought of as “plant-based”
Quorn actually uses fermentation to create its signature ingredient, mycoprotein

Plant-based seafood startups



Plant-based tuna,
shrimp, and salmon



Plant-based shrimp
using algae, soy and
pea protein



Plant-based tuna,
burgers, crab cakes
using legumes



OCEAN HUGGER
FOODS, INC.™



Plant-based tuna and
eel alternatives using
whole vegetable
ingredients

New plant-based seafood companies



Kuleana
Plant-based raw bluefin
tuna sashimi



Hooked
Plant-based shredded
seafood products



Wild Skinny Clean
Plant-based shrimp and
crab cakes

White space in plant-based seafood



We eat 200-300 different species of seafood.

Because far more species of fish are consumed compared to species of land animals, there are nearly endless opportunities to develop novel products.



Most plant-based products are ground or minced.

With more sophisticated manufacturing methods, it may be possible to create the layers of fat, collagen, and protein that give fish its desirable cooking properties like flakiness.



Very few products are in the fresh, refrigerated category.

Most plant-based seafood products are either shelf-stable or frozen. Plant-based seafood could build on the long-standing success of refrigerated plant-based milk and the momentum of fresh plant-based burger growth.

Cultivated seafood could reach the market before cultivated terrestrial meat

Potential technical advantages:

1. Can grow in lower temperature
2. Can grow in low oxygen conditions
3. High buffering capacity - ability to maintain neutral pH
4. Rapid growth of muscle cells
5. High expression of telomerase
6. Simple structure relative to muscle tissues found in many terrestrial animals.

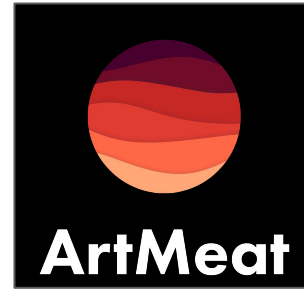


Photo credit: Wild Type Foods

For more detail, see: Rubio, N., Datar, I., Stachura, D., & Krueger, K. (2019). Cell-based fish: a novel approach to seafood production and an opportunity for cellular agriculture.

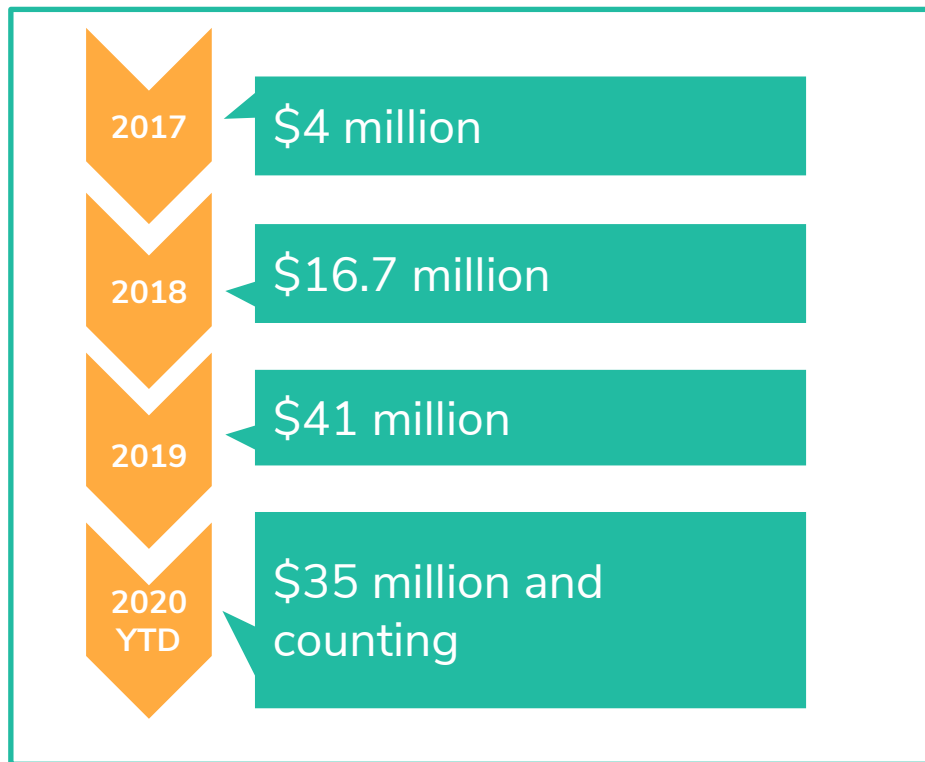
Cultivated seafood

Produced by cultivating cells from marine animals





Recent investment activity



Plant-based seafood

accounts for just \$9.5 million (1%) of total plant-based meat dollar sales -
Plant-based seafood is a market white space.

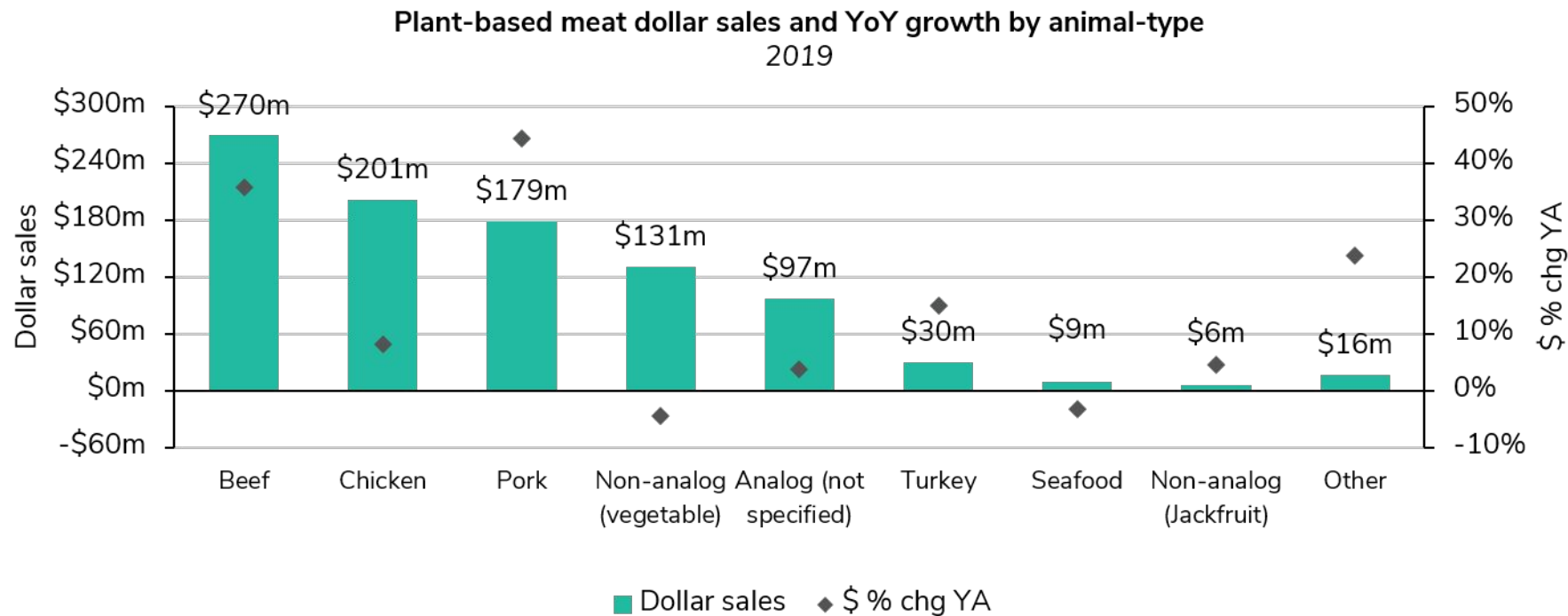


Photo courtesy of Hungry Planet



Note: the data presented on this slide is based on custom-GFI plant-based categories that were created by refining standard SPINS categories. Due to the custom nature of these categories, the presented data will not align with standard SPINS categories.

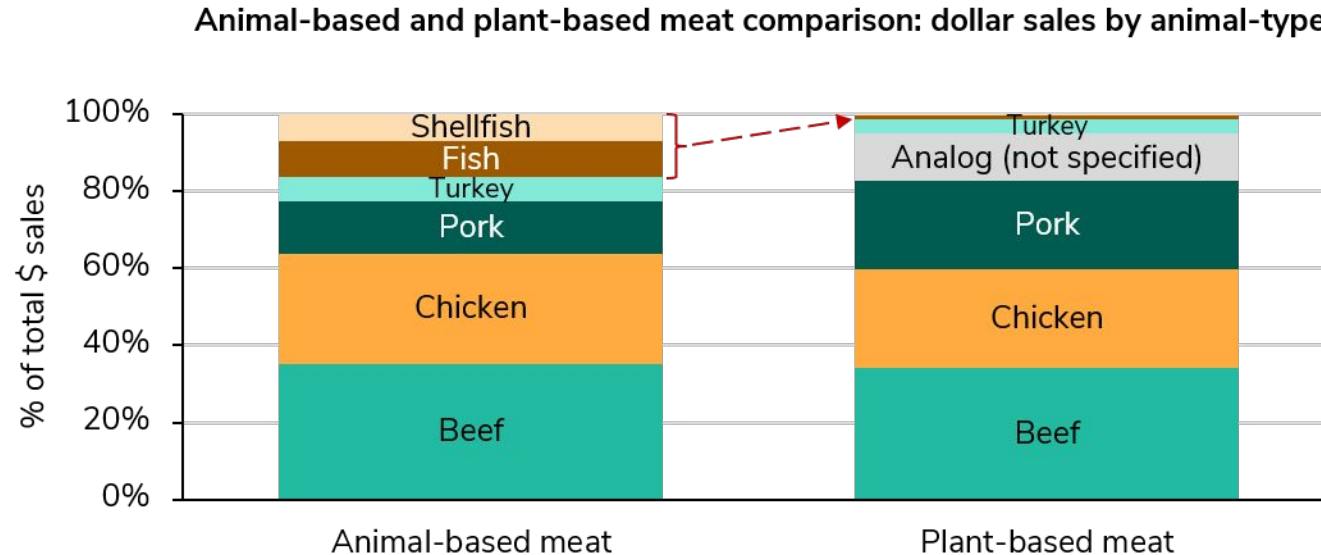
Plant-based versions of beef, poultry, and pork products make up more than 60% of plant-based meat sales



Note: the data presented on this slide is based on custom-GFI plant-based categories that were created by refining standard SPINS categories. Due to the custom nature of these categories, the presented data will not align with standard SPINS categories.

Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019

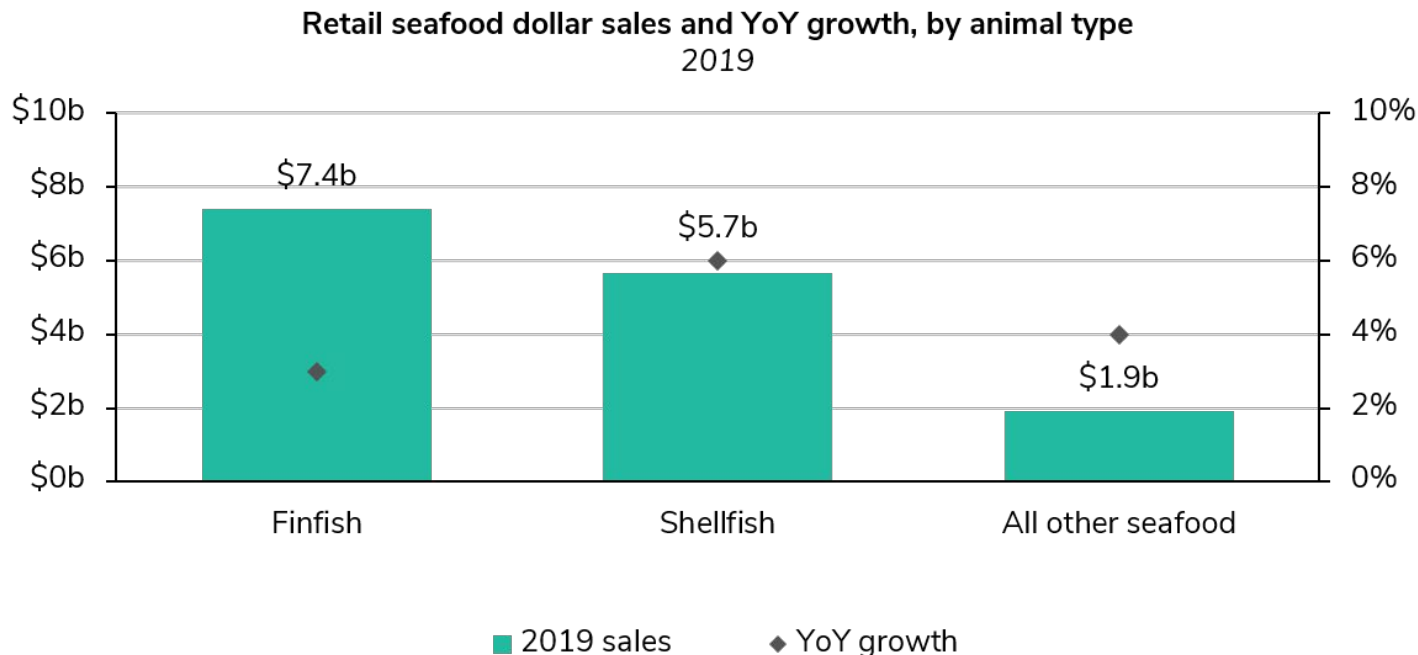
Fish and shellfish are underrepresented in the plant-based meat market



Note: Animal-based meat dollar sales for year ending August 2018; plant-based meat dollar sales for year ending April 2019; the data presented on this slide is based on custom-GFI plant-based categories that were created by refining standard SPINS categories. Due to the custom nature of these categories, the presented data will not align with standard SPINS categories.

Source: Nielsen custom defined data set, xAOC + WFM, 52 weeks ending 8/11/18; SPINSScan Natural and Specialty Gourmet (proprietary), SPINSScan Natural and Specialty Gourmet (proprietary), SPINSScan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019

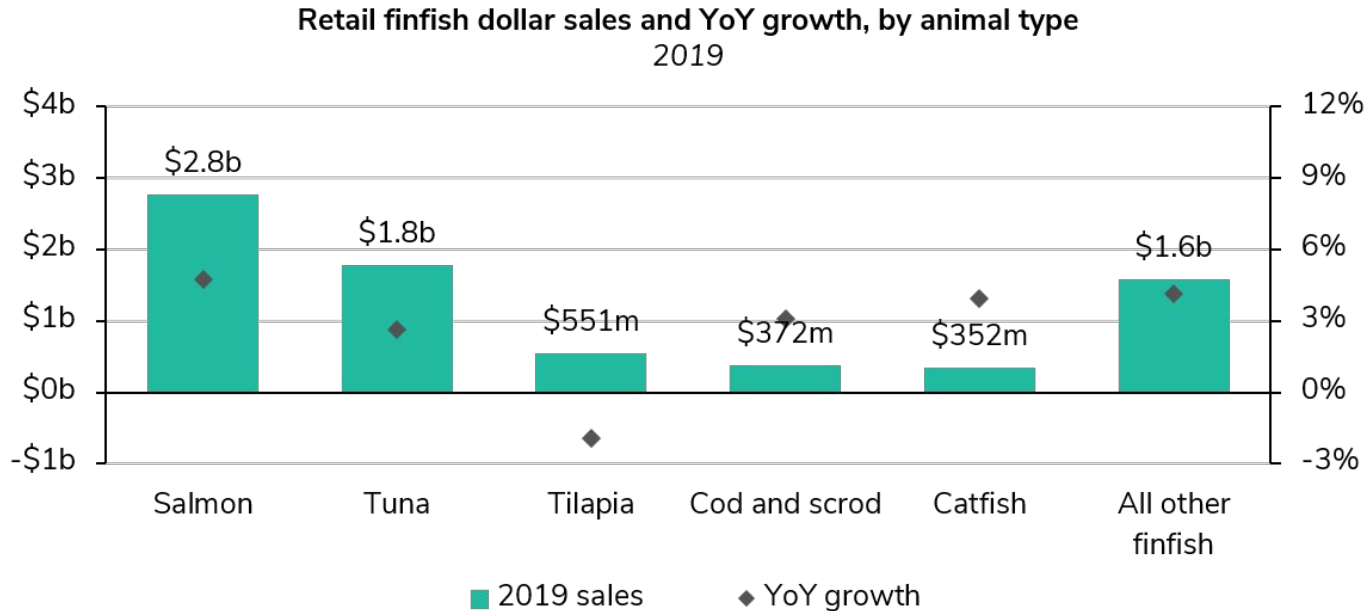
The retail seafood category is worth \$15b, with finfish accounting for ~50%, and shellfish for ~ 1/3



Note: "All other seafood" includes sushi, complete meals, octopus, squid, caviar, meal kits, snacks, and combination packs

Source: Nielsen, xAOC+Whole Foods, 52 weeks ending 12-31-2019

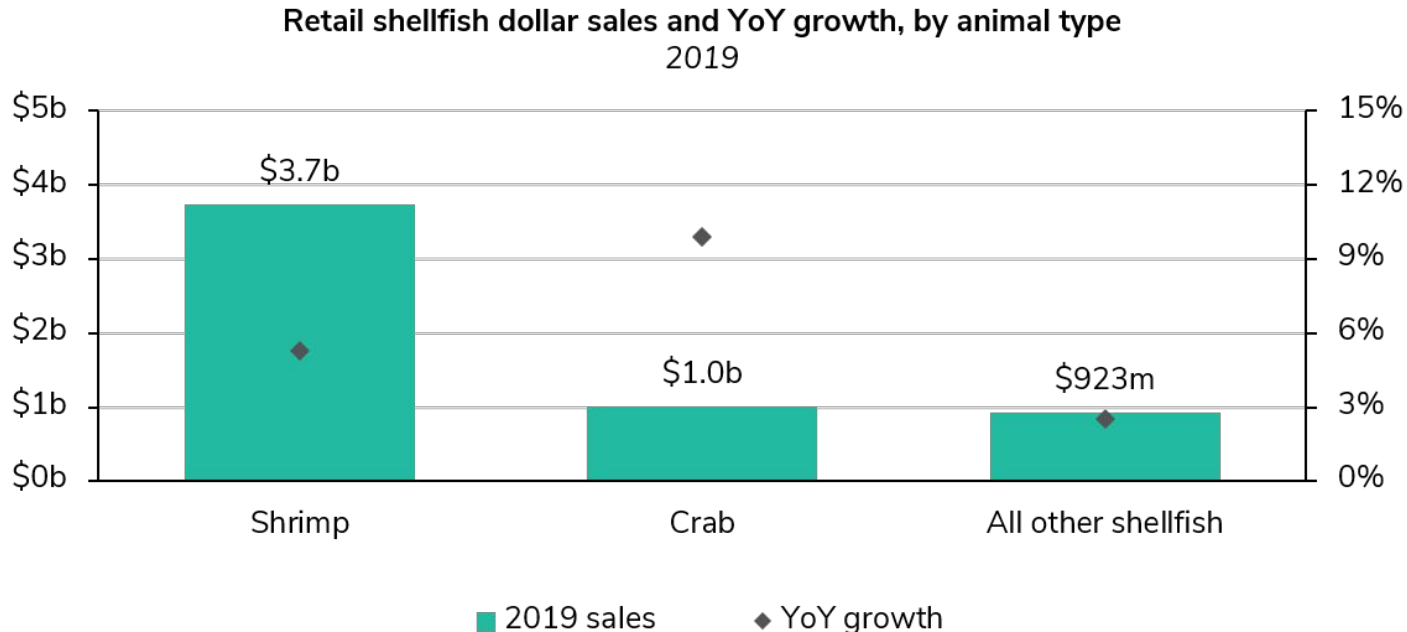
Within finfish, salmon and tuna comprise the majority of volume at over 60% of dollar sales



Note: "All other finfish" includes anchovy, flounder, grouper, haddock, halibut, herring, mackerel, mahi mahi, perch, pollock, roughy, sardine, sea bass, snapper, sole, swordfish, trout, and whiting

Source: Nielsen, xAOC+Whole Foods, 52 weeks ending 12-31-2019

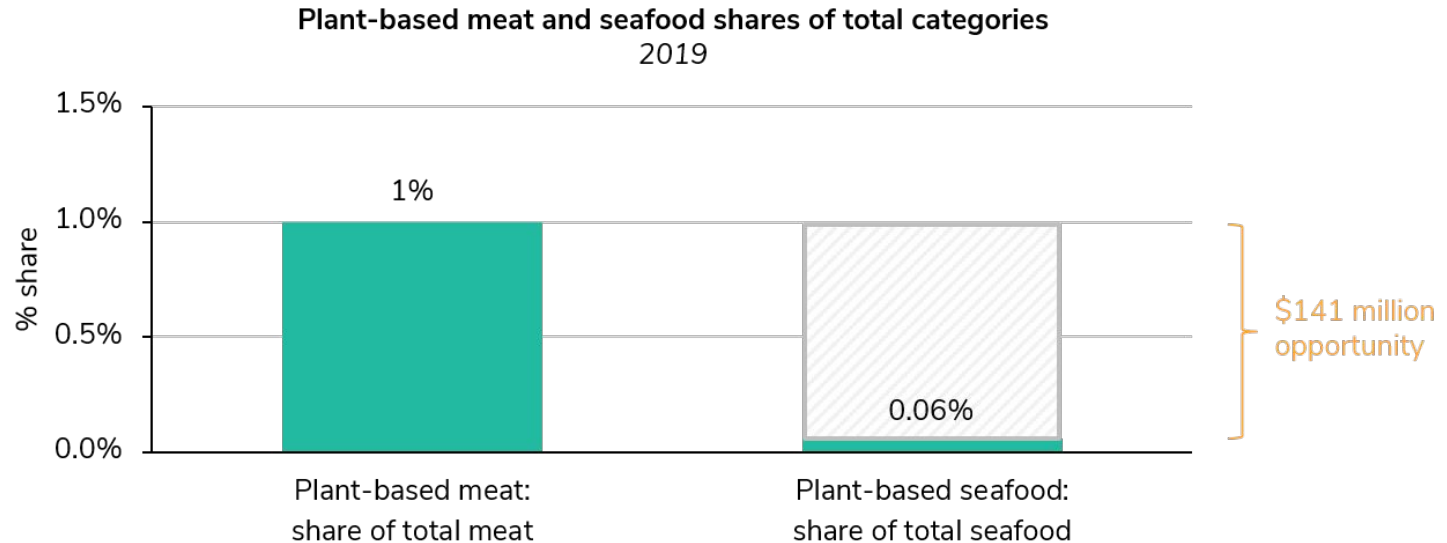
Shrimp makes up the majority of shellfish sales, followed by crab



Note: "All other shellfish" includes clams, conch, crawfish, crayfish, lobsters, mussels, oysters, and scallops

Source: Nielsen, xAOC+Whole Foods, 52 weeks ending 12-31-2019

The opportunity for plant-based seafood to reach just 1% share of the seafood market is worth \$141 million



Note: SPINS does not report non-UPC meat counter sales. To account for this, the plant-based meat total retail share calculation uses the \$95 billion total meat market size reported by Nielsen, as this number includes both retail packaged meat sales and non-UPC meat counter sales. The plant-based data presented on this slide is based on custom-GFI plant-based categories that were created by refining standard SPINS categories. Due to the custom nature of these categories, the presented data will not align with standard SPINS categories.

Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019; Nielsen (2019),

[The F Word: Flexitarian Is Not a Curse to the Meat Industry](#)

Incumbent protein companies are getting on board

Broaden

their consumer base by making something for everyone.

Appeal

to the next generation of protein consumers.

Enhance

their sustainability and social responsibility stories.

Diversify

sources of supply and investments to increase resilience to shocks.

Tyson Ventures

- Invested in plant-based seafood company New Wave Foods in September, 2019



Photo credit: New Wave Foods

“I tasted it for the first time in a cafe in Palo Alto, and I had no idea I was eating plant-based shrimp.”

- *Former Tyson Ventures CFO Tom Mastrobuoni*

Van Cleve Seafood

- Virginia family-owned seafood company
- Launched plant-based shrimp and plant-based crab cakes in new line in october, 2019



Photo credit: The Van Cleve Seafood Co.

"We see the trend turning into more of a movement and wanted to create something to satisfy everybody. Since we know seafood so well, who better than us to create the plant-based alternatives that taste just like the real thing?"

- *Shelly Van Cleve, co-owner and VP of Product Development, the Van Cleve Seafood Co.*

Nutreco

- Announced strategic partnership with BlueNalu in January, 2020



“Since the global demand for protein is increasing, we need to provide protein from a variety of sources, including traditional aquaculture farming as well as new innovative solutions. Nutreco’s strategic partnership with BlueNalu is very exciting as it opens the opportunity to up-scale real seafood production in a highly sustainable way.”

- Rob Koremans, CEO, Nutreco

Bumble Bee Foods



- Joint Venture with Good Catch announced March, 2020
- CEO joined board of Gathered Foods in April, 2020

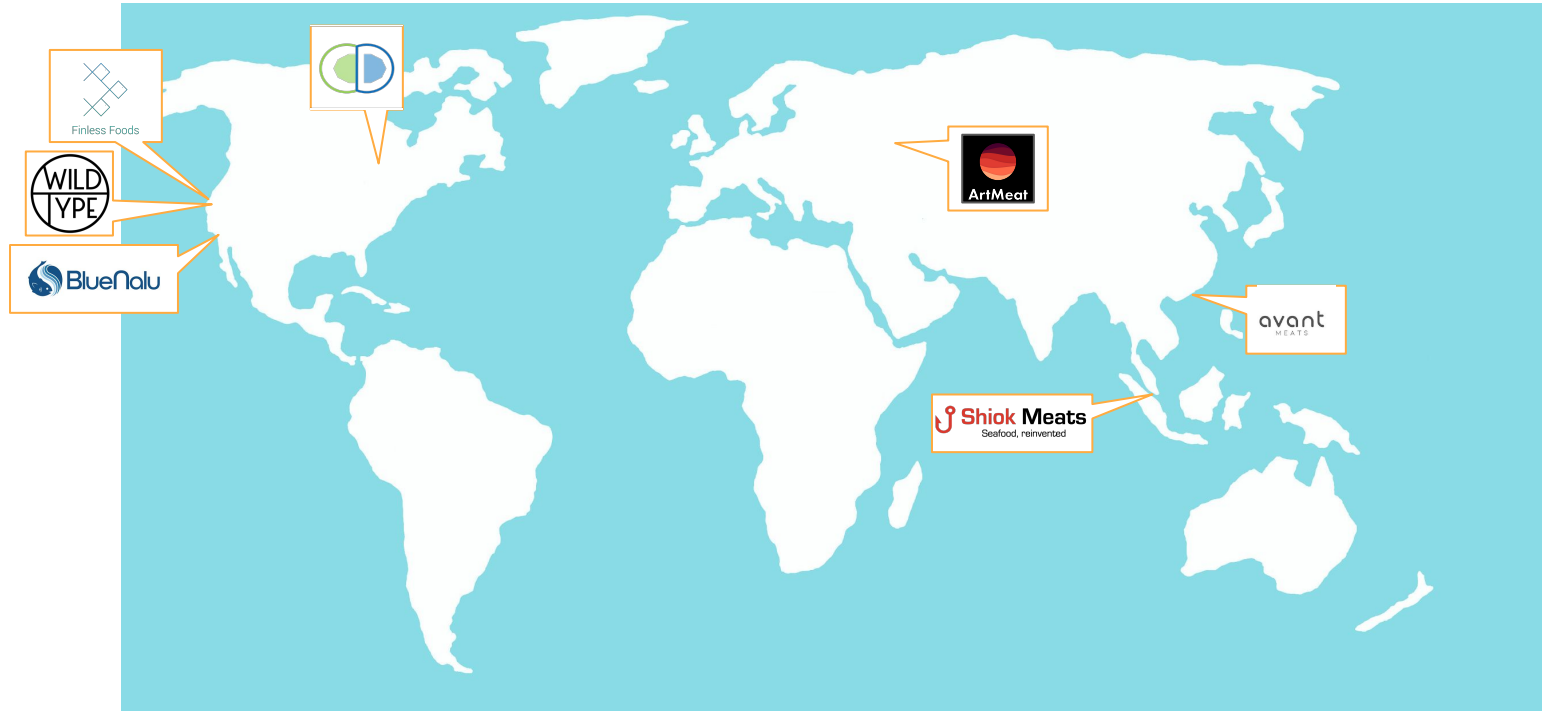


Photo credit: Good Catch Foods

"It is critically important that as an industry we continue to find innovative solutions to decouple growth with environmental impact. Providing great-tasting alternative ways for consumers to enjoy ocean-inspired foods is a key pillar of our long-term commitment to ocean health."

- *Jan Tharp, President & CEO, Bumble Bee Foods*

Alternative seafood is already global



Alternative seafood is already global



Keep up with the news from GFI



Sustainable Seafood Initiative newsletter
(launching this summer)

<https://go.gfi.org/seafood-newsletter>



Plant-Based Insider

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GFI e-news

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