

2020 State of the Industry Report

Plant-Based Meat, Eggs, and Dairy



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The Good Food Institute is a 501(c)3 nonprofit think tank and open-access resource hub developing the roadmap for a sustainable, secure, and just protein supply. We identify the most effective solutions, mobilize resources and talent, and empower partners across the food system to make alternative proteins accessible, affordable, and delicious.

This report, as well as all of GFI’s research, data, and insights, is made possible by gifts and grants from our global family of donors.

Executive summary



Executive summary

In 2020, continued momentum in the plant-based industry led to rapid growth. Hundreds of new products made it to market, innovations like shear-cell technology and 3D printing demonstrated their potential as emerging technologies that will continue to advance the market, and key regulatory wins on food labeling helped ensure a level playing field for plant-based products. Despite disruptions to the food industry caused by the pandemic, the accelerated growth of plant-based meat, eggs, and dairy signals a growing global appetite for more-sustainable alternatives to conventional meat, eggs, and dairy.

With an increased global focus on reaching net-zero emissions, the shift to climate-friendly, sustainable protein production presents significant sales and investment opportunities. Companies and investors interested in plant-based innovation recognize its transformative potential to achieve a carbon-neutral food system, and they are positioning themselves to lead this transition. This motivation, in addition to the clear opportunity presented by growing consumer excitement around plant-based options, made 2020 a record-breaking year for plant-based sales and investments globally:

- The U.S. retail plant-based food market grew 27.1 percent, almost twice the rate of the total retail food market, to just over \$7 billion.
- U.S. plant-based meat retail sales grew 45 percent, flying by the \$1 billion mark for the first time and closing out the year at \$1.4 billion in total sales.
- Global plant-based meat retail sales crossed the \$4 billion mark to \$4.2 billion, up from \$3.4 billion in 2019.
- More capital was raised during 2020 than in any single year in the industry's history. A healthy \$2.2 billion was invested in the plant-based space, making up almost half of all capital invested in the industry since 1980.
- New unique investors in the plant-based space increased by 44 percent from 2019 to 2020.

Around the world, more than 800 companies and brands either primarily focus on plant-based foods that directly replace animal products or have a business unit or product line focused on such products. Retail products launched throughout the year in all regions of the globe. The companies expanding into the space ranged from small plant-based startups to large multinational food companies and conventional meat companies. Foodservice also saw numerous plant-based product launches in 2020, particularly as plant-based companies expanded into international markets through partnerships with companies local to specific regions. Considerable development occurred along the upstream supply chain, with numerous

ingredient companies and equipment providers making advancements in seeds and crops, ingredient processing, and end-product manufacturing.

Plant-based innovation in protein fractionation, crop breeding and optimization, and end-product manufacturing continued to develop over 2020. Of particular focus was the creation of whole-muscle products, with developments in shear-cell technology, spinning, and 3D printing as means of creating fibrous muscle textures to deliver the experience of eating animal-based meat. Researchers continue to advance technology in the plant-based space, including those leading the dozens of plant-based research projects funded through GFI's Competitive Research Grant Program.

Regulatory developments in 2020 include the Virginia governor's veto of the state's dairy label censorship bill and a ruling by a California judge against limiting dairy terminology on product packaging from plant-based dairy company Miyoko's. The European Parliament rejected a proposal that would have banned all conventional meat-related terms on plant-based food labels across all 27 countries of the European Union. All three of these regulatory developments are key victories for the plant-based food industry in its fight against label censorship, although regulatory action around label censorship is ongoing in both the United States and Europe.

The impressive slate of plant-based product releases, company launches, investments, science and technology innovations, and labeling wins in 2020 signals another year of continued growth and momentum ahead and brings us closer to realizing a world where alternative proteins are no longer alternative. While 2020 was a record-breaking year for plant-based proteins, more investment is needed—from both the public and the private sectors—to mitigate the environmental impact of conventional protein production, meet global climate goals, and sustainably feed a growing population.

Introduction



Image credit: Treeline Cheese

Section 1: Introduction

In a year of uncertainty, the steady progress made by the plant-based food industry provided a positive point of contrast. Despite disruption caused by Covid-19, the industry gained more momentum in 2020, with strong and sustained growth in plant-based retail sales, record investments in plant-based companies around the globe, meaningful technological advancements, and notable regulatory achievements. The plant-based food industry's continuing global acceleration is proof that a more secure, sustainable, and just food system is within the world's grasp.

The Good Food Institute is pleased to offer our third annual state of the industry report on the global plant-based meat, egg, and dairy industry. This report covers key developments from 2020 across the business and regulatory landscapes, with a focus on the U.S. and, where data is available, global markets.



“Much of the world is focused on limiting global warming to no more than 1.5 degrees above preindustrial levels. To make that happen, we need to achieve net-zero emissions in the food and land sectors, and we need to ‘electrify everything.’ Plant-based alternatives to conventional meat, eggs, and dairy have a big role to play in achieving those goals, so it’s quite encouraging to see so much commercial activity in the plant-based sectors, from investors and startups to the world’s largest food and meat companies. We have a long way to go, but although tough for the world in so many ways, 2020 was a good year for the plant-based food industry.”

—Bruce Friedrich, executive director at The Good Food Institute

Commercial landscape



Image credit: Beyond Meat

Section 2: Commercial landscape

Overview and major developments

2020 was a strong year for plant-based foods, as evidenced by developments across the commercial and cultural landscapes:

- Veganuary, the UK-based charity that encourages consumers to go vegan for one month, kicked off its annual campaign in January. **More than 400,000 people worldwide participated**, up from 250,000 in 2019. Brands and retail stores in the United States and Europe launched more than **650 new products and 550 new menu items** as part of Veganuary to meet increased demand for plant-based foods.
- In the United States, Impossible Foods **unveiled Impossible Pork**, its first new product since the launch of Impossible Burger in 2016.
- India-based GoodDot announced that it had **partnered with a variety of companies** across North America, Asia, Africa, and the Middle East to bring plant-based meat products to retail markets in these regions, highlighting the truly global appeal of plant-based meat.
- Liverpool Football Club **partnered with Quorn** as part of the team's sustainability efforts, which will make Quorn products available to Liverpool FC players and fans.
- The Food Safety and Standards Authority of India (FSSAI) launched a 100-day consumer outreach program to amplify its Eat Right India initiative focused on food safety and nutrition and **recommended a plant-based diet** to improve overall health and wellness.
- Plant-based food's prominence continued to grow over the year, with **Beyond Meat's launch of an ad campaign** in May featuring well-known celebrities like Kevin Hart, Snoop Dog, and Chris Paul, who explained their reasons for eating more plant-based foods.
- Eat Just **opened its Future Food Studio in Shanghai**, China's first 100 percent plant-based culinary studio. The studio is open to the public and provides a space for customers to learn how to prepare plant-based meals.
- Impossible Foods quickly expanded its retail presence, **reaching 2,700 stores across the United States** in May. Impossible's products also became available for purchase outside the United States for the first time with a **retail launch in Hong Kong**.

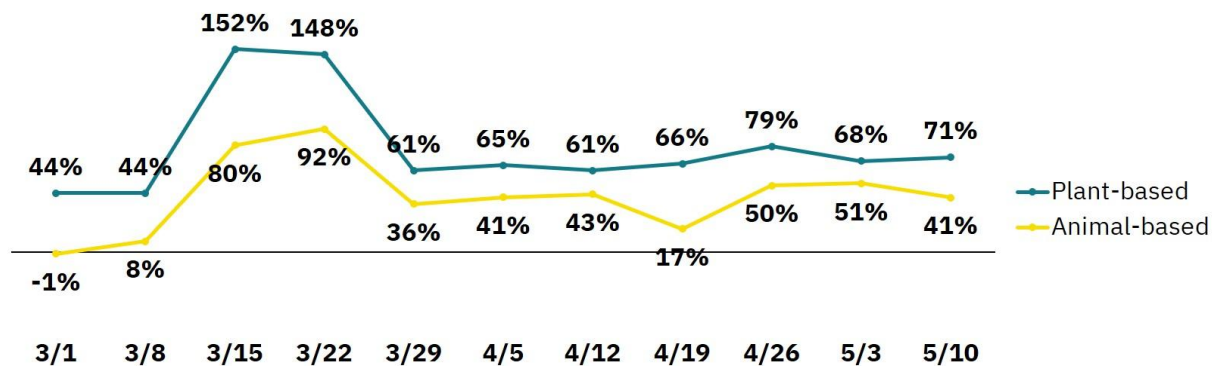
A note on Covid-19 in the United States

Telling the full story of plant-based meat, eggs, and dairy in 2020 is impossible without accounting for the effects of Covid-19. Go-to-market strategies were thrown into uncertainty as the food system experienced significant shifts, including interruptions to supplies of key inputs, limited access to production spaces, and disrupted distribution of products. Despite these constraints, plant-based companies adapted and continued to launch new products and grow sales.

Shutdowns across the United States in response to Covid-19 led to disruptions in the food supply chain. Foodservice channel distribution was significantly impaired, and pantry stocking and panic buying led to a sharp increase in retail sales over the prior year. Many plant-based food categories performed particularly well during the initial pantry-stocking period:

- Plant-based meat **grew 152 percent over the prior year** for the week ending March 15, while animal-based meat grew only 80 percent over 2019 for the same period.
- Refrigerated plant-based meat performed especially well, **with 454 percent growth over the prior year** for the week ending March 21, while refrigerated animal-based meat grew only 100 percent over 2019 for the same period.

Figure 1: Sales growth of plant-based meat and animal-based meat in 2020 over 2019



Source: Alt-Meat.net, "[Sales up, yes, but market share down for alt-meat in retail surge](#)" (May 2020) - 210 Analytics LLC using IRI data; Alt-Meat.net, "[Refrigerated plant-based alt-meat products sales outpace frozen](#)" (June 2020) - 210 Analytics LLC using IRI data. © 2021 The Good Food Institute, Inc.



For more information on Covid-19's effects on the U.S. plant-based meat category, read [this article](#) by Kyle Gaan, research analyst at GFI.

Plant-based meat was not the only plant-based category that performed strongly during the first few months of 2020. Plant-based milk also experienced massive sales growth. Plant-based milk sales were up 86 percent over 2019 for the week ending March 21, according to **Bloomberg**. Animal-based milk was up significantly less, at 53 percent. Oat milk enjoyed even more massive sales growth, up 513 percent over 2019 for the same week.

Retail product launches

2020 brought a flurry of retail product launches from brands operating across the plant-based meat, egg, and dairy categories. Some notable product launches are detailed below.

While plant-based burgers mimicking beef accounted for many of the new plant-based meat products in 2020, the year also saw a number of product launches across other plant-based meat formats and types, highlighting how companies are innovating beyond the plant-based burgers that established the next-generation plant-based meat category.

Beef:

- Tofurky **launched a plant-based burger**, a move that brought the company in alignment with many other plant-based brands that have flagship plant-based burger products.
- Impossible Foods announced that both **Trader Joe's** and **Walmart** would sell its Impossible Burger. These two expansions brought Impossible's total retail footprint to more than 8,000 stores across the United States. Impossible also entered the Asian retail market with **launches of the Impossible Beef range in grocery stores across the region**.
- Australian company JAT Oppenheimer **launched plant-based Wagyu beef** in Australian supermarkets under the name "V Meat."
- Canadian company Top Tier Foods announced it would **launch a plant-based Wagyu beef in Japan**.
- Canadian plant-based meat company Very Good Butchers **announced its expansion into the U.S. retail market** with plant-based beef and pork products.
- Spanish company Heura **launched a 2.0 version of its plant-based burger** and positioned the product as one of the healthiest options on the market due to olive oil used to reduce saturated fat.
- Other plant-based burger launches included Chile-based NotCo's Not Burger, **introduced in Brazilian supermarkets**, and Before the Butcher's Mainstream plant-based patties, **priced close to parity with animal-based ground beef**. Reaching price parity with animal-based meat is a key goal for plant-based meat companies, and

Before the Butcher's Mainstream line demonstrates that lower prices for plant-based meat products are within reach. For more details, see "**Box 1: plant-based meat works toward price parity**" below.

- Japanese company Next Meats **released plant-based yakiniku**, a Japanese beef dish that is barbecued or grilled, as well as **plant-based gyudon**, a Japanese rice bowl topped with beef. Next Meats' plant-based yakiniku was first made available through direct-to-consumer online sales.
- The Antarctic research stations run by the U.S. National Oceanic and Atmospheric Administration added MorningStar plant-based burgers to their existing plant-based meat portfolio.



"While it has been gratifying to see the recent meteoric rise of the core functions of plant-based manufacturing, sales, and marketing, it is the expanding breadth of this industry that is truly astonishing. Key contributions from impact investors, technologists, policy experts, and others have expanded this once-niche industry into an entire ecosystem unto itself. The push to revolutionize our food system is now an all-hands-on-deck effort, with points of entry for practically anyone to bring their passion and skills to this vital work."

—Jaime Athos, president & CEO at Tofurky

Chicken:

- Rebellious Foods **released plant-based chicken nuggets in retail stores**.
- Field Roast **introduced its first plant-based chicken nugget**, expanding the brand's line of plant-based meat products beyond deli slices, sausages, and burgers.
- U.S.-based SIMULATE (formerly NUGGS) **launched plant-based chicken patties through the company's website**. SIMULATE had reformulated its plant-based chicken product earlier in the year.

Pork:

- Beyond Meat entered the frozen breakfast category with the **launch of its breakfast sausage patties**.
- Hong Kong-based OmniPork **released plant-based pork products in 210 retail locations across China**. Steady price increases for animal-based pork products in

China, driven by disruptions in the supply chain, created an ideal opportunity for OmniPork to expand access to its products in the country.

Seafood:

- Plant-based seafood company Good Catch debuted **plant-based crab cakes, fish cakes, and fish burgers** in the frozen sections of U.S. grocery stores, another highlight in expansion of product type. Good Catch also announced its **launch in Europe, starting in Spain and the Netherlands**.



“The accessibility to plant-based offerings is making it easier to reach consumers who have been curious to explore a plant-based diet or simply want to swap meat counterparts with plant-based options a few meals out of the week. Plant-based foods are no longer seen as only for those living a vegan lifestyle, especially as companies continue to innovate their products to become more similar in taste, texture, smell, and look to their animal counterparts. ... Reaching a variety of consumers and giving them a plant-based alternative that is just as good or better than its animal counterpart is a huge goal for us at Sophie’s Kitchen and what led to the redesign of our ‘toona’ recipe after 10 years.”

—Miles Woodruff, CEO at Sophie’s Kitchen

Box 1: Plant-based meat works toward price parity

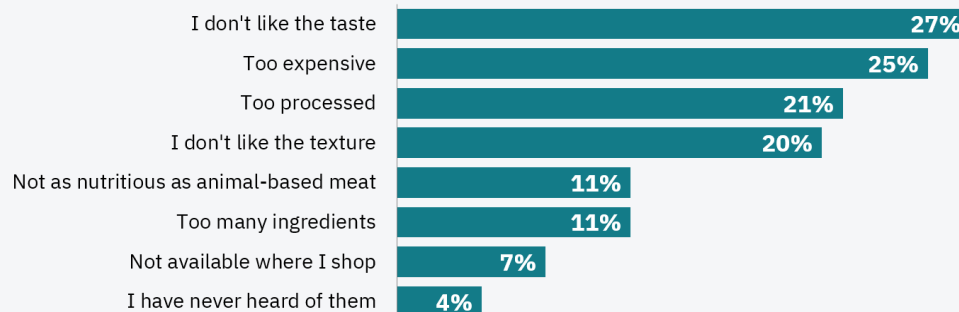
Several plant-based meat companies moved closer to price parity with animal-based meat products in 2020:

- Impossible Foods **cut the price of its plant-based meat products** by an average of 15 percent for foodservice distributors.

- Beyond Meat **began selling Cookout Classic 10-burger value packs**. As **reported by CNBC**, the suggested retail price for the Cookout Classic patties translated to \$6.40 per pound. Animal-based beef patties sold for \$5.26 per pound the week of Beyond’s Cookout Classic announcement.
- Before the Butcher’s Mainstream plant-based patties rolled out **in near price parity with animal-based ground beef**.

Reaching price parity with animal-based meat is an important step toward widespread adoption of plant-based meat. Consumers consistently highlight the high price of plant-based meat relative to animal-based meat as a main barrier to trial. Studies from both Mintel and UBS found price to be the second-highest barrier, behind perceived taste. By making the price of plant-based meat equal to or lower than that of animal-based meat, plant-based meat companies can overcome this barrier and earn a larger share of the total meat market.

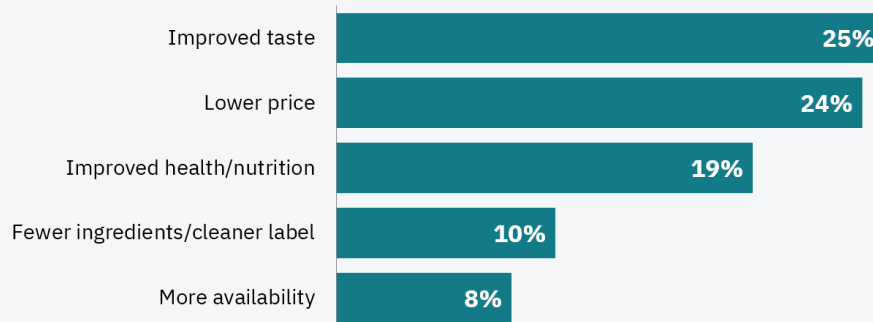
Figure 2: U.S. consumers: barriers to eating plant-based meat products (March 2020)



Note: percentages for “I prefer real meat” (51%), “Other, please specify” (4%), and “None of the above” (8%) excluded from graph to focus on barriers with actionable solutions.

Source: Mintel Reports US, Plant-based Proteins, 2020.

Figure 3: U.S., German, and British consumers: factors that would lead to interest in trying plant-based meat (August 2020)



Note: percentages for “I never plan on trying plant-based meat” (46%), and “Other” (5%), excluded from graph to focus on barriers with actionable solutions.

Source: UBS Evidence Lab © UBS. All rights reserved. Reproduced with permission. May not be forwarded or otherwise distributed.



For more details on plant-based meat’s path to price parity, [read this article](#) by Liz Specht, GFI director of science and technology.

Eggs:

The nascent plant-based egg category grew in 2020 with several product releases and a significant new partnership:

- Eat Just **introduced a folded plant-based egg product** sold in the frozen section of retail stores. Eat Just **launched an Asia-based subsidiary, Eat Just Asia**, in partnership with Proterra Investment Partners Asia. Eat Just Asia will further distribution of Eat Just’s plant-based egg products in Asia, which includes creating a manufacturing facility in Singapore. This partnership highlights the growing interest in plant-based egg products around the world.
- Singapore-based Float Foods **debuted its plant-based egg product**, OnlyEg, which replicates the yolk and egg white components of an animal-based egg. The product is expected to launch commercially in 2022.
- In December, British brand Crackd **released a liquid egg product in the United Kingdom**, closing out the year for plant-based egg product launches.



“Covid-19 did a lot to slow the world but also a lot to change it in some unexpected ways. Many more people are now more aware that something is amiss in our food system and something needs to change. Choosing to eat plant-based is a part of how that change is going to happen. We don’t see this as a trend but a permanent shift ushered in by a permanent awareness by consumers that something must change in this world and that change needs to start with them and what they feed their families.”

—Josh Tetrick, CEO at Eat Just

Milk:

The plant-based milk category saw companies branch out from familiar plant-based milk products with a variety of novel-product releases. These included regional drink products that incorporate plant-based milk and plant-based milk products enhanced with additional nutrients:

- Mamma Chia **launched organic Chiamilk**.
- Danish dairy cooperative Arla released **a line of oat milk products**.
- Japanese drink company Asahi **released a soy-milk version of its cultured milk product, Calpis**.
- Califia Farms **introduced Protein Oat**, a plant-based milk with all nine essential amino acids.
- Take Two Foods **debuted a barley milk product line** that uses barley as a byproduct of beer brewing.
- Swedish pea milk brand Sproud **entered the U.S. and Canadian markets** through Amazon sales and its own direct-to-consumer website. A month later its plant-based milks **were available at Sprouts Farmers Market retail locations**.
- Ripple **increased distribution of its pea-based milk** by expanding into several Costco stores in the U.S. Midwest.
- Dubai-based brand Koita Foods **rolled out its plant-based milk product line in the United States**.
- Oatly **expanded into Singapore** with the launch of its oat milk in grocery stores across the city-state.

- Chile-based NotCo **introduced its line of plant-based milk products to the U.S. market.**



“In 2020, consumers learned how to recreate their favorite food and beverages at home, often with bold experimentation of healthier plant-based options. Looking ahead in 2021, we think we will see even more consumers experimenting and exploring what’s possible with plant-based dairy alternatives. This uptick in “plant curiosity” should help accelerate an even wider adoption of plant-based dairy as people learn they can make all of the foods they love just as delicious and nutritious with plant-based dairy options.”

—Suzanne Ginestro, CMO at Califia Farms

Cheese:

The plant-based cheese category saw several launches in 2020 that expanded consumer access across formats and flavors:

- Field Roast **increased access to its Chao plant-based cheese brand** by debuting its slices at Costco and Sprouts. The company also increased the product’s distribution at Target and Albertsons.
- Tofurky **announced plans to launch its Moocho plant-based dairy brand** at Expo West. Unfortunately, the cancellation of Expo West due to Covid-19 put **the Moocho launch on hold.**
- Treeline expanded its cashew-based cheese lines **to include cream cheese.**
- Animal-based cheese company Schuman Cheese **introduced a plant-based cheese brand, Vevan.**
- Dutch plant-based cheese brand Willicroft **debuted its products in the UK market.**
- Bel Brands entered the plant-based market with **a plant-based version of its Boursin cheese** created in partnership with Follow Your Heart.



“2020 was a pivotal year in increasing awareness among consumers about plant-based foods. The health benefits of plant-based foods go beyond simply nutrients—consumers began to make the connection between animal agriculture and the pandemic. As an industry, we’ll need to be bolder and louder in getting this message across, and it will become increasingly incumbent on companies to align their activist voices to transform the world into a safe, peaceful, compassionate place.”

—Miyoko Schinner, CEO at Miyoko’s Creamery

Other dairy:

- Kite Hill launched **plant-based sour cream and a line of plant-based yogurt made from coconut milk.**
- Ripple added **plant-based ice cream** to its portfolio of pea-based dairy products.
- Plant-based ice cream brand Frönen **introduced two new flavors.**
- Dairy-free dessert brand Chloe’s released **a line of oat milk pops.**
- Swiss dairy company Emmi entered the plant-based dairy category with the debut of its **Beleaf range of plant-based drinks, yogurts, and cultured shots.**
- Startup Eclipse Foods began direct-to-consumer sales of its **plant-based ice cream products.**
- Startup Noops released **plant-based pudding made from oat milk.**
- New Zealand-based dairy company The Collective announced its **planned entry into the plant-based dairy category** with a line of plant-based yogurt products.



“2020 was a significant year for the plant-based food industry because of continued growth and mainstream adoption of plant-based foods. Several milestones highlight this progress, including plant-based meat passing the \$1 billion mark in sales (\$1.4 billion), household penetration of plant-based milk surpassing 40 percent in the U.S., and plant-based ice cream and frozen novelty dollar sales growing 20 percent. This growth is driven, in large part, by more and more mainstream consumers integrating plant-based products into their diet. We expect this trend to continue accelerating, propelling the plant-based industry forward.”

—Aylon Steinhart, CEO at Eclipse Foods

Retail product launches from large food companies, animal-based meat companies, and retailers

Retail product launches in 2020 came not only from dedicated plant-based companies but from large food companies, animal-based meat companies, and retailers. For the purposes of this report, we define “large food companies” as companies (or their associated brands) with more than \$10 billion in annual revenue. Some of the launches from these companies are detailed below.

Large food companies:

- Nestle’s Nesquik brand launched **GoodNes, a chocolate oat milk product**. This launch highlights the growing interest in plant-based foods across age demographics, including children and parents who want a plant-based chocolate milk option for their families.
- Unilever’s Ben and Jerry’s ice cream brand, already known for plant-based ice cream options, **released three new plant-based ice cream varieties made from sunflower butter**. These products are the first sunflower-based ice cream products available to consumers.
- French multinational food company Danone debuted **plant-based whipped cream** and **plant-based half and half** through its Silk plant-based dairy brand. Danone followed up several weeks later with the release of **Silk plant-based lattes in the U.S. market**.
- Baicaowei, the Chinese-snack company owned by PepsiCo, launched its **plant-based sausage snack**, highlighting China’s growing interest in plant-based meat.

- Global confectioner Mars introduced **plant-based chocolate milkshakes**, another instance of a large food company expanding into plant-based dairy.
- **Nestlé introduced plant-based tuna under the Garden of Eatin' brand** in the company's home market in Switzerland.
- Unilever announced its **1 billion euro sales goal for plant-based meat and dairy products over the next five to seven years**. Unilever's sales target reinforces the robust growth of plant-based foods and strongly indicates that companies view the shift toward plant-based foods as a lasting change in the commercial landscape.

Animal-based meat companies:

- Agribusiness giant and animal-based meat company Cargill **began manufacturing private-label plant-based meat products** for sale in retail and foodservice outlets. This development underscores the growing trend of animal-based meat companies to move into the plant-based meat space.
- Planterra Foods, a subsidiary of Brazil-based JBS, the world's largest meat company, **launched its Ozo brand of plant-based meat products**. Ozo's products use fermentation company MycoTechnology's pea- and rice-protein blend, created in part through fermentation of shiitake mycelia.
- Brazilian meat company Marfrig expanded its presence in the plant-based space **through a joint venture with global ingredients company ADM**. The joint venture, PlantPlus Foods, will enable the companies to sell plant-based foods across North and South America.
- Hormel Foods launched **a line of pea-based plant-based meat grounds**, with traditional, Italian, breakfast, and chorizo options.
- Tyson closed out a whirlwind year of retail product launches in December when the company announced **plans to reformulate its Raised & Rooted products to be 100 percent plant-based**. This decision by Tyson is a strong indicator that consumer demand for animal-free products is growing and products containing animal-based ingredients do not meet consumer expectations.



“When I look back on 2020, the impact that we should see as significant is that as a result of the pandemic, consumers have instilled a renewed sense of healthy eating overall, AND health is the primary motivation for trying alternative protein. This is a promising signal for the industry.”

—Carlos Vargas, strategy and business development lead, global alternative protein, at Cargill

Private-label launches and expansions by retailers:

- U.S. retailer The Kroger Co. expanded its **Simple Truth natural and organic private-label brand by adding more than 50 new plant-based products**, including plant-based burgers and grounds. Kroger’s plant-based product line now covers a wide variety of plant-based dairy and meat products, including yogurt, cheese, ice cream, and chicken.
- **Trader Joe’s released private-label plant-based burgers** made from pea protein.
- UK retailer Tesco committed to a **300 percent increase in sales of plant-based meat products by 2025**. The company set this ambitious goal in partnership with nonprofit World Wide Fund for Nature in an effort to reduce the environmental impact of UK shoppers. This move by Tesco highlights the robust consumer demand for plant-based foods in the United Kingdom.
- 7-Eleven launched **plant-based meals featuring OmniFoods’ OmniPork** in 800 stores across Hong Kong, underscoring Asia’s growing interest in plant-based foods.
- Canadian plant-based e-commerce platform PlantX **entered the U.S. market and prepared to open its first brick-and-mortar retail store in the United States**.
- UK-based Wicked Foods announced plans to release plant-based products in the United States and Canada.
- Japanese retailer Muji added **four ready-to-eat plant-based meat products** to its store shelves. Muji merchandises a wide variety of products ranging from stationery and clothes to furniture and beauty products. The addition of plant-based meat products illustrates how even retailers not primarily focused on food are capitalizing on the alternative protein opportunity.



“2020 was a big year for plant-based foods. The Covid-19 pandemic exposed the vulnerabilities of the conventional animal agriculture industry and gave consumers both the time and desire to eat more consciously and think about the impacts of their food. Aside from Covid’s impacts, 2020 saw significant growth in private-label products and big commitments from food conglomerates to expand their plant-based divisions. I expect that 2021 will be the year that plant-based foods other than milk and burgers start reaching the mainstream.”

—David Benzaquen, managing director at Mission: Plant LLC

Top-selling plant-based meat and dairy brands in U.S. retail

Tables 1–2 provide alphabetized lists of the top 10 plant-based meat and dairy brands by U.S. retail dollar sales in 2020. GFI and the Plant Based Foods Association commissioned the sales data from SPINS and refined it using custom coding. The top brands in the plant-based meat category barely changed, with nine of 10 brands maintaining their status from 2019. Impossible Foods became the notable new addition after its retail launch in September 2019.

Table 1: Top 10 plant-based meat brands by dollar sales in U.S. retail (alphabetized)

Brand	Parent company	Country	Date founded	Plant-based meat product categories
Beyond Meat	n/a	United States	2009	Burgers Grounds Meatballs Sausage links and patties
Boca	The Kraft Heinz Company	United States	1993	Burgers Grounds Nuggets, tenders, and cutlets Sausage links and patties
Dr. Praeger’s	n/a	United States	1992	Burgers Nuggets, tenders, and cutlets Other
Field Roast	Maple Leaf Foods	United States	1997	Burgers Deli slices Sausages

				Nuggets, tenders, and cutlets Roasts Other
Gardein	Conagra	Canada	2003	Burgers Loaves/roasts Nuggets, tenders, and cutlets Jerky Sausage links and patties Chunks and strips Meatballs
Impossible Foods	n/a	United States	2011	Burgers Grounds Sausage links and patties
Lightlife	Maple Leaf Foods	United States	1979	Bacon Burgers Deli slices Grounds Meatballs Nuggets, tenders, and cutlets Sausage links and patties
MorningStar Farms	Kellogg's	United States	1975	Bacon Burgers Chunks and strips Grounds Meatballs Nuggets, tenders, and cutlets Sausage links and patties Other
Quorn	Monde Nissin	United Kingdom	1985	Burgers Chunks and strips Deli slices Grounds Loaves/roasts Meatballs Nuggets, tenders, and cutlets Sausage links and patties Steaks and breasts Other
Tofurky	n/a	United States	1980	Burgers Chunks and strips Deli slices Grounds Loaves/roasts Sausage links and patties Other



“In 2020, as a result [of Covid-19] major meat producers had to shutter their processing factories, causing America to face meat shortages for the first time since World War II. The country’s largest grocery chain ran out of meat, and one of the country’s top burger chains ran out of patties.

“Before 2020, the food industry was embracing Impossible Burger in response to deafening consumer demand. But by the end of the year, senior executives, financial institutions, and boards of directors were realizing they could no longer rely on animal-derived meat. The demand for plant-based meat from restaurants and retailers expanded from a means to meet consumer demand to a matter of business continuity. More companies incorporated sustainable products on their menus and shelves. Impossible Foods’ products expanded from 20,000 to 30,000 restaurants and from 150 to more than 20,000 grocery stores in 2020 alone. And once people discover that sustainable food can be delicious, nutritious, and convenient, they continue to buy it—and they buy correspondingly less animal-derived food.”

—Rachel Konrad, chief communications officer at Impossible Foods

Table 2: Top 10 plant-based dairy brands by dollar sales in U.S. retail (alphabetized)

Brand	Parent company	Country	Date founded	Plant-based dairy product categories
Ben & Jerry's	Unilever	United States	1978	Ice cream and frozen novelty
Blue Diamond	HP Hood LLC	United States	1910	Creamer Milk Yogurt
Califia Farms	n/a	United States	2010	Butter Creamer Milk Ready-to-drink beverages Yogurt
Daiya	Otsuka Pharmaceutical Co. Ltd.	Canada	2008	Cheese Dairy sauces Ice cream and frozen novelty Yogurt
Earth Balance	Conagra	United States	2018	Butter
Oatly	Privately owned	Sweden	1994	Ice cream Milk Ready-to-drink beverages Yogurt
Planet Oat	HP Hood LLC	United States	2018	Ice cream Milk
Silk	Danone	United States	1978	Creamer Milk Ready-to-drink beverages Yogurt
Smart Balance	Conagra	United States	2005	Butter
So Delicious	Danone	United States	1987	Creamer Milk Ice cream and frozen novelty Yogurt



More information on these and other companies is available in GFI's [company database](#).

Foodservice partnerships and expansion

In a uniquely challenging year for the foodservice channel, plant-based food retained its status as a growth category, although like other categories, it experienced the overall shift of volume from restaurants and institutional foodservice to retail.

International expansion

International expansion was a key theme of 2020 plant-based foodservice launches:

- **Starbucks** partnered with Beyond Meat to launch several new plant-based meat items in its stores in China.
- KFC debuted plant-based chicken nuggets from **Cargill** in China. KFC also joined fellow Yum China brands **Taco Bell and Pizza Hut** in offering plant-based burgers from Beyond Meat.
- Chinese fast-food chain Dicos added **Starfield's plant-based chicken** and **swapped animal-based eggs for Eat Just's plant-based eggs** in seven menu items across 500 locations. Starfield also released **ground meat items in hundreds of locations across China** in partnership with six chains: Papa John's, Brut Eatery, Hong Li Village (红荔村), Nayuki, Gaga Chef, and Element Fresh.
- Green Monday partnered with McDonald's to launch **multiple OmniPork menu items** across hundreds of outlets in Hong Kong and Macau. Menu items included plant-based SPAM luncheon meat. Luncheon meat **holds a special place in the hearts and minds of East Asians**, and until the OmniPork launch no plant-based version had been available.
- KFC Canada **made its Lightlife chicken sandwich a permanent menu item**.
- Tyson announced that it would sell the **Raised & Rooted plant-based meat line in European foodservice**.
- Papa John's added **plant-based cheese from Follow Your Heart and meats from Beyond Meat** in Costa Rica.
- Canadian family-casual and fast-food chains **White Spot and Triple O's launched the Impossible Burger**.
- In South Korea, national fast-food brand Lotteria debuted its **Miracle Burger**, the first plant-based burger to appear on the menu of a major burger chain in the country.

Leading international restaurant chains expanded their plant-based tests and permanent menu offerings in 2020:

- Burger King expanded its partnership with **Unilever-owned Vegetarian Butcher** by launching a plant-based Whopper with a Vegetarian Butcher patty in China and Latin America. In the Philippines, Burger King sourced its Rebel Whopper patties from

Australia-based v2food, and in South America, the mega chain partnered with **Chilean supplier NotCo**.

- McDonald's **announced the McPlant product line**, a unique platform that not only leverages the chain's iconic branding but is flexible: According to the announcement, McDonald's can launch new plant-based beef, pork, chicken, or fish items under the McPlant banner or fold in existing plant-based items. The chain already offers the Big Vegan burger in Germany and Israel, the McVegan in Scandinavia, and the McAlloo Tikki sandwich in India. In early 2020, McDonald's concluded the plant-based P.L.T. trial in Canada.

Product and category expansion

Plant-based burgers were the first wave of next-generation plant-based meat products to attain mainstream appeal. However, plant-based protein has expanded beyond the burger format into multiple occasions, dayparts, and segments:

- **Eggs.** 2020 was a year of developments for plant-based eggs in foodservice, including **Eat Just's partnership with foodservice management giant Sodexo** and the **U.S. foodservice launch of ZeroEgg**.
- **Breakfast.** Successes for plant-based eggs helped drive the plant-based trend into the breakfast daypart, as breakfast sandwiches, burritos, and combos featuring plant-based meat and eggs became common. Notable releases and trials included **Wawa's addition of multiple plant-based breakfast items**, **Einstein Bros. Bagels' trial of a Beyond Sausage sandwich**, Burger King U.S.'s **addition of the Impossible Croissan'wich**, and **Starbucks U.S.'s nationwide rollout of the Impossible breakfast sandwich**.
- **Chicken.** 2020 saw multiple plant-based chicken debuts and limited-time offers, including **KFC's Beyond Chicken nuggets**, **Hooters' release of Quorn's Unreal Wings**, and **El Pollo Loco's rollout of Improved Nature's chicken**.
- **Pizza.** **Domino's India**, **Pizza Hut**, **Papa John's UK**, and **California Pizza Kitchen** tested or launched plant-based meat pizza toppings.
- **Mexican.** The Mexican category continued to embrace plant-based meat, with trials or launches at **On the Border** and **Pollo Tropical**. Del Taco also added **more plant-based meat items** to its existing lineup.
- **Burger-plus.** Nestlé debuted a **fully plant-based bacon cheeseburger**.

The increasing variety of plant-based foods in foodservice channels not only tracks with incremental segment growth but offers compounding benefits to the entire plant-based category. Variety helps increase familiarity and signal flavor by making plant-based items an integrated category within the full menu rather than individual outliers. A variety of plant-based

menu items covers more occasions, dayparts, and needs, enabling consumers to easily fit plant-based foods into diverse contexts.



“As some customers shift their preference toward high-quality plant-based options, we want to ensure that they, too, can experience KFC’s iconic recipes. The response to KFC’s plant-based chicken in all markets where it has been tested, including in the U.S., Canada, the UK, and Asia, has been phenomenal. We are excited to continue our journey in developing plant-based products for consumers seeking meat alternative options.”

—Ana Maria Basurto, global head of food innovation and technology at KFC

Improved marketing and promotion

As consumers sought to replace out-of-home dining with socially distanced convenience, digital channels, such as apps and third-party restaurant delivery, experienced a massive surge that makes them more important than ever going forward. **Plant-based has performed well on digital channels**, probably due to suppliers’ brand equity and the digital fluency of younger consumers who love plant-based foods.

Box 2: Co-branding in foodservice

One notable foodservice trend that persisted throughout 2020 was the co-branding of plant-based meat suppliers and restaurants on menus. Co-branded foods on restaurant menus are quite rare—beverage brands like Coca-Cola and Pepsi are the only widespread exceptions on the strength of their consumer branding. For the vast majority of other menu items, especially meats, the restaurant brand is primary.

In the United States, according to data obtained from GFI’s **Restaurant Scorecard analysis**, most plant-based fast-food introductions are co-branded, while non-fast-food introductions are less likely to be co-branded and rely less on analogue products that

closely replicate the sensory experience of animal-based meat. Supplier brand equity may be particularly salient in novel categories such as meat analogues, where trust, familiarity, and taste perceptions are critical drivers of initial trial.

Time will tell whether this advantage persists. If it does, it will be unique in the meat category. Most consumers have no idea who supplies animal meat to McDonald's and Burger King, for example, and transparent co-branding could be a competitive, point-of-difference edge for alternative protein companies.

Early-stage companies

Entrepreneurs around the globe launched and grew plant-based food startups, augmenting the success of the plant-based food industry in 2020. Startups and early-stage companies continue to drive innovation in the plant-based food space, advancing key technologies ranging from ingredient processing to new production methods. The following table spotlights the top early-stage companies by funds raised in 2020 across all regions of the world.

Table 3: Top 10 plant-based food producer fundraising rounds of 2020

Company	2020 invested capital (\$M)	Headquarters
Impossible Foods	\$700	Redwood City, USA
LIVEKINDLY Co.	\$338	Los Angeles, USA
Oatly	\$278	Malmö, Sweden
Califia Farms	\$172	Los Angeles, USA
NotCo	\$85	Santiago, Chile
Green Monday	\$70	Hong Kong, SAR, China
Ripple Foods	\$56	Berkeley, USA
v2food	\$55	Sydney, Australia
Good Catch	\$37	Heath, OH, USA
Meatless Farm	\$32	Leeds, UK

Source: GFI analysis of PitchBook data.

Note: Data has not been reviewed by PitchBook analysts. See Box 6 for GFI's data collection methodology and the definition of "invested capital."



Developments in the upstream supply chain

Seeds and crops

Crops have historically not been optimized for their protein content or the functionality required by many plant-based meat, egg, and dairy products. The plant-based ingredient industry has a need for crops that are bred to exhibit lower levels of metabolites and enzymes that negatively impact taste, as well as higher protein content and functionality—such as improved solubility, water-binding capacity, and fat-binding capacity, all of which contribute to desirable sensory attributes in plant-based end products. 2020 saw multiple developments in seed and crop optimization:

- Equinom **closed a \$10 million Series B funding round** and **opened a new R&D facility for seed breeding in Israel**. Equinom uses a non-GMO seed breeding process to create golden-trait seeds that are optimized for use in alternative protein products, including a high-protein pea that the company claims can be processed into texturizable concentrate without costly wet fractionation.
- Benson Hill, a seed breeding company using both traditional and GMO breeding methods, **announced plans to release its “ultra-high protein” soybean varieties** in the 2021 crop year on more than 20,000 acres and expand to 200,000 acres in 2022. If successful, these varieties will be the first commercially available soybeans that could effectively replace soy protein concentrate made through standard soybean crushing and bypass traditional dry and wet fractionation steps. Benson Hill also **raised a \$150 million Series D round**.
- Yield10 and Rothamsted Research **announced a partnership** aimed at commercializing a CRISPR-edited Camelina plant capable of synthesizing the highly unsaturated omega-3 fatty acids EPA and DHA. An abundant source of low-cost, animal-free omega-3 fatty acids will be required for alternative proteins to mimic the nutrient profile of fatty fish, such as salmon and tuna.

Once novel crops with promising potential as alternative protein inputs are identified, several challenges will remain:

- Establishing the necessary agricultural infrastructure—seeds, agricultural inputs, farm equipment, crop insurance, storage, transportation—to enable efficient and scaled cultivation
- Determining how to efficiently and profitably process harvested raw material into useful ingredients, such as oil and protein
- Connecting with downstream food-product manufacturing customers

Market mechanisms to address these challenges are needed to diversify the crops from which the plant-based industry can source ingredients. In addition to startups such as **Fieldcraft** and **Indigo Ag**, the Foundation for Food and Agriculture Research is **establishing the Open Market consortium**, an open-source blockchain system to connect farmers directly with institutional crop buyers.

2020 brought major developments from companies working to commercialize novel crops relevant to alternative proteins:

- Quinoa market leader NorQuin **formed a partnership with Ingredion to commercialize quinoa flours and concentrates.**
- PURIS, a Minnesota-based breeder and processor of non-GMO crops, such as yellow pea and soy, created a CPG product accelerator, **launched a lupin flour**, and **released a pea syrup.**
- U.S.-based startup TerViva, which is commercializing oil and protein from beans harvested from pongamia trees, **established an organic and Fair for Life-certified supply chain in India.**
- Plantible Foods, which **raised \$4.6 million in April**, articulated plans to release its lemna (duckweed) protein commercially in 2021.
- Israeli startup InnovoPro **opened a U.S. subsidiary, began recruiting a sales team,** and closed several funding rounds, including an **\$18 million Series B round** to fund the company's commercialization of a 70-percent-protein chickpea concentrate.



For more information about established and emerging crop sources of plant proteins, check out **GFI's Plant Protein Primer**.

Intermediate ingredient processing

Ingredient processing is almost always scale-dependent, relying on high volumes to make up for low margins. Even as demand for new protein flours, isolates, and concentrates grows rapidly, the cost and complexity of building processing facilities can make ingredient production capacity slow to materialize. Repurposing is difficult since facilities are often optimized for one commodity and even for highly specific cultivars and traits. One of the highest priorities for alternative protein scaling is identifying new chemical, mechanical, and biological processing methods that offer high output quality and functionality benefits and are inexpensive, more efficient, compatible with diverse crop inputs, and less scale-dependent than current processes.

2020 brought developments from notable startups and ingredient processing companies:

- Canada-based Burcon Nutrascience, which is commercializing a variety of plant protein crops and processing technologies, including for canola protein, **secured a \$95 million CAD debt financing package to complete its new protein production facility.**
- PURIS, a Minnesota-based breeder and processor of non-GMO yellow pea and soy, **opened a new pea protein facility in Dawson, Minnesota.**
- Canadian ingredient giant Roquette **opened the world's largest pea protein facility** in Portage la Prairie, Manitoba. At a cost of \$600 million CAD, the plant is expected to reach full capacity in early 2022 and process more than 125,000 metric tons of yellow peas annually.
- Kerry **added multiple new ingredients** to its Radicle brand of plant proteins, including pea, rice, and sunflower proteins. The company **created an online tool** to support product developers across various categories, including plant-based meat, eggs, and dairy.
- Ingredion invested \$185 million in plant protein R&D, **completed a 100 percent acquisition of plant protein producer Verdient Foods**, and **opened a new pea protein processing plant** in South Sioux City, Iowa.
- AGT Foods **launched a new pasta line** that uses starch side streams from pea protein processing. Protein Industries Canada awarded AGT, **along with ingredient startup ulivit**, an **\$11.3 million CAD grant** to further R&D for pea, lentil, and fava bean protein concentrates.
- French agrifood company Avril and Netherlands-based ingredient supplier DSM **announced a collaboration to produce plant protein**, initially canola protein. Production is slated to begin in 2022.
- Corteva Agriscience, Bunge, Botaneco, and Protein Industries Canada **announced a joint investment of more than \$27 million CAD to improve the protein content of Canadian canola.** They aim to make canola competitive with soy and pea as a protein source for plant-based foods.
- U.S.-based Arbiom finished a **proof-of-concept** test of a novel umami protein extracted by fermenting wood biomass.

End-product manufacturing

Given the enormous scale required to produce meat, egg, and dairy products for billions of people, production technology and capacity scaling are key areas for future innovation and investment in the alternative protein industry. The top priorities are as follows:

- Optimized production equipment, including scalable tools for protein texturization
- Manufacturing equipment with increased throughput
- Greater availability of contract manufacturing and pilot plant capacity
- Repurposed manufacturing capacity from other sectors

- Infrastructure capital, such as project financing, working capital facilities, debt funding, grant funding, loan and purchase guarantees, and advance market commitments

Notable innovators in end-product formulation and manufacturing made substantial progress in 2020:

- Rebellious Foods, a startup focused on plant-based meat production equipment, **closed a \$6 million Series A round** and **launched its chicken products in retail stores**.
- Plant-based contract manufacturer Plant & Bean, a spinoff of Breck Foods—pioneer of high-moisture-extruded meat analogues—**opened Europe’s largest plant-based meat factory**.
- Rival Foods, a spinoff of Wageningen University focused on commercializing shear-cell technology for creating structure and texture in plant-based meat applications, **entered into a plant-based chicken development partnership** with the LIVEKINDLY Collective.
- Chilean startup NotCo **released plant-based milk** formulated with a proprietary AI platform.
- Startups **Redefine Meat**, **Novameat**, and **Legendary Vish** drew closer to commercializing 3D-printing technology for manufacturing structured meat analogues.
- Heura **released a fat analogue**, enabling product formulators to use olive oil in plant-based meat applications.



To learn more about the innovations needed to drive progress throughout the plant-based protein supply chain, check out **GFI’s Advancing Solutions initiative**. To meet the scientists leading open-access plant-based research in crop development, ingredient processing, and end-product formulation and manufacturing, see this report’s **section on GFI’s research grants**.

*Are we missing your company? Did we get something wrong? We’d appreciate your feedback via **this form**.*

Sales



Section 3: Sales

U.S. retail sales overview

Across the United States, retail plant-based food sales soared in 2020. Shelter-in-place orders and shutdowns of restaurants and other foodservice outlets due to Covid-19 shifted consumer spending toward retail, but the pandemic wasn't the only driver of growth, as plant-based food sales grew nearly two times as fast as overall food sales; overall food sales increased by 15 percent (up from 2 percent growth in 2019), and retail plant-based food sales grew by 27 percent to more than \$7 billion.

Certain plant-based categories experienced even stronger growth in 2020:

- Plant-based meat crossed the billion-dollar mark, growing from \$962 million in 2019 to \$1.4 billion in 2020—a growth rate of 45 percent.
- The plant-based egg category grew by a massive 168 percent.
- Plant-based dairy categories in aggregate grew by 24 percent to \$4.4 billion.
- Plant-based milk, the largest of all the plant-based food categories, grew by 20 percent. At \$2.5 billion, it now makes up 35 percent of all plant-based food sales.

Box 3: U.S. retail market data collection

To size the U.S. retail plant-based food market, GFI and the Plant Based Foods Association commissioned retail sales data from market research firm SPINS. The firm built a dataset by first pulling in all products with the SPINS “plant-based positioned” product attribute and the SPINS “plant-based diet” product attribute. The dataset was further edited by removing any products that were not or did not contain direct replacements for animal products (meat, seafood, eggs, and dairy). Inherently plant-based foods, such as chickpeas and kale, are not included. **Due to the custom nature of these categories, the retail data in this report will not align with that of standard SPINS categories.** SPINS obtained the data over the 52-week and 104-week periods ending December 27, 2020, from the SPINS Natural Enhanced and Conventional Multi Outlet (powered by IRI) grocery channels. SPINS defines these channels as follows:

- **Conventional Multi Outlet (MULO):** More than 104,000 retail locations spanning grocery, drug, mass, dollar, military, and club.
- **Natural Enhanced:** More than 1,800 full-format stores with \$2 million+ in annual sales and 40 percent or more of UPC-coded sales from natural/organic/specialty products.

SPINS is generally thought to offer the broadest available view of retail food sales, although the data does not represent all retailers. Some companies, such as Whole Foods Market and Trader Joe's, do not report their scanner data to SPINS or IRI.

Figure 4: Total U.S. retail plant-based food market

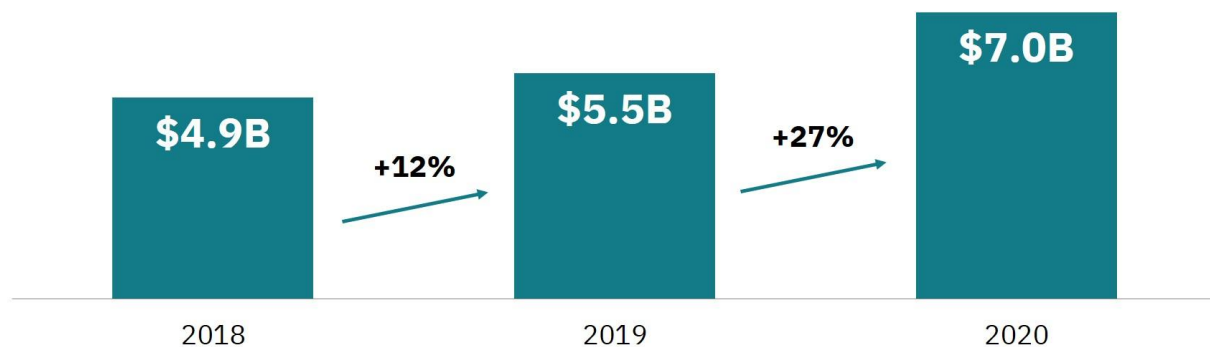


Figure 5: U.S. retail plant-based food dollar sales by category

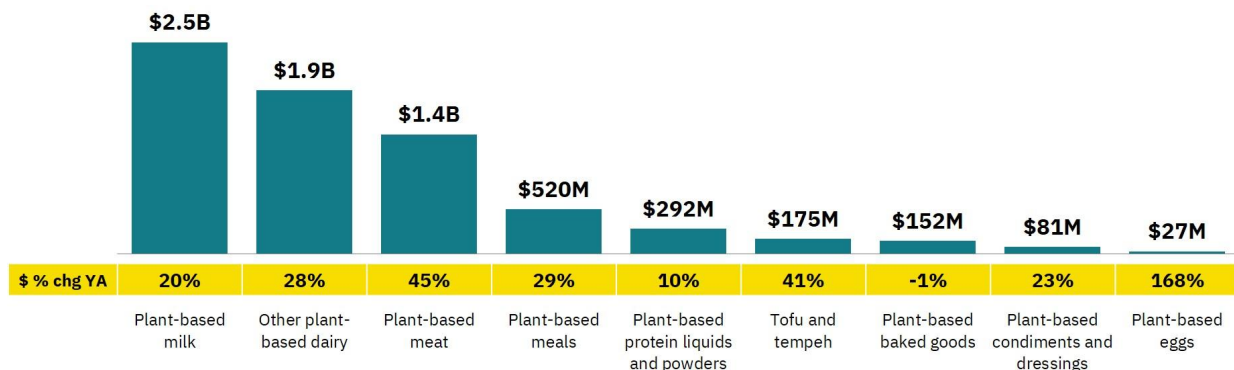
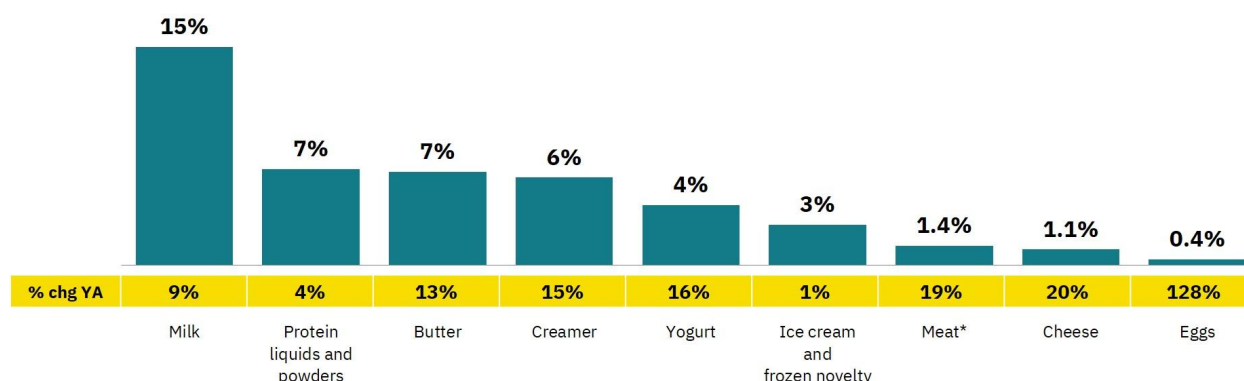


Figure 6: U.S. retail plant-based dollar share of total category



Citation for figures 4–6

Source: SPINS Natural Enhanced Channel, SPINS Conventional Multi Outlet Channel (powered by IRI) | 52 weeks ending 12-27-2020.

Note: The data presented in these figures is based on custom GFI and PBFA plant-based categories created by refining standard SPINS categories. Due to the custom nature of these categories, the presented data will not align with that of standard SPINS categories. SPINS does not report non-UPC animal-based meat counter sales. The plant-based meat share of the total meat category assumes that non-UPC animal-based meat counter sales are equivalent to animal-based packaged meat sales.



For a comprehensive overview of U.S. retail sales data, including coverage of all plant-based categories and additional detail on the plant-based meat and plant-based milk categories, check out [GFI's market data page](#).

Plant-based purchasing dynamics

Box 4: U.S. consumer panel data collection

To better understand consumer purchasing dynamics and demographics, GFI and the Plant Based Foods Association also commissioned consumer panel data from SPINS. SPINS acquires its panel data through the National Consumer Panel, a Nielsen and IRI joint venture. NCP's panel is composed of roughly 100,000

households, which are recruited and selected according to U.S. population statistics, as well as demographic and geographic criteria.

GFI purchased consumer panel data for several of the custom plant-based categories used for its point-of-sale data. Every plant-based category covered in the panel data has a composition identical to that of its corresponding category in the point-of-sale data.

Due to the custom nature of these categories, the panel data presented in this report will not align with that of standard SPINS categories. SPINS obtained the data from all U.S. outlets over the 52 weeks ending December 27, 2020, and the 52 weeks ending December 29, 2019.

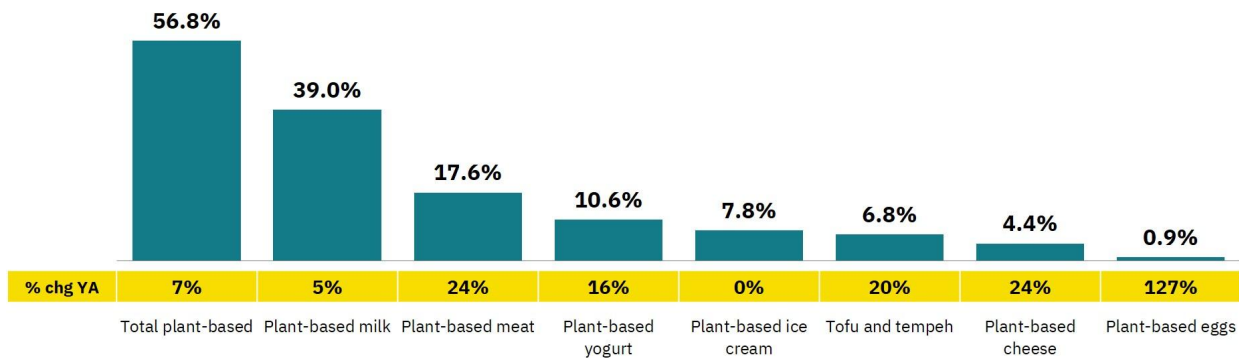
The strong sales growth of plant-based foods is driven by growth in key metrics, such as household penetration, repeat purchasing, and dollar sales per buyer.

Household penetration

2020 saw significant growth in household penetration across multiple categories as more consumers purchased plant-based options:

- The total plant-based food category has a household penetration of 56.8 percent, a 7 percent growth rate over the course of 2020.
- Plant-based milk's household penetration grew at a rate of 5 percent over the course of 2020 to 39 percent, the highest household penetration rate of any individual plant-based food category for which we have data.
- Plant-based meat has the second-highest household penetration rate at 17.6 percent, an impressive 24 percent growth rate over the course of 2020.

Figure 7: Household penetration of plant-based products



Source: NCP, All Outlets, 52 weeks ending 12-27-20.

Note: The data presented in this graph 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.



For a comprehensive overview of purchasing dynamics data, check out [GFI's market data page](#).



“Plant-based is becoming increasingly important in every category across the store and is a key driver of sales growth.”

—Laura Smith, category strategy manager, Our Brands, at The Kroger Co.

U.S. consumer dynamics and research

Consumer awareness of and interest in plant-based foods continued to rise during 2020. Plant-based meat, eggs, and dairy, product categories formerly most familiar to vegans and vegetarians, are gaining mainstream status and appealing to a broad swath of consumers.

According to a **2020 Gallup poll**, a significant and increasing percentage of U.S. consumers have eaten or are at least aware of plant-based meat products:

- Half of U.S. consumers are familiar with plant-based meat products.
- Forty-one percent of U.S. consumers have tried plant-based meat.
- Of Americans who have tried plant-based meats, 60 percent are very or somewhat likely to continue eating them. Additionally, a **2020 Mintel study** found that of U.S. consumers who eat plant-based meat, almost 50 percent eat more plant-based meat than they did in 2019.

Consumer interest in plant-based foods is driven by omnivores more so than by vegans and vegetarians. A **Mattson survey** conducted in June yielded several corroborative findings:

- While only 5 percent of consumers are vegan or vegetarian, 32 percent identified as “mostly vegetarian” or stated they were trying to reduce their intake of animal products.
- Nearly 60 percent of consumers believe plant-based diets are a fundamental change in how people eat and will continue for a long time.
- Another 25 percent of consumers feel that plant-based diets are a fundamental shift that will continue forever.

In other words, more than 80 percent of U.S. consumers believe that the recent shift toward plant-based diets is a significant and long-lasting change.

Recent consumer studies also reveal important findings about consumer motivations:

- Consumer studies consistently find that the primary motivation for eating plant-based foods is health, although we know that the products must compete on price, taste, and convenience to be viable choices for the health-motivated. The 2020 Mintel study also provides these findings:
 - Fifty-six percent of U.S. consumers eat plant-based proteins for their health.
 - Sixteen percent eat plant-based proteins for environmental sustainability.
 - Thirteen percent eat plant-based proteins for animal welfare.
- Interestingly, the June 2020 Mattson study found that while health remains the primary motivator for trying to eat *more* plant-based foods (rather than exclusively or mostly plant-based foods), the percentage of consumers trying to eat more plant-based foods for health reasons decreased from 82 percent in 2018 to 65 percent in 2020.
- Meanwhile, the percentage of consumers trying to eat more plant-based foods for environmental reasons increased from 31 percent in 2018 to 48 percent in 2020. This suggests that environmental and sustainability concerns play an increasingly important role in the decision to try increasing plant-based food consumption.

While health and environmental concerns bring consumers into the plant-based food category, taste and price are key factors influencing trial or continued consumption. As explained in Box 1 on **plant-based meat price parity**, perceived taste and price are among the top reasons consumers either do not eat or will not try plant-based foods. This suggests that plant-based food companies should focus on creating high-fidelity plant-based products that closely mimic the sensory attributes of animal-based foods and seek to lower prices.

Purchasers of plant-based products tend to be younger and from higher income brackets than the average consumer and are more likely to hold college or graduate degrees. Data reveals that purchasers of plant-based products over-index on several demographics:

- 18–54 age bracket
- Income greater than \$50,000
- College or graduate degrees
- People of color (notably high engagement among Asians)
- Households with children

Table 4: Plant-based food buyer demographics

	Cohort	Buyer index	Dollar index		Cohort	Buyer index	Dollar index
HH age	HH age 18-34	111	118	Income	HH income under 20k	81	71
	HH age 35-44	111	122		HH income \$20k-\$24.9k	79	59
	HH age 45-54	106	116		HH income \$25k-\$34.9k	88	77
	HH age 55-64	96	90		HH income \$35k-\$44.9k	94	89
	HH age 65+	83	70		HH income \$45k-\$49.9k	92	93
HH education	HH graduated high school or less	81	64		HH income \$50k-\$59.9k	101	100
	HH some college	97	91		HH income \$60k-\$69.9k	103	101
	HH graduated college	108	116		HH income \$70k-\$99.9k	106	103
	HH post-graduate school	115	133		HH income \$100k+	115	132
Ethnicity	White	96	95	Kids	HH with children	109	115
	Asian	132	112		HH without children	96	93
	African-American	105	117				
	Other race	105	112				

Source: NCP, All Outlets, 52 weeks ending 12-27-20.

Note: The data presented in this graph 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.





“At Planterra Foods, we are always monitoring consumer trends. With more people at home over the last year, we saw experimentation in the kitchen skyrocket—and that includes a significant rise in the trial and acceptance of plant-based foods. More consumers today are aware of plant-based protein and are looking for ways to eat it more often, so it’s up to us to provide the best-tasting, nutritious food to satisfy consumers so they come back wanting more. With more people entering the category now, great-tasting flavor is not only important; it’s necessary.

“By providing options and keeping up with current trends in consumers’ food needs, we remain committed to feeding future generations.”

—Darcey Macken, CEO of Planterra Foods

Direct-to-consumer sales

As the Covid-19 pandemic disrupted foodservice and retail distribution channels, many brands turned to DTC distribution:

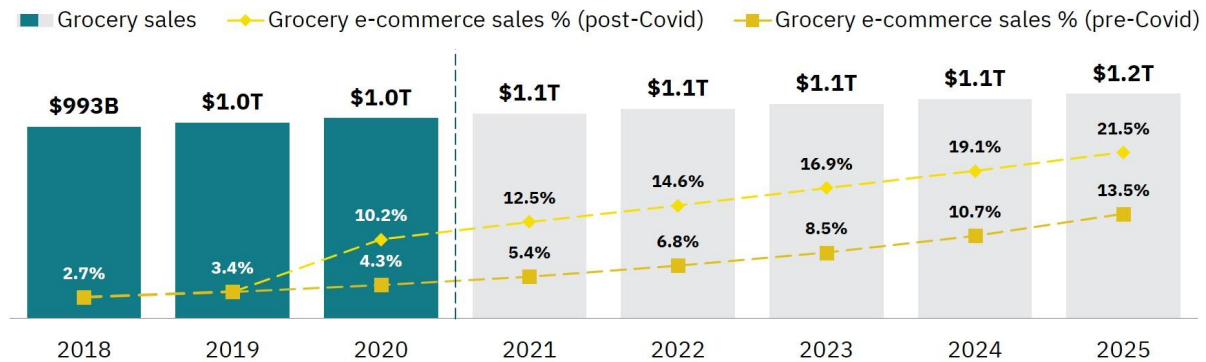
- Impossible Foods **launched a DTC website in June.**
- Beyond Meat **introduced its own DTC website in August.**
- Alpha Foods **began DTC sales in November.**
- Brands such as Exponential Foods and Australia-based Fable Food Co **launched their DTC presence years ahead of schedule** as part of their efforts to adapt to disruption in the brick-and-mortar retail channel.

Covid-19 may have brought about a long term shift in consumer behavior and online grocery store sales beyond the plant-based food category:

- Rabobank predicts that **online grocery sales will make up 6.4 percent of total grocery sales by the end of 2021**, compared with only 4.6 percent by the end of 2021 if not for Covid-19.
- Eventual share of online grocery sales could range from 4.8 percent to 9.1 percent of total grocery sales by the end of 2021, up from online grocery’s 3.1 percent share at the end of 2019.

- Mercatus more bullish forecasts **that online grocery will make up 12.5 percent of total grocery sales by the end of 2021**, compared with only 5.4 percent if not for Covid-19. Mercatus also predicts that online grocery sales will hit nearly 22 percent of total grocery sales by 2025.

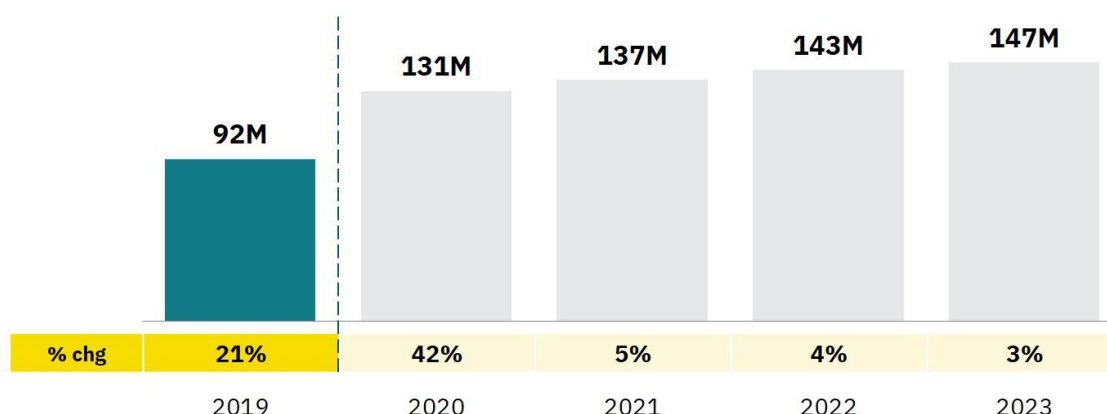
Figure 8: Total U.S. grocery dollar sales and grocery e-commerce share of total: Historical and projected (2018–2025)



Source: Mercatus, “The Evolution of the Grocery Customer” (September 2020).

An eMarketer forecast suggested that the **number of online grocery buyers in the United States would reach 131 million in 2020**, a nearly 42 percent increase over 2019. eMarketer predicts that nearly 150 million people will be online grocery buyers by 2023. While the trend toward online sales was already underway, Covid-19 certainly hastened that shift. Plant-based brands must fully leverage all channels to distribute their products, and online grocery will play an increasingly important role in distribution.

Figure 9: U.S. digital grocery buyers: Historical and projected (2019–2023)



Source: eMarketer, “Online grocery sales will increase by nearly 53% this year” (November 2020).

Global retail sales overview

The plant-based food industry has established itself around the globe, with plant-based meat and milk products accessible to consumers on every continent. For the first time since The Good Food Institute began publishing annual state of the industry reports, we are providing global sales data from Euromonitor International for a perspective on the growth of global plant-based sales.

Global sales of plant-based meat grew 24 percent in 2020 to \$4.2 billion, and global sales of plant-based milk grew 4 percent to \$16.9 billion. Below are more details on plant-based meat and plant-based milk sales and share at global and regional scales.

Box 5: Global retail market data collection

Euromonitor is one of few providers of standardized retail sales data across global regions. The company assembles data through a combination of desk research, store checks, and trade surveys. Desk research relies on data and insights from a variety of sources:

- Governmental and official sources
- National and international trade press
- National and international trade associations
- Industry study groups and other semiofficial sources
- Company financials and annual reports
- Broker reports
- Online databases
- Financial, business, and mainstream press

Store checks are used to gather data on these key factors:

- **Place:** products tracked in all relevant channels—selective and mass, store and non-store
- **Product:** innovations in products, pack sizes, and formats
- **Price:** brand price variations across channels and comparison with private-label pricing
- **Promotion:** marketing and merchandising trends, offers, discounts, and tie-ins

Trade surveys supply additional or missing data:

- Fill gaps in available published data per company
- Generate a consensus view of the size, structure, and strategic direction of a category
- Access year-in-progress data where published sources are out of date
- Evaluate expert views on current trends and market developments

These methods combined enable Euromonitor to assemble a rigorous dataset that provides a global perspective on plant-based meat and plant-based milk sales.

Note: Plant-based meat is part of Euromonitor’s larger “meat substitutes” category, which aggregates retail sales of plant-based meat and tofu. To account for this, we have refined graphs to display only estimated plant-based meat sales. Assumptions for refining the plant-based meat data are as follows:

- According to Euromonitor, plant-based meat constitutes only 1 percent of Asia Pacific’s “meat substitute” sales. Tofu makes up the remaining 99 percent in Asia Pacific.
- Plant-based meat constitutes 90 percent of meat substitute sales for all other regions. We calculated this 90 percent conversion factor by summing the SPINS U.S. retail sales data for plant-based meat and tofu and then taking plant-based

meat's share of that aggregated number. We then applied the 90 percent conversion factor to all regions, excluding Asia Pacific.

We did not refine Euromonitor's plant-based milk data.

Figure 10: Estimated global plant-based meat retail market overview

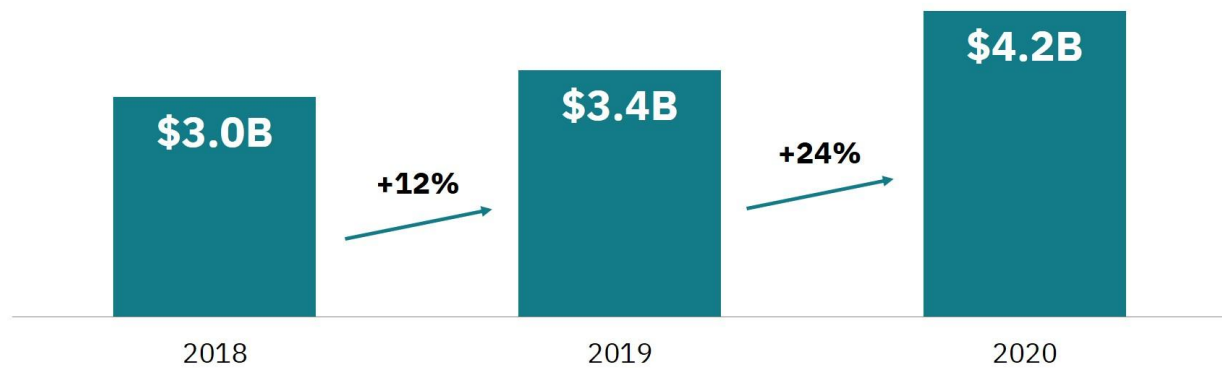


Figure 11: Estimated global plant-based meat retail dollar sales and dollar sales growth by region

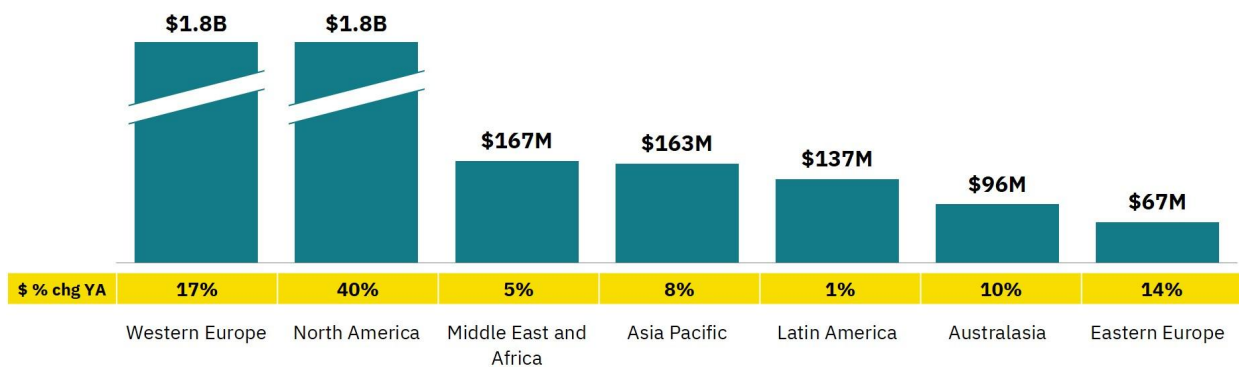


Figure 12: Global plant-based milk retail market overview

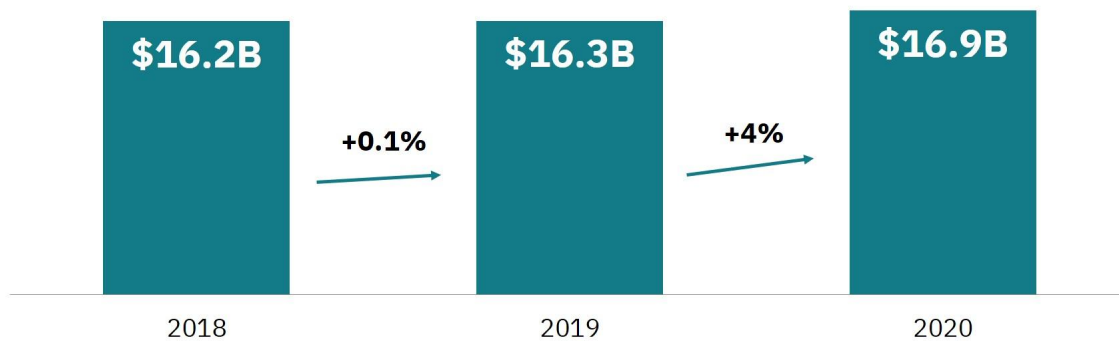
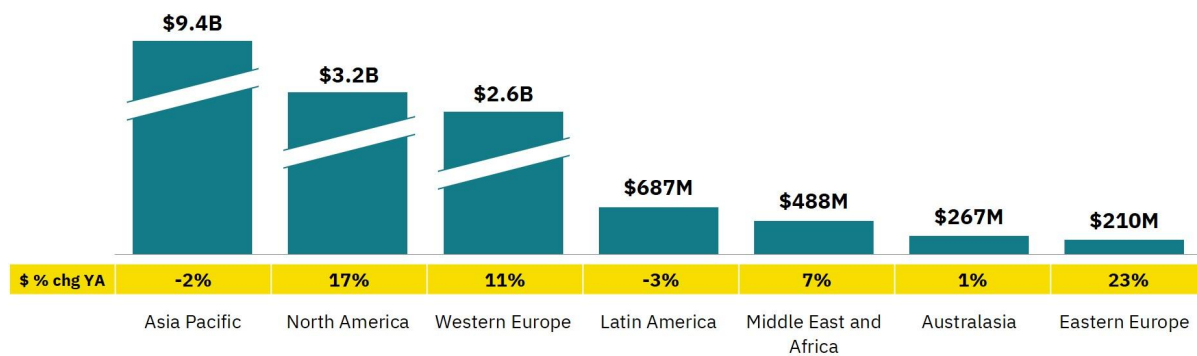


Figure 13: Global plant-based milk retail dollar sales and dollar sales growth by region



Citation for Figures 10–13

Source: Euromonitor Passport, GFI analysis.

Note: Euromonitor’s “plant-based meat” category includes tofu.

To account for this, we refined Euromonitor’s plant-based meat sales data according to guidance provided by Euromonitor and assumptions made by GFI.



Investments



Section 4: Investments

2020 was a record year for investments across the plant-based, cultivated, and fermentation-derived alternative protein categories, with plant-based meat, egg, and dairy companies still leading the pack. Such companies received \$2.15 billion in investments in 2020—the most capital raised in any single year in the industry’s history and more than three times the \$667 million raised in 2019. Plant-based meat, egg, and dairy companies raised \$4.43 billion in investments from 1980 to 2020, with all but \$11 million raised in the past decade (2010–2020). In 2020 alone, the industry raised nearly half the total amount raised to date.

2020 brought many stand-out funding events:

- **Impossible Foods** enjoyed a record fundraising year, raising \$700 million through a \$500 million Series F round in March and a \$200 million Series G round in August. Taken together, this is more than the entire plant-based protein industry raised in 2019. Investors’ willingness to fund a \$500 million round near the start of the Covid-19 pandemic, when many investors took a cautious stance, demonstrates investor enthusiasm for, and confidence in, the category.
- **LIVEKINDLY co.**, a collective of early-stage and more-established plant-based brands, raised \$335 million in venture capital financing. See Box 7 for a discussion of LIVEKINDLY’s differentiated structure and approach.
- Plant-based dairy had a strong year, with **Califia Farms** raising \$172 million in private equity capital and **Oatly** raising \$200 million in private equity capital and \$78 million in debt financing.
- Half the top 10 most-funded plant-based companies in 2020 are based outside the United States, demonstrating the attractiveness of plant-based companies worldwide. See Table 3 for a list of the top 10 most-funded companies in 2020.

While equity investments accelerated rapidly in 2020, debt raises remained less utilized in the plant-based industry. The sole debt raised in 2020 was Oatly’s \$78 million general debt round, which amounted to 33 percent of the \$234 million in debt financing raised by plant-based companies in the past decade. Debt is an important source of nondilutive financing, as it enables startup founders to borrow meaningful capital without giving up a large portion of their companies’ ownership to fund large-scale projects, such as building a manufacturing facility to scale production. Therefore, this represents a clear gap that investors can look to fill in 2021 and beyond.

Table 5: Plant-based food company investment (1980–2020) (U.S. and global)

	2020	1980–2020	Highlights
Total invested capital	\$2.15B	\$4.43B	2020 invested capital grew 222% from 2019 and represented 48% of all-time investment.
Invested capital deal count	93	419	2020's largest investment was \$500 million raised by Impossible Foods.
Unique investors	196	645	The number of active unique investors grew 44% in 2020 from 2019.
Liquidity event capital	\$15M	\$25.32B	The first known liquidity event occurred in 1987.
Liquidity event count	9	68	
Other financing capital	\$31M	\$127M	The first known other financing event occurred in 2009.
Other financing count	5	14	

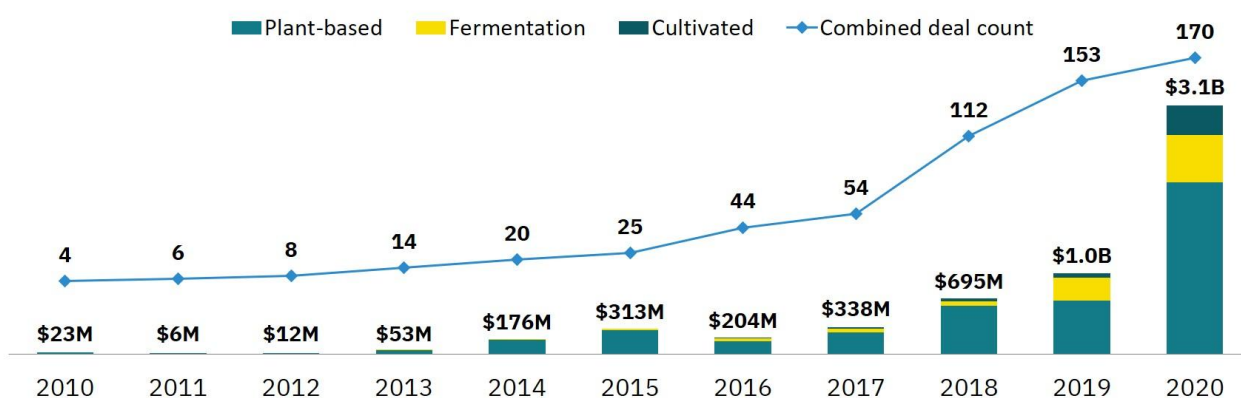
Source: GFI analysis of PitchBook data.

Note: Data has not been reviewed by PitchBook analysts. Total invested capital includes deals with undisclosed dates and thus may not match the sum of annual invested capital figures in this report.

See Box 6 for GFI's data collection methodology and definitions of "invested capital" / "investment," "liquidity event," and "other financing."



Figure 14: Annual alternative protein investment backdrop (2010–2020) (U.S. and global)

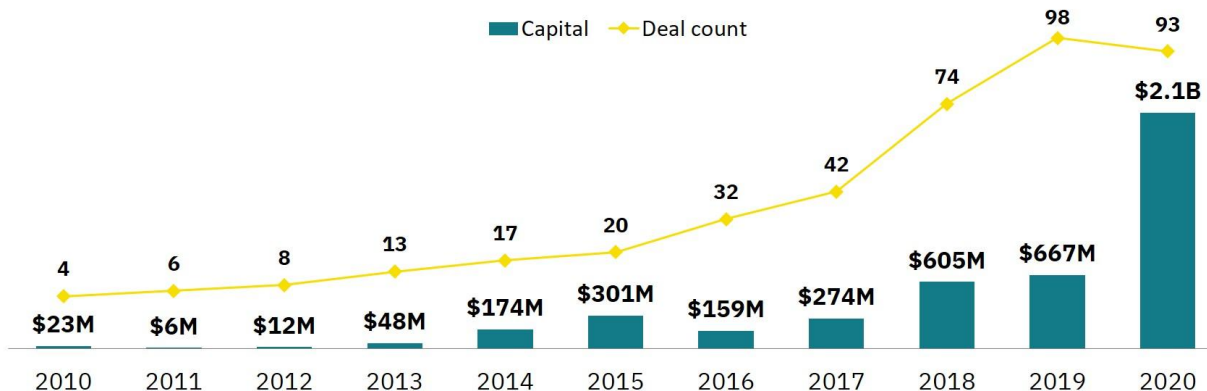


Source: GFI analysis of PitchBook data.

Note: Data has not been reviewed by PitchBook analysts.



Figure 15: Annual investment in plant-based companies (2010–2020) (U.S. and global)



Source: GFI analysis of PitchBook data.

Note: Data has not been reviewed by PitchBook analysts.



Box 6: Data collection methodology

GFI conducted a global analysis of plant-based meat, egg, and dairy companies using data from PitchBook. Our analysis uses a list we custom built in PitchBook of

companies that focus primarily on plant-based meat, egg, or dairy products or providing services to those who produce them. PitchBook profiled 438 plant-based companies, of which 177 have disclosed deals. Of the 177 companies with disclosed deals, 146 have deals with publicly disclosed amounts. Because these aggregate calculations account only for companies with deals and deal sizes disclosed to PitchBook, they are conservative estimates. For example, \$4.43 billion total invested capital raised excludes 108 deals (from a total of 419) with undisclosed or unavailable amounts. This means at least 26 percent of deals in this industry are not represented.

For the purposes of this report, *invested capital/investment* refers to accelerator and incubator funding, angel funding, seed funding, equity and product crowdfunding, early-stage venture capital, late-stage venture capital, private equity growth/expansion, capitalization, corporate venture, joint venture, convertible debt, and general debt completed deals. *Liquidity events* refers to mergers, acquisitions, reverse mergers, buyouts, leveraged buyouts, and IPOs, while *other financing* refers to subsequent public share offerings and private investment in public equity. We do not include capital raised through a SPAC IPO until the entity has merged with or acquired a target company. Please note that the figures published in this report may differ from prior figures published by GFI as we continually improve our dataset.

Table 6: Deal type summary statistics (2010–2020)

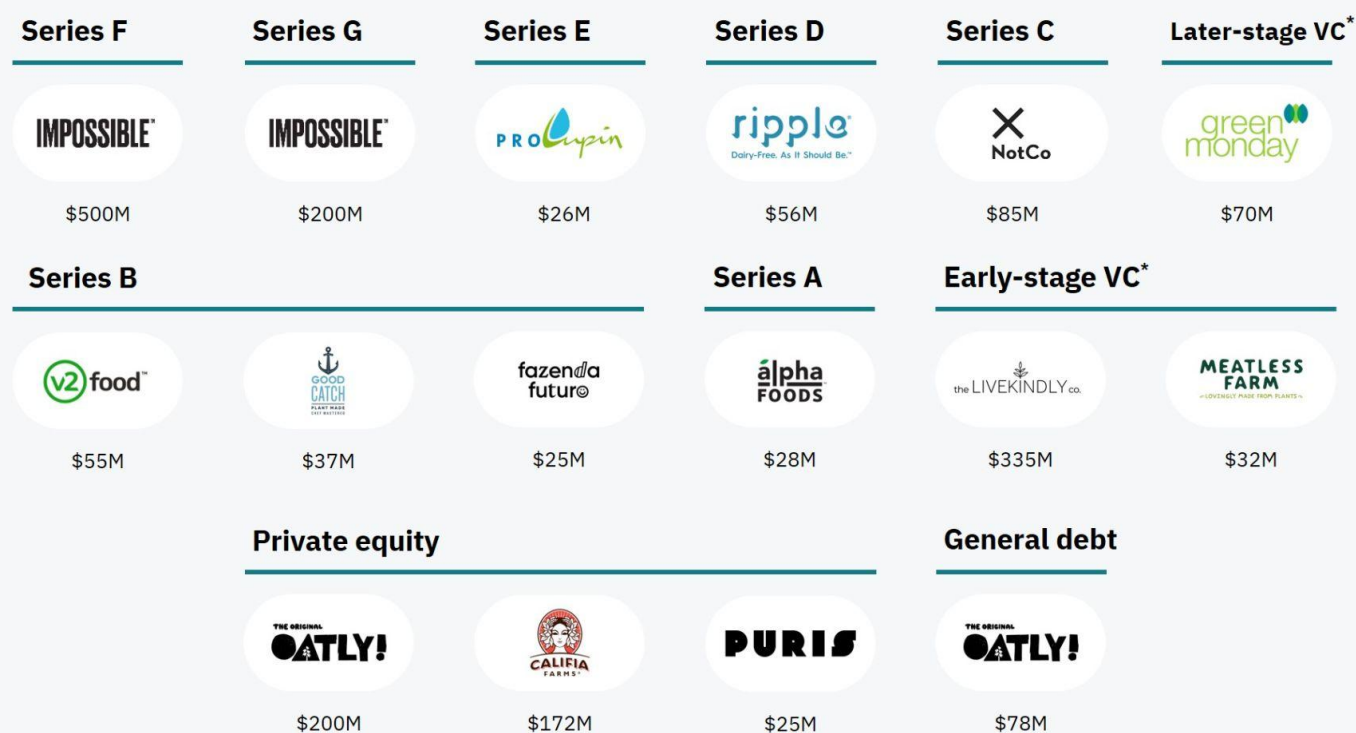
Deal type	Median	Minimum	Maximum	Count
Angel	\$390K	\$30K	\$8M	34
Seed	\$1M	\$50K	\$10M	40
Series A/A1/A3	\$4M	\$350K	\$28M	39
Series B/B1/B2/B3	\$16M	\$2M	\$55M	18
Series C/C1	\$40M	\$10M	\$90M	7
Series D	\$100M	\$56M	\$108M	3
Series E/E1	\$89M	\$17M	\$300M	4

Series F/G/H	\$55M	\$23M	\$500M	5
Equity and product crowdfunding	\$30K	\$10K	\$6M	25
General debt	\$3M	\$20K	\$80M	14

Source: GFI analysis of PitchBook data.

Note: Data has not been reviewed by PitchBook analysts. These figures represent summary statistics of invested capital rounds with disclosed deal amounts. Deal count includes rounds with undisclosed amounts. Due to their limited number and/or size, this table excludes accelerator and incubator, capitalization, convertible debt, Series 1, and joint venture rounds. It also excludes uncategorized rounds.

Figure 16: 2020 key funding rounds



*Uncategorized series

Source: GFI analysis of PitchBook data. Data has not been reviewed by PitchBook analysts.

Box 7: Case study of The LIVEKINDLY co.

Among the many companies focused on developing and scaling a successful plant-based meat, egg, or dairy brand, LIVEKINDLY stands out with its model of owning and operating “the entire value chain of production.” The LIVEKINDLY co. was founded by Roger Lienhard, founder and chairman of Blue Horizon Ventures, a Zürich-based venture capital firm that heavily invests across the alternative protein industry to make plant-based eating “the new normal.”

Not to be confused with LIVEKINDLY Media, which operates under its namesake parent company, The LIVEKINDLY co. has taken the differentiated approach of establishing strategic partnerships across seed growers, producers, and distributors, as well as investing in infrastructure to transform traditional meat production facilities into plant-based production facilities. The company has also fully or partially acquired a number of plant-based brands in various stages of maturity, including Fry Family Food Co., Oumph, Food for Progress, and Like Meat, and entered into a joint venture with PHW-Gruppe, an animal-based poultry producer, to form Green Meadows.

This innovative approach leverages economies of scale, which is critical to producing tasty and affordable plant-based products. It also offers a mission-aligned exit opportunity for plant-based brands, adding an attractive option to this essential component of the venture capital and private investment model.

Liquidity events

Liquidity events, also known as exits, represent the sale of an equity owner’s interest in a company—typically in the form of a merger, an acquisition, a buyout, or an IPO. Liquidity events do not necessarily create investment capital for a business, but they do drive the venture capital investment model. Therefore, liquidity events play an important role in motivating investment in the industry. According to PitchBook data, since 1987 the plant-based food industry has seen 68 disclosed liquidity events summing to \$25.3 billion in disclosed activity across 23 deals with disclosed transaction amounts. The vast majority are mergers and

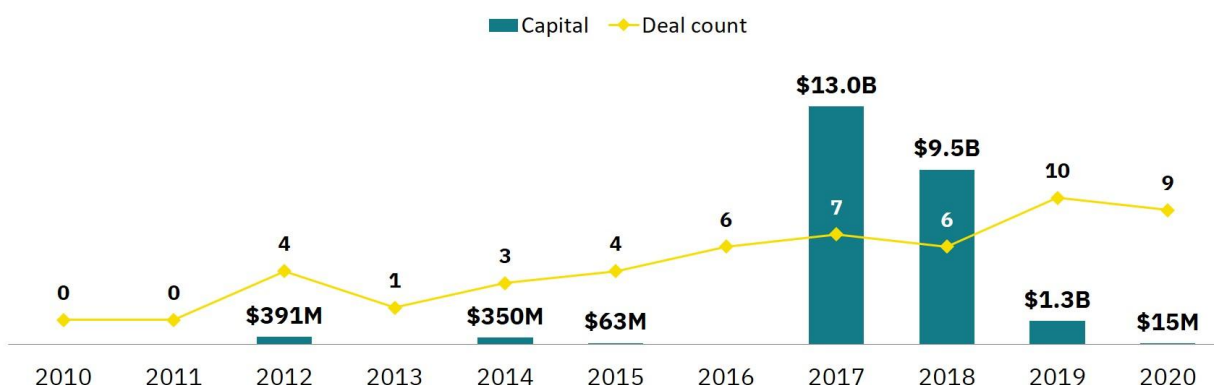
acquisitions. The largest to date is Danone’s acquisition of WhiteWave Foods, a plant-based milk market leader that operated the Silk brand, for \$12.5 billion in 2017.

2020 was a light year for liquidity events, with only nine disclosed deals, summing to \$15 million in disclosed transactions across two deals. The two deals with disclosed amounts were both IPOs:

- The Very Good Butchers raised \$2.6 million in its IPO on the Canadian National Stock Exchange.
- SavorEat raised \$12.6 million in its IPO on the Tel Aviv Stock Exchange.

Just nine liquidity events in the segment in 2020 is not too surprising or meaningful, as liquidity events are relatively infrequent, particularly early in an industry’s development, and vary vastly in size such that a single event can skew any one year’s liquidity event capital amount.

Figure 17: Plant-based food liquidity events (2010–2020) (U.S. and global)



Source: GFI analysis of PitchBook data.

Note: Data has not been reviewed by PitchBook analysts.



Other financing

In addition to more-traditional financing methods, some public companies pursue financing paths such as subsequent public share offerings and private investment in public equity (PIPE). Plant-based meat, egg, and dairy companies raised a disclosed \$96 million in such alternative financing across two deals in 2019 and a disclosed \$31 million across five deals in 2020.

Table 7: Plant-based food other financing events (2019–2020) (U.S. and global)

Company	Year	Amount (\$M)	Financing type
Else Nutrition Holdings	2019	\$56	PIPE
Beyond Meat*	2019	\$40	Public investment second offering
The Very Good Butchers	2020	\$10	PIPE
The Very Good Butchers	2020	\$9	PIPE
Modern Meat	2020	\$3	PIPE
Else Nutrition Holdings	2020	\$4	PIPE
Else Nutrition Holdings	2020	\$6	PIPE

*Note: Of the total \$520 million raised by Beyond Meat through a public investment secondary offering in 2019, the total proceeds to the company were \$40 million and to the selling shareholders \$480 million. We have used only proceeds to the company in this table.

Box 8: Plant-based enters the SPAC craze

2020 was the year of the SPAC. SPACs, or special purpose acquisition companies—shell corporations that take companies public without traditional IPO processes—accounted for most U.S. IPO market growth in 2020 compared with 2019. According to the Nasdaq, U.S. SPACs raised \$80 billion in gross proceeds over 237 deals through December 28, 2020, nearly six times the \$13.6 billion record set in 2019 over 59 deals.

The extreme economic uncertainty and financial market volatility in 2020 made SPACs a more appealing path to going public for many companies. SPACs are often less complicated and expensive than traditional IPOs. Unlike direct listings, they also enable private companies to raise new capital during their transition to the public markets, a critical consideration during a recession.

Plant-based food was no exception; 2020 brought the first plant-based SPAC. The Natural Order Acquisition Corp. filed with the U.S. Securities and Exchange Commission (SEC) to go public in October 2020 and raised \$230 million in its IPO on the Nasdaq stock exchange the next month. After the offering, outstanding shares priced at \$10 each totaled 23,000,000, valuing the company at \$230 million.

Partners Paresh Patel (CEO) and Sebastiano Cossia Castiglioni (chairman) lead Natural Order Acquisition. Patel previously led hedge fund Sandstone Capital, while Castiglioni is a long-time investor in the plant-based space, having invested in more than 60 plant-based companies. Which company Natural Order Acquisition will aim to acquire remains unclear, but the SPAC has shared several selection criteria, including commercial revenue, a high growth rate, and a valuation between \$800 million and \$4 billion.

Investors

Table 8: Most active investors in plant-based food by deal count (2020) (U.S. and global)

Investor	Investor type	Headquarters	2020 deal count	Portfolio companies (by number of investment rounds)
Unovis Asset Management	Venture capital	New York, USA	5	Alpha Foods (3) Beyond Meat (2) ForA: Butter (2) Good Catch (2) Kite Hill (2) Zero Egg (2) Abbot's Butcher (1) Evolution Meats (1) GoodDot (1) Heura (1) Miyoko's (1) New Wave Foods (1) NovaMeat (1) Numu Vegan (1) Oatly (1) Ocean Hugger Foods (1)

				Starfield Food Science Technology (1) Sunfed (1)
Big Idea Ventures	Venture capital	New York, USA	5	Evo Foods (2) Karana (2) Grounded Foods (1) Phuture (1) Pleese Foods (1) Revolution Gelato (1) Uproot (1) WTH Worth The Health (1) Zhenmeat (1)
Kale United	Venture capital	Stockholm, Sweden	5	Astrid och Aporna (1) Evo Foods (1) Huera (1) Hooked (1) Hooray Foods (1) LIVEKINDLY (1) Noquo Foods (1) Ocean Hugger Foods (1) THIS (1) Veganz (1)
Lever VC / Lever VC China	Venture capital	Brooklyn, USA / China	5	Good Planet Foods (1) HaoFoods (1) HERO Protein (1) Marvelous Foods (1) The Better Meat (1) The New Butchers (1)
Siddhi Capital	Venture capital	Cherry Hill, USA	5	Abbot's Butcher (1) ForA: Butter (1) Good Catch (1) LOCA (1) Malk Organics (1) Moku Foods (1) Mooala (1) No Evil Foods (1) Ripple Foods (1) Spero Foods (1)
ProVeg Incubator	Accelerator/incubator		5	Better Nature (1) Cashewbert (1) Hooked (2) Mondarella (1) POW! Foods (1) The Fast Good Company (1) Updated Foods (1)

				Vly (1)
Stray Dog Capital	Venture capital	Leewood, USA	4	Miyoko's (3) Good Catch (2) Nutpods (2) Beyond Meat (1) Daring Foods (1) Good Planet Foods (1) Good Seed (1) Grounded Foods (1) Hooray Foods (1) Kite Hill (1) Meatless Farm (1) Meta Burger (1) No Evil Foods (1) NuMilk (1) Ocean Hugger Foods (1) Sunfed (1)
VegInvest	Venture capital	New York, USA	4	Yofix (2) Alpha Foods (1) Eat Just (1) Evo Foods (1) Good Catch (1) Goodmylk (1) Grounded Foods (1) Lavva (1) LIVEKINDLY (1) New Wave Foods (1) No Evil Foods (1) Nutpods (1) Rebellyous Foods (1) Revolution Gelato (1)
Blue Horizon Ventures / Corporation	Venture capital	Zürich, Sweden	3	Alpha Foods (2) ForA: Butter (2) Beyond Meat (1) Eat Just (1) Good Catch (1) Heartbest Foods (1) Impossible Foods (1) LIVEKINDLY (1) New Roots (1) New Wave Foods (1) No Evil Foods (1) Ocean Hugger Foods (1) Outstanding Foods (1) Planted (1) Puris Proteins (1)

				Rebellyous Food (1) Sunfed (1)
CPT Capital	Venture capital	London, United Kingdom	3	Good Catch (2) Yofix (2) Alpha Foods (1) Beyond Meat (1) Eat Just (1) Fantastic Farms (1) Green Monday (1) Impossible Foods (1) Innovopro (1) Kite Hill (1) Rebellyous Foods (1) Redefine Meat (1) Sunfed (1)
Temasek Holdings	Sovereign wealth fund	Singapore, Singapore	3	Califia Farms (1) Impossible Foods (4) v2food (1)
KBW Ventures	Venture capital	Dubai, United Arab Emirates	3	Beyond Meat (1) Eat Just (1) Moku Foods (1) Rebellyous Foods (1) Ripple Foods (1)
Alexis Ohanian	Angel		3	Impossible Foods (2) Eclipse Foods (1) Simulate (1)
Joy Capital*	Venture capital	Beijing, China	3	Starfield Food Science Technology (3)
Matrix Partners China*	Venture capital	Beijing, China	3	Starfield Food Science Technology (3)

Source: GFI analysis of PitchBook data.

Notes: Data has not been reviewed by PitchBook analysts. "Most active investors in 2020" includes any organization that made three or more publicly disclosed investments in a plant-based food company during the calendar year 2020.

*Indicates funders that made disclosed investments in plant-based meat, eggs, and dairy for the first time in 2020.





“The rapid onset of the Covid-19 pandemic thrust virtually the entire global economy into the chaos where entrepreneurial agility is what survives (and, at times, thrives). Any company without agility to shift strategies and/or capture opportunity suffered. In the middle of all of this chaos, humans still continued to need to feed themselves. Share of stomach was the same, but the means of gathering food shifted massively and, perhaps, to a new normal of commerce and consumer interaction. Frozen foods, meal kits, direct-to-consumer offerings, and takeout performed well. Staple pantry products flew off the shelves. Relating to plant-based foods, companies whose offerings were user-friendly and quick to delight did well at retail ... if they were on the shelves already. Those seeking category review and slotting saw dates pushed back month after month. Demos and tastings were effectively nonexistent.”

—Chris Kerr, CIO at Unovis Asset Management

*Are we missing your company? Did we get something wrong? We'd appreciate your feedback via **this form**.*

Science and technology



Section 5: Science and technology

The past few years have ushered in a new era of creating plant-based meat that matches the taste, texture, and full sensory profile of animal-based meat. Recent advancements in protein sourcing, ingredient optimization, and manufacturing methods significantly improve plant-based products:

- Optimize the organoleptic and functional properties of plant proteins
- Establish biodiverse plant protein supply chains for specialty crops, such as millets and pulses, as well as develop novel crops and customized varieties
- Develop products in new categories, such as plant-based seafood, to cater to increasing demand and evolving consumer preferences
- Surpass twin-screw extrusion to produce whole-cut meat products through spinning, shear-cell texturization, and 3D printing



For a comprehensive overview of the current state of the science, including a deep dive into key opportunities for technological development, check out GFI's primer on **the science of plant-based meat**.



For resources specific to plant-based dairy, please refer to **GFI India's plant-based dairy webinar** and **GFI's seminar on colloid approaches to plant-based milk**.



For information about applications of egg alternatives and optimizing functional properties, please see GFI's technical paper on **plant-based egg alternatives**.

Ingredient innovation and optimization: Advances in crop development and processing techniques

Historically, formulation decisions for plant-based meat, egg, and dairy products have been driven by convenience and accessibility of functional ingredients for manufacturers—in particular, the availability of side streams from other food industries, such as soy protein left over from soy oil harvesting. The aim to optimize the organoleptic properties of plant-based meat, egg, and dairy products increasingly focuses research on identifying and optimizing new plant protein sources and improving their functionality through ingredient processing innovations.

Crop breeding for higher protein yield and improved functionality

Until recently, the vast majority of plant-based products relied on proteins from commodity crops, such as wheat or soy, which historically have not been bred for protein content. Genomically informed trait mapping and crop breeding can increase protein yields and improve innate functionality, which in turn can decrease cost and avoid extensive downstream processing. To read about companies that made advancements in crop breeding and genetics optimizing in 2020, see “[Seeds and crops](#)” in the “Developments in the upstream supply chain” section of this report.

Innovations in protein fractionation and functionalization

Protein fractionation and functionalization (the process of enriching raw plant materials for protein content and optimizing protein properties through downstream processing) are underexplored areas for innovation, especially for unconventional plant protein sources. To read about companies that made advancements in protein fractionation and functionalization in 2020, see “[Intermediate ingredient processing](#)” in the “Developments in the upstream supply chain” section of this report.



GFI is a partner organization for the [EU Smart Protein Project](#), whose key focuses include innovation in crop breeding and protein fractionation. Check out the project’s [publication page](#) for examples of its scientific research.

Structuring innovations to create whole-muscle products

Extrusion is still the predominant method for texturizing plant-based meat products (see [GFI’s plant-based meat manufacturing guide](#) for more information). While extrusion is effective for producing ground meat products, such as plant-based burgers, grounds, and sausages, its capacity to produce longer fibers—such as those required for whole-muscle products like plant-based steak or chicken breast—is limited. To produce whole-muscle products, novel methods for texturizing and structuring plant-based proteins are being developed as alternatives to extrusion. These novel methods include shear-cell technology; 3D printing; and processes developed from the weaving industry, such as fiber-spinning technologies.

Spinning technology

Spinning technology creates whole-muscle textures by spinning plant-based proteins into fibers. Robert A. Boyer, a chemist once employed by Henry Ford, holds one of the [earliest known patents for use of wet-spinning to texturize proteins](#) for meat analogues (1952). Scientists at Unilever and [Campbell Soup Company](#) also explored this technology as a means of texturizing protein in 1970 and 1978, respectively. 2020 saw many developments in spinning technology:

- Ireland-based contract research firm **Cybercolloids** started developing a **novel, high-shear spinning technology** that is less costly than extrusion and could create superior meat-like fibers.
- Experts from The Netherlands Organisation for Applied Scientific Research **validated electrospinning as a credible means** of creating nano-sized protein strands, which can aid in mimicking the texture and bite of conventional meat.
- **ProMeat**, an ideation-stage startup winner of GFI India's 2020 **Smart Protein Innovation Challenge**, has also explored applications of spinning technology for plant-based meat, with elephant yam as a core ingredient for texturization.

Shear-cell technology

Shear-cell technology creates fibrous texture by applying shear force to plant proteins between two cylindrical rotating plates. The commercialization of shear-cell technology has been spearheaded by the **Plant Meat Matters Consortium** at Wageningen University & Research (WUR) in the Netherlands, with collaboration from strategic food industry players Avril, Ingredion, Givaudan, The Vegetarian Butcher, and Unilever, among others.

The only company currently deploying commercial shear-cell technology is **Rival Foods**, which spun off WUR in 2019. Rival Foods recently entered into a **partnership with LIVEKINDLY Collective** to create plant-based chicken through **shear-cell technology**.

Learn more about Rival Foods and its technology in GFI's *Science for Alt Protein* **webinar series**.



“Creating high-quality and versatile plant-based products is necessary to address a broader consumer base. Novel shear-cell technology allows for transformation of a wide ingredient base into products with a distinct fish- or meat-like whole-muscle fibrous texture and unparalleled juiciness, under very mild conditions. With this technology, large pieces can be created with unique thickness, opening up possibilities to create plant-based whole-cut products, such as tenderloin, chicken breast, or tuna steaks. Shear-cell technology can be a great addition to the existing structuring technologies, like extrusion or power heaters, that today are being used to create plant-based meat analogues.”

—Birgit Dekkers, co-founder of Rival Foods

3D printing

3D printing can improve manufacturing precision and flexibility, enabling the fabrication of highly sophisticated products that mimic whole-muscle meat cuts. Several startups are exploring 3D printing for applications in plant-based meat:

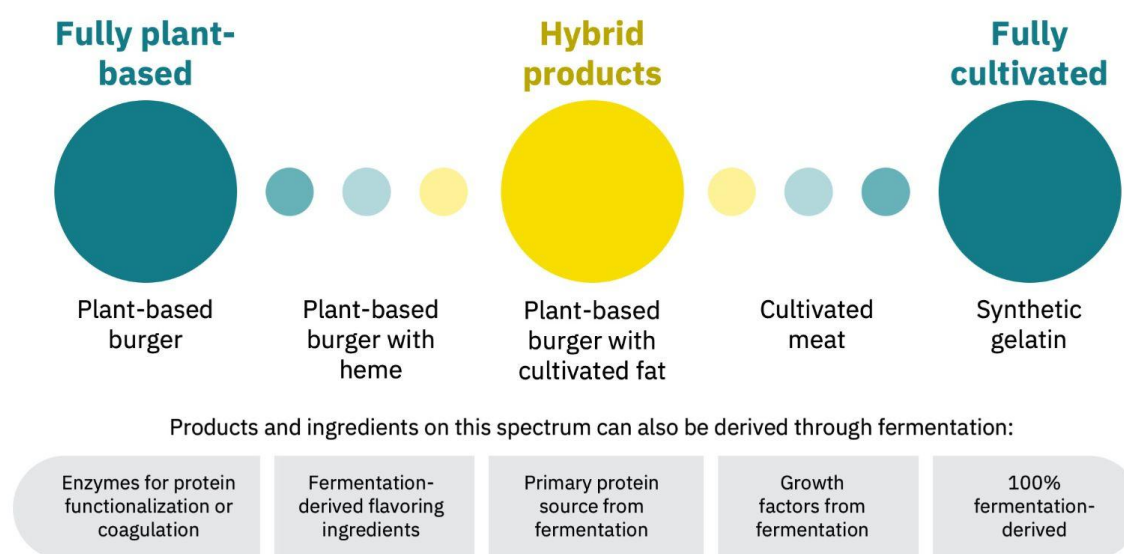
- In 2020, students and researchers of the EU-led research project Training4CRM and University of Denmark **developed a technique** for 3D printing fish such as salmon and tuna. Through this project, they established **Legendary Vish (now known as Revo Foods)** to manufacture the world's first 3D-printed plant-based salmon.
- **Open Meals**, a Japanese company focusing on 3D-printed sushi in the foodservice context, also points to a promising 3D-printed, plant-based seafood future.
- 2020 saw 3D-printing incumbents, such as NovaMeat, create **more-sophisticated versions of their products**, including beef and pork steak and improved chicken and fish fillet products. NovaMeat's products currently cost around \$1.50 for 50 grams, with the potential to drop significantly with further commercialization. This is especially the case in **countries leading the way in low-cost manufacturing, such as China**. NovaMeat's new **pilot plant**, slated to begin production in 2021, will feature a novel microextrusion machine that produces 50 kilograms of plant-based meat every hour. NovaMeat plans to achieve commercial cost parity with animal-based meat by licensing its technology to large food manufacturers.
- **Redefine Meat** uses a **3D-printing process with three separate tubes** to manufacture its next-generation plant-based beef, pork, and lamb steak to replicate the fat (Alt-Fat™), blood (Alt-Blood™), and muscle (Alt-Muscle™) components typically present in conventional whole-cut meats. This approach is enabled by the added flexibility of 3D printing compared with mold-based structuring or other more established industrial texturization processes. Redefine Meat **unveiled 3D-printed plant-based steak products** in June 2020.

Emergence of hybrid products

Alternative protein products are generally categorized as plant-based, cultivated, or fermentation-derived. However, a growing number of products are created through a combination of ingredients and processes across these three production platforms. The Impossible Burger, for example, is made from soy and other plant-based ingredients, as well as **fermentation-derived heme** protein (soy leghemoglobin) initially isolated from soy root nodules but now made through precision fermentation. Precision fermentation, the use of specially designed microbial hosts as “cell factories” for producing specific functional ingredients, is used increasingly by alternative protein companies such as Perfect Day and

Clara Foods to produce ingredients including whey, casein, and egg proteins. New generations of hybrid products show immense promise at scale to decrease costs, increase end-product functionality and nutrition, and improve the organoleptic properties of alternative proteins.

Figure 18: Alternative protein product spectrum



2020 saw the addition of several of these next-generation hybrid products:

- JBS subsidiary Planterra Foods launched its **Ozo brand of plant-based meat products**. Ozo's products use fermentation company MycoTechnology's pea- and rice-protein blend, which is functionalized through fermentation using shiitake mycelia.
- Israeli cultivated meat company Future Meat **announced hybrid offerings** created from a blend of cultured animal tissue (probably fat) and plant-based proteins for market in 2021.
- UK-based Higher Steaks **demonstrated a pork belly product** made from 50 percent cultivated cells and a bacon product containing 70 percent cultivated meat. The remainder of the bacon product comprises a mixture of plant-based proteins, fats, and starches.
- California-based cultivated meat company Mission Barns held **public taste tests of a hybrid cultivated bacon product** created through a combination of cultivated animal fat and plant-based proteins.
- UK-based Moolec Science **announced pilot R&D efforts** to develop the next generation of alternative meat products using molecular farming. Moolec plans to bioengineer protein-rich crops, such as soybean and peas, to manufacture highly functional bovine and porcine proteins.

- Biospringer, a biotech unit under French fermentation giant and world’s largest yeast producer Lesaffre, **announced the launch** of its new yeast protein ingredient developed specifically for plant-based cheese and meat.

GFI’s research grant program is catalyzing plant protein R&D

Additional scientific research is needed for plant-based meat to compete with conventional meat on taste, price, and scale. GFI works to close this gap through its research grant program and targeted outreach to policymakers, companies, scientists, and students. Since 2019, GFI has funded more than a dozen projects spanning the core technology opportunity areas in plant-based protein development. However, a strong need for substantially more research funding, infrastructure, and technical training programs remains. The 2021 Competitive Research Grant Program focuses on funding solutions for creating structured whole-cut meat and seafood products.

The table below lists the open-access plant-based research projects funded by GFI under three key categories: crop optimization, ingredient processing, and end-product formulation and manufacturing.

Table 9: GFI Competitive Research Grant Program plant-based research grants

Focus area	Project	Principal researcher
Crop development	Breeding peas and sorghum for plant-based meat	Dr. Dil Thavarajah
	Characterizing quinoa protein	Dr. Ofir Benjamin
	Valorizing agricultural side streams	Dr. Marieke Bruins
	Exploring cassava leaf proteins	Dr. Ana Carla Kawazoe Sato
	Scaling the cashew apple supply	Dr. Ana Paula Dionísio
Ingredient processing	Identifying pea protein off flavors	Dr. Jian Li
	Using red seaweed protein for plant-based meat	Beth Zotter
	Fermenting oat proteins	Ms. Mari-Liis Tammik
	High-pressure processing for plant proteins	Dr. Ciara McDonnell
	Fermenting flavor bases	BZ Goldberg
	Characterizing bean proteins	Dr. Caroline Mellinger
End-product formulation and manufacturing	Integrating sensors into plant-based meat extrusion	Dr. Filiz Koksel
	Engineering plant-based meat's microstructure	Dr. Mario Martinez
	Adding encapsulated fats to plant-based meat	Dr. Ricardo San Martin
	Developing functional protein fractions	Ms. Miek Schlangen
	Improving textured protein	Dr. Girish Ganjyal
	Developing shear-cell technology	Dr. Birgit Dekkers
	Making plant-based meat without extrusion	Dr. David Julian McClements
	Creating muscle-like structures from pulse proteins	Dr. Zata Vickers
	Texturizing proteins from red seaweed	Dr. Yoav Livney

Government and regulation



Section 6: Government and regulation

Regulatory overview

As consumers' dietary preferences continue to evolve and consumer interest in consuming plant-based foods continues to rise, manufacturers must keep pace with the evolving laws and regulations that govern their products. From laws censoring conventional meat and dairy terms on plant-based food labels to the U.S. Food and Drug Administration's consideration of whether and how food standards of identity should be revised, established, or eliminated, clear and fair regulations are important to the success of plant-based foods.

FDA updates

In February 2020, the U.S. Food and Drug Administration (FDA) reopened the comment period on a **2005 proposed rule** to establish principles for determining whether to establish, revise, or eliminate a food standard of identity. Standards of identity detail the specific composition or production methods required for foods to receive certain labeling. GFI's **comment** argues that standards of identity should not prevent plant-based dairy producers from using non-misleading, qualified standardized terms, such as "soy milk," for foods that lack an existing standard of identity. The FDA aims to establish a modernized food standards framework that reflects the current marketplace, including changes in consumer preferences. GFI supports this goal and encourages the FDA to develop principles that account for both the possibility of innovations in food production and the major role that nonstandardized foods, such as plant-based dairy, play in the American diet.



“GFI’s number one policy goal is to convince governments to fund open-access alternative protein R&D as a key element of climate mitigation strategy, and in 2020, we’re finally seeing some real movement. USDA’s National Institute of Food and Agriculture issued two awards totaling just shy of \$1 million over two years for research at the University of Massachusetts at Amherst on plant-based meat production methods and at Purdue University on pea protein functionality. In a related field, the National Science Foundation awarded \$3.55 million to a consortium of researchers at the University of California, Davis, to perform cultivated meat research over five years.”

—Jessica Almy, director of policy at The Good Food Institute

U.S. state regulation

The Covid-19 pandemic led many state legislatures to end their sessions early. So unlike 2019, 2020 did not see an onslaught of state legislative proposals to restrict plant-based food producers’ use of conventional meat and dairy terms on product labels. Nevertheless, a few state legislators did introduce label censorship bills, most of which failed.

- **Virginia.** One notable victory for the plant-based dairy industry was Gov. Ralph Northam’s **veto** of Virginia’s dairy label censorship bill. After advocacy by GFI and aligned organizations, Governor Northam stated that despite his support of the dairy industry, he was concerned the bill was “unconstitutional and could violate commercial freedom of speech.” This was the only bill of 1,291 measures passed during Virginia’s 2020 General Assembly session that Governor Northam chose to veto.
- **California.** The plant-based dairy industry celebrated another win when a California judge **partially granted a motion for preliminary injunction in favor of Miyoko’s**, a plant-based dairy company—thus blocking the California Department of Food and Agriculture from limiting the company’s use of conventional dairy terms, such as “butter,” on its labels.

Various groups continue to oppose label censorship laws, including GFI; the Plant Based Foods Association (PBFA); conservative think tanks, such as the **Heritage Foundation**; and free

speech groups. 2020 saw **new challenges** to label censorship laws in **Louisiana** and **Oklahoma**. Label censorship cases are also pending in **Missouri** and **Arkansas**.

- **Louisiana.** GFI and co-counsel the Animal Legal Defense Fund (ALDF) brought suit in Louisiana on behalf of Turtle Island Foods (d/b/a Tofurky), arguing that the state's label censorship law violates First Amendment free speech principles.
- **Oklahoma.** PBFA and Upton's Naturals, represented by the Institute for Justice, brought suit in Oklahoma. Unfortunately, in November 2020, the judge denied PBFA and Upton's Naturals' motion for a preliminary injunction, stating that plant-based meat labels could be misleading; this non-final ruling is being appealed. Oklahoma's law differs from other label censorship laws, in that it requires that a disclosure that the product is derived from plant-based sources be the same size and as prominent as the product name on labels.

Box 9: Louisiana label censorship litigation

"It is unconscionable that state legislators would so recklessly interfere with the market ... favoring certain industries over others while simultaneously making it harder for their constituents to access the healthier protein options of their choosing."

—Jaime Athos, president and CEO at Tofurky

In October 2020, GFI and ALDF, acting on behalf of Tofurky, filed a **lawsuit** in federal court challenging Louisiana's label censorship law. The law would impose fines of up to \$500 *per day* for every plant-based meat product marketed or sold with conventional meat terms on the label, even if those terms are paired with modifiers such as "plant-based" or "veggie."

Like Tofurky's other pending label censorship cases, the lawsuit argues that Louisiana's law violates the First Amendment of the U.S. Constitution by improperly censoring truthful commercial speech and that no evidence supports the claim that Tofurky's current labels mislead consumers; in fact, Tofurky's product labels clearly indicate that the company's products are plant-based, meatless, vegetarian, or vegan. GFI and allied organizations are committed to protecting producers and consumers from governmental overreach by opposing unnecessary and unlawful labeling restrictions.

Label censorship and regulation in Europe

In a milestone vote after heavy advocacy by GFI and other organizations, in October 2020 the European Parliament rejected a legislative proposal that would have banned the use of all conventional meat-related terms, such as “veggie burger” and “plant-based steak,” on plant-based food labels across all 27 countries of the European Union. The battle continues on the plant-based dairy front, after the Parliament approved (by a small margin) new restrictions on marketing plant-based dairy products. GFI and its allies will continue to advocate that national leaders take this dairy proposal off the table.

The Irish Food Safety Agency concluded in 2020 that pea protein hydrolysate and soy protein hydrolysate do not fall into the novel-food category requiring regulatory approval. In so reasoning, the agency acknowledged that pea protein isolate’s history of consumption had been established. This conclusion may help set a precedent for the non-novel status of pea protein isolate in the European Union and possibly ease the regulatory path there for products containing this ingredient.

Are we missing something? Did we get something wrong? We’d appreciate your feedback via [this form](#).

Conclusion and forecast



Section 7: Conclusion and forecast

2020 solidified the plant-based food industry as a fundamental component of the global food system. In a challenging year that brought about worldwide shutdowns and supply chain disruptions, the plant-based food industry thrived. Plant-based product launches continued across all categories and all regions of the world, and retail sales growth skyrocketed, far outpacing the growth of animal-based and other food products. Signs for the future are excellent, but a lot of work remains to be done. At GFI, we welcome everyone to the table: governments, NGOs, consumers, and the conventional meat industry. To achieve net-zero carbon emissions and keep climate change to below 1.5 degrees, we must accelerate the protein transformation—together.

These are among the many developments in 2021 so far:

- **Danone acquired plant-based dairy and mayo brand Follow Your Heart**, adding to Danone's portfolio of plant-based brands, such as Silk and So Delicious.
- 7-11, in partnership with Green Monday, **launched new plant-based ready meals across 700 stores in Hong Kong**. Items such as Omnipork Strip Spaghetti in Black Pepper Sauce and OmniPork Strip Rice Vermicelli with Sesame in Teriyaki Sauce sold at price parity with ready meals containing animal-based meat.
- Green Monday also **announced a partnership with McDonald's in China** and **launched its OmniMeat pork product in Japan**. The company expanded globally with the **soft launch of its OmniPork product in several U.K. restaurants** as part of the restaurants' Veganuary menus.
- Oatly announced that it had filed for a potential IPO and **reportedly seeks a valuation of \$10 billion**. The company also **partnered with Starbucks** for a nationwide rollout of oat milk in U.S. Starbucks stores and announced **plans to open one of the world's largest plant-based dairy factories** by 2023.
- Eat Just **raised \$200 million** in a round led by Qatar's sovereign wealth fund. The funding will build out Eat Just's production capacity and brings the company's total fundraising to more than \$650 million.
- Burger King Canada announced it would **launch Impossible Whoppers nationwide**, while Burger King UK **committed to a 50 percent plant-based menu by 2030**. The company also **debuted plant-based Whoppers across Japan, China, and the Philippines**. Australia-based v2food and Unilever's Vegetarian Butcher brand supplied the plant-based burgers.

- Chinese QSR chain Dico's **replaced all animal-based eggs with Eat Just plant-based eggs** in 500 of its stores. This is an incredible example of a plant-based ingredient fully displacing an animal-based ingredient.
- Starbucks turned one of its Seattle stores **into a test site for a 100 percent plant-based menu** and debuted plant-based beef products from Green Butcher **across dozens of locations in Indonesia**. The company also **added Beyond Meat sandwiches to menus** in more than 200 stores across the Middle East.
- Impossible Foods enacted a **15 percent price cut for plant-based meat products sold to foodservice distributors**. Impossible followed this up with a **20 percent price cut for plant-based meat products in U.S. retail**, which the company followed with a **20 percent price cut for products sold in Hong Kong grocery stores**. These price cuts highlight the company's efforts to bring plant-based meat to price parity with animal-based meat.
- Beyond Meat **locked in a three-year deal with McDonald's, as well as partnerships with Yum! Brands' chains KFC, Pizza Hut, and Taco Bell**. The company also **expanded product distribution in Walmart stores, partnered with PepsiCo** to produce plant-based snacks and beverages, and **signed a 12-year, \$178 million lease** for a new global headquarters.

10 key actionable insights from 2020

1. Plant-based meat product launches across non-burger product formats and types highlight an opportunity for companies to expand innovation beyond plant-based burgers.
2. Taste is a key factor influencing trial or continued consumption of plant-based foods. Plant-based companies should consider strategies for creating high-fidelity plant-based products that closely mimic the sensory profiles of animal-based foods.
3. Consumers consistently identify the high price of plant-based meat relative to animal-based meat as a main barrier to trial. Plant-based meat companies can overcome one of the main barriers to adoption and earn a larger share of the total meat market by making the price of plant-based meat equal to if not lower than that of animal-based meat.
4. Companies can expand plant-based dairy offerings by incorporating plant-based milk into regional drinks or enhancing plant-based dairy products with additional nutrients.
5. Increasing the variety of plant-based foods in foodservice channels offers compounding benefits to the entire plant-based category. A variety of plant-based menu items helps increase familiarity and signal flavor while covering more occasions, dayparts, and consumer needs.

6. Plant-based brands have additional opportunities to fully leverage all channels to distribute their products. Online grocery will play an increasingly important role in distribution.
7. Debt raises were less utilized than other funding models in the plant-based industry in 2020, even though debt is an important source of nondilutive funding for large-scale projects, such as building manufacturing facilities to scale production. This represents a clear gap that investors can look to fill in 2021 and beyond.
8. The plant-based ingredient space clearly needs crops that are specifically bred to improve taste; enhance protein content; and improve functionality, including enhancing solubility, water-binding capacity, and fat-binding capacity. All these factors contribute to sensory quality in plant-based end products.
9. Achieving scale will require new chemical, mechanical, and biological ingredient processing methods that offer high output quality and functionality benefits and are inexpensive, compatible with various crop inputs, and more efficient.
10. Key priority areas in end-product manufacturing include optimized production equipment, increased availability of contract manufacturing and pilot plant capacity, and better access to infrastructure capital.

Expert predictions

Looking to the year ahead, we asked a group of industry experts for their predictions for the plant-based food industry.



“In 2020, the plant-based sector showed that it is gearing up to tackle more-sophisticated, whole-muscle products (think steaks and fillets, not just burgers and sausages) with a number of prototypes using novel structuring methods. It will be fascinating to see which of these platforms can achieve scalability in the next couple of years. We will increasingly see the lines blurred between plant-based products and the other key pillars of the alternative protein industry: fermentation and cultivated meat. The most fruitful terrain for innovation is likely to be found at the intersection of these platforms.”

—Liz Specht, director of science and technology at The Good Food Institute



“Plant-based burgers are now well-established in retail and on foodservice menus, but the market is lacking a breadth of great-tasting plant-based chicken in all formats, not just nuggets. I predict we are going to see an explosion of plant-based chicken options in foodservice, and then plant-based will truly have achieved a tipping point.

“There will also be continued growth for plant-based private-label brands, either entering the category for the first time or creating new and expanded products. A recent research study we conducted at Kerry found that attributes of plant-based products align with the interests of a core group of private-label consumers, presenting an opportunity for these brands to create plant-based products. Predicted areas for growth in private label include new protein formats beyond burgers, full meal solutions, and snacking options.”

—Alison Rabschnuk, business development director, plant protein, North America, at Kerry



“The plant-based food industry in 2021 and beyond is strongly driven by the global outbreak of Covid-19, since the pandemic has accelerated a fundamental shift in food consumption. Successful companies will be those that produce food and beverages which improve the health of the planet and its population. However, there is certainly a lot that still needs to be done in terms of plant-based food. We need better products on the market—more specifically, we need many more plant-based products with convincing tastes and textures. There is also a lot of room for improvement in terms of price points and availability in supermarkets.”

—Dr. Kai-Brit Bechtold, senior consumer research scientist at ProVeg International



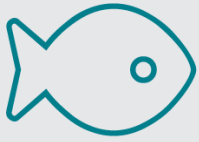
“As 2021 takes a turn away from Covid-19, there will be a new norm to contend with, but the exact shape is not yet clear. The Roaring 20s of a century ago came at the end of a world war and a similar global pandemic. We can expect the same in this century. Dining out and gatherings will build throughout 2021 and into 2022—with food and drink at the center of it all. For plant-based foods, the best offerings will shine in these environments. Mediocrity will not suffice, as personal wealth regains, home cooking wanes, and a true joy of food will drive eating decisions. This is the year that plant-based offerings must put their best foot forward, or we could lose hard-won gains of the last decade.”

—Chris Kerr, CIO at Unovis Asset Management



“We will see more restaurants and consumers move to fully plant-based options as opposed to including some version of plant-based in what they sell or eat. That will only accelerate the shift away from needing to rely on industrialized animal agriculture for what we feed our families. This shift will occur at restaurants large and small and in our own home kitchens.”

—Josh Tetrack, CEO at Eat Just



“The shift towards filling your plate with more plants and less meat was a trend that has now turned into a lifestyle for so many consumers. The adoption of this lifestyle change will continue to rise, and from that demand, great innovations will come forth in every food category. The increase in availability of plant based foods able to meet consumers where they are will continue to drive even more growth for the industry. You will see this with plant based seafood as the category prepares for takeoff!”

—Monica Van Cleve-Talbert, CEO at The Plant Based Seafood Co.



“In 2021, we will continue to see incredible innovation in virtually every category of plant-based foods. Innovation will be fueled by increasing investor interest and appetite from consumers, particularly millennials and Gen Zers, who are driving this growth. Retailers, manufacturers, and foodservice companies will continue to create proactive strategies to expand plant-based offerings, and we will see increased communication around them in efforts to compete and capture this critical segment of the market.

“Businesses know that it is no longer an option to ignore the role that food, specifically intensive animal agriculture, plays in climate change and environmental destruction. Plant-based foods not only offer an essential part of the solution in attributes alone, but the energy, innovation, and investment in the sector is also resulting in the churning out of some of the most delicious, nutritious, and exciting foods on the market.”

—Rachel Dreskin, CEO at Plant Based Foods Association



“Animal agriculture is the overwhelming driver of our planet’s late-stage extinction crisis. Pastureland, hunting, fishing, and other forms of animal exploitation have caused wildlife populations to collapse by about 70 percent since 1970; our addiction to animal-derived products is disintegrating the web of life itself. The good news: More and more people are sounding the alarm, demanding that we “rewild” nearly half the Earth now dedicated to livestock. Having reached its dangerous zenith, animal agriculture will inevitably decline—and all species, including *Homo sapiens*, will benefit in a restoration of public health, reversal of global warming, and flourishing biodiversity.”

—Rachel Konrad, chief communications officer at Impossible Foods



“The new presidential administration has signaled its commitment to using R&D and innovative technologies to address the climate crisis. Plant-based proteins should play a central role in this strategy. From Capitol Hill to the halls of the White House, leaders who care about the environment, U.S. leadership, and the economy will begin to work together to position American alternative protein innovation at the heart of science and agricultural policy. The direct effect of this work will be a major public investment in open-access research that advances the science, empowers entrepreneurs, and diversifies the talent pipeline. Other countries will take notice and will begin to compete with the United States for leadership, setting off a modern-day space race to create a sustainable, secure, and just protein supply. Simultaneously, courts and legislatures will strike down efforts to restrict plant-based food labels, making clear that label censorship has no place in a robust and vibrant marketplace.”

—Jessica Almy, director of policy at The Good Food Institute



“This past year has changed the way so many of us enjoy and consume meals. As people get back to daily lives of going into work rather than working from home, taking kids to school and more hectic schedules, consumers are going to crave convenience and want to eat protein that’s good for them and the planet, complete with delicious flavor and clean ingredients.

“We also expect to see more consumers flex the variety of proteins they bring to the table—in and out of the home. Consumers are looking for simple ways to improve mealtime and feel better about their health, even if it’s one small change at a time. Whether vegetarian, vegan, or flexitarian, they want choices in their plant-based foods and will not sacrifice taste or quality.”

—Darcey Macken, CEO at Planterra Foods

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The author would also like to thank the following GFI team members.

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Editors: Caroline Bushnell, Alicia Crawford, Bruce Friedrich, Emma Ignaszewski, Mirte Gosker-Kneepkens, Liz Specht, Sheila Voss

The author is grateful to the following industry experts for their perspectives:

Jamie Athos, Ana Maria Basurto, Dr. Kai-Brit Bechtold, David Benzaquen, Birgit Dekkers, Rachel Dreskin, Suzanne Ginestro, Chris Kerr, Rachel Konrad, Darcey Macken, Alison Rabschnuk, Miyoko Schinner, Laura Smith, Aylon Steinhart, Josh Tetrick, Monica Van Cleve-Talbert, Carlos Vargas, and Miles Woodruff.

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About GFI

GFI is a 501(c)3 nonprofit organization developing the roadmap for a sustainable, secure, and just protein supply. We identify the most effective solutions, mobilize resources and talent, and empower partners across the food system to make alternative proteins accessible, affordable, and delicious.

Our vision:

A world where alternative proteins are no longer alternative.

Our programmatic priorities:

- **Science and Technology:** Advancing foundational, open-access research in alternative proteins and creating a thriving research and training ecosystem around these game-changing fields.
- **Corporate Engagement:** Partnering with companies and investors across the globe to drive investment, accelerate innovation, and scale the supply chain—all faster than market forces alone would allow.
- **Policy:** Advocating for fair policy and public research funding for alternative proteins.



Alternative proteins are a global solution to global problems. In addition to the United States, GFI works in places where we can have the greatest possible impact on our global food system: Asia Pacific, Brazil, Europe, India, and Israel.

GFI is 100 percent powered by philanthropy. Our progress is possible thanks to gifts and grants from our global family of donors.

People around the world support our work because, together, we can transform our food system to mitigate climate change and environmental degradation, feed our planet's growing population, and secure a food supply that decreases the risk of zoonotic and antibiotic-resistant diseases.



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