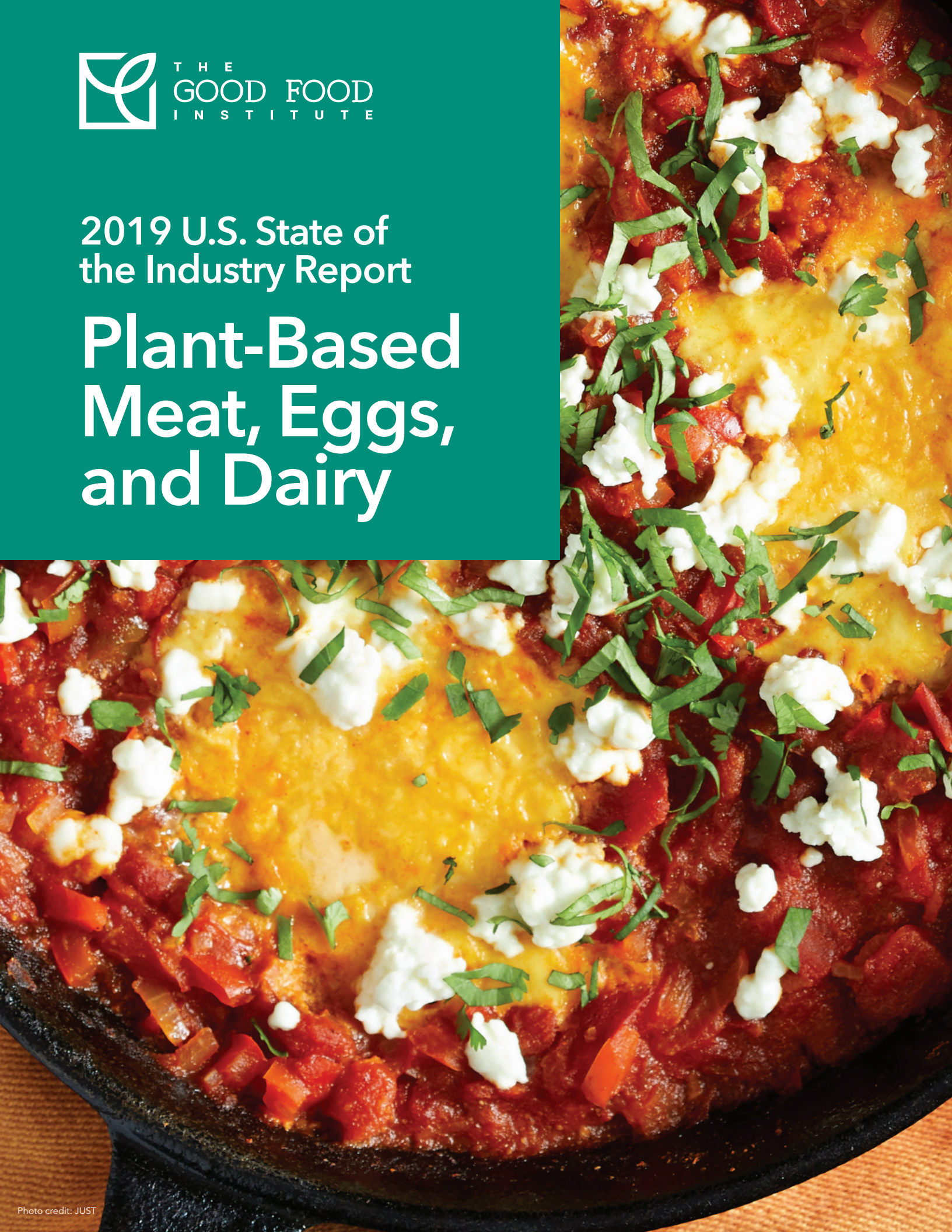
THE GOOD FOOD INSTITUTE

2019 U.S. State of the Industry Report

Plant-Based Meat, Eggs, and Dairy



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Section 1: Introduction

2019 was the most successful year so far for plant-based meat, eggs, and dairy. Their growth in the United States dramatically outpaced that of their conventional counterparts. Despite this growth and the tremendous milestones reached in 2019, with the global population projected to reach 9.8 billion by 2050,[1] demand for meat is expected to rise by more than 50 percent.[2] To meet this demand without exacerbating the numerous and well-documented harmful costs of animal agriculture to the environment and public health,[3] accelerated growth and globalization of alternatives to animal products are critical.

As is becoming more evident, making meat directly from plants—taking the animal entirely out of the equation—is key to sustainably meeting this growing demand. The new generation of plant-based meat is inspired by first understanding the biochemical composition and three-dimensional structure of meat and then replicating these qualities using non-animal ingredients and novel manufacturing techniques. Several products on the market today, such as Beyond Sausage and the Impossible Burger, have demonstrated that this biomimicry approach can create the flavor, texture, and overall experience of eating meat with a high degree of consumer satisfaction.

The plant-based meat industry in the United States dates back to the 19th century,[4] and several of today's leading plant-based meat companies were established in the 1970s–90s. However, the plant-based meat category remained small and relatively stagnant until recently, as the market had largely been viewed as limited to vegans and vegetarians.

The expansion of the plant-based meat market came about for several reasons, including the move to biomimicry. This approach to producing plant-based meat really only began in 2012 with the launch of Beyond Meat's chicken strips, and it really took off with the 2016 launch of the Impossible Burger and the Beyond Burger, both of which have succeeded in mainstream fast-food outlets. After trying Beyond Meat's plant-based chicken in 2013, Bill Gates said: "What I was experiencing was more than a clever meat substitute. It was a taste of the future of food."[5] The future is fast-arriving, with major food companies and protein producers, such as Tyson and Nestlé, making big moves into plant-based food, a flurry of startup and investor activity, and accelerating plant-based food retail and foodservice sales in 2019.

Section 1: Introduction

The Good Food Institute has produced this second annual report to serve as a benchmark for the U.S. plant-based food industry. As we document below, 2019 brought us substantially closer to plant-based meat, eggs, and dairy that are delicious, affordable, and accessible. This report provides a snapshot of the plant-based food industry, highlights the major developments of 2019, and predicts trends for 2020 and beyond.

Box 1: Plant-Based Food, Defined

For the purpose of this report, GFI uses the term "plant-based food" to refer to plant-based products that are direct replacements for animal-based products, such as plant-based meat, seafood, eggs, and dairy. This definition includes products that use the biomimicry approach to replicate the taste and texture of meat, as well as products made from plant ingredients (such as jackfruit, seitan, tofu, and tempeh) that serve as functional meat replacements. We also include complete meals that contain direct animal ingredient replacements in our scope. Inherently plant-based foods that do not have an animal-based counterpart, such as chickpeas and kale, are not included. Please note that, although fungi and algae are not biologically classified as plants, we include fungi- and algae-based products, such as Quorn, in our definition of plant-based foods.

Tofu & Tempeh

Plant-Based Meat

Plant-Based Milk

Egg Substitutes

Meals

Other Dairy Alternatives

- Cheese
- Yogurt
- Ice cream and frozen novelty & desserts
- Butter
- Plant-based dairy spreads, dips, sour cream & sauces
- Ready-to-drink beverages
- Creamers
- Plant-based condiments, dressings & mayo

Section 2: Companies

Overview

For plant-based food manufacturers, 2019 was a watershed year. Plant-based meat, particularly the plant-based burger, has generated considerable interest with consumers, investors, and the press. This has been due in large part to a record-setting IPO by Beyond Meat and numerous retail product launches from both new and established food companies. Beyond Meat and Impossible Foods proved that plant-based meat can be tasty and popular, while large food companies have made strong moves to meet the growing demand for plant-based meat with their own products and distribution networks. The sea of change started by plant-based milk and propelled upward by plant-based meat has lifted the plant-based food industry as a whole, with nascent categories, such as plant-based eggs, also experiencing increased innovation and growth.

Plant-Based and Conventional Meat Companies Respond to Growing Demand for Plant-Based Meat

Plant-based meat product launches are by no means limited to plant-based companies such as Beyond Meat and Impossible Foods. In order to respond to consumer interest in plant-based products that closely mimic animal-based meat, established plant-based meat brands, such as Lightlife, MorningStar Farms, and Sweet Earth, announced their next generation of plant-based meat products in 2019. In January, Lightlife announced a new **plant-based product line** that will include burgers, grounds, and sausages. In September, MorningStar Farms announced that their new product line, **Incogmeato**, would reach shelves in early 2020. The Incogmeato line will include products such as MorningStar's first ready-to-cook refrigerated plant-based burger and fully prepared plant-based chicken tenders and nuggets. Shortly after MorningStar Farms' announcement, Sweet Earth (owned by Nestlé) announced the launch of their **Awesome burger and Awesome grounds**.

Animal-based meat companies also launched their own plant-based or blended meat product lines in 2019. Smithfield announced their **Pure Farmland brand** in August, which comprises a variety of plant-based meat products, including some with plant-based cheese. Hormel introduced both a plant-based meat brand, **Happy Little Plants**, and a blended product, **The Great Organic Blend Burger**, under their Applegate Farms brand. Tyson and Perdue also debuted blended products, Tyson with their **Raised & Rooted** brand of blended burgers and meatless nuggets and Perdue with their **Chicken Plus** line of blended chicken, chickpea, and cauliflower nuggets. While these blended products are not plant-based, their launches still highlight animal-based meat companies' efforts to respond to growing consumer interest in reducing meat consumption.

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Plant-based seafood, a small but quickly expanding sector, experienced numerous product launches in 2019. Good Catch's plant-based tuna made its **national retail debut** in Whole Foods and Thrive Market in February, along with New York regional grocer Fairway Market. In addition to showcasing their plant-based tuna, Ahimi, Ocean Hugger Foods debuted a new plant-based eel product, **Unami**, at the National Restaurant Association Show in May. The company creates the new product by altering the texture and flavor of eggplant to resemble those of freshwater eel, or unagi.

Meanwhile, the Van Cleve Seafood Co., a family-owned conventional seafood company based in Virginia, launched their new plant-based line, **Wild.Skinny. Clean**, in the fall by rolling out their plant-based Crab-less Cakes and plant-based pink shrimp. Tyson Ventures' **investment** in New Wave Foods marked the first major investment by a conventional meat company in the plant-based seafood space. The investment represents the opening of countless new opportunities for major meat companies, which have historically been limited in operations to a few species. For a company like Tyson, seafood has traditionally been out of grasp because the production systems, both in capture fishing and aquaculture, required for seafood production are vastly different from those of their core business of terrestrially produced meat. Plant-based seafood, however, can be produced in the same facility as other plant-based meat products with only minor adjustments to production processes.

Source: Hormel

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Box 2: The World's Five Largest Food Companies All Got More Involved in U.S. Plant-Based Food in 2019

A combination of factors has led to a booming market for plant-based meat. Between 2017 and 2019, retail sales of plant-based meat grew 31%, while total U.S. retail meat sales grew just 5%.[6] Additionally, foodservice companies have used plant-based entrees to drive sales. One of many examples is the introduction of the Impossible Whopper in the United States, which led to a 3.5% increase in overall sales at Burger King.[7] This high demand has stimulated substantial investments on the supply side. In fact, nine out of the top 10 largest U.S. meat companies became involved with plant-based meat by launching, buying, or collaborating on a brand.[8] This list highlights activities of the world's five largest food companies in the U.S plant-based food industry.

PepsiCo

PepsiCo laid the groundwork for the North American launch of their **Nutrition Greenhouse** accelerator by first introducing it in Europe to tap into a group largely composed of plant-based food innovators. In fact, **plant-based food** and beverage is one of their four core focus areas. In early 2020, PepsiCo announced their New York **cohort** of participants, including NuMilk plant-based milk, as well as mushroom and fava bean snacks.

Tyson Foods

Tyson made strong moves to appeal to meat-reducing consumers in 2019. Tyson not only launched **Raised & Rooted**, their own line of plant-animal blended products and meatless nuggets, but invested in several alternative proteins, including **New Wave Foods**' plant-based shrimp, **MycoTechnology's** mycelium-based ingredients, and **Future Meat Technologies**' cultivated meat.

Nestlé

In addition to growing their Sweet Earth plant-based food brand and expanding their production of plant-based patties for McDonald's Europe, Nestlé **launched** the clean-label Awesome burger in 2019. In their 2019 **yearly report**, Nestlé lauded "strong double-digit organic growth" of their plant-based products, which they now consider "must haves" in the market.

JBS USA

JBS, the world's largest meat producer, has embraced plant-based meat as part of their sustainability and innovation strategy. JBS's global innovation lead, Christy Lebor, **told GFI**, "Plant-based protein is an area of interest for us, as it fits this model perfectly: Consumer need plus scale advantage equals a successful product." In 2019, JBS **introduced** a plant-based burger and **technology hub** in Brazil and laid the groundwork for an exciting new U.S.-based plant-based food venture, Planterra Foods, under the brand Ozo.

Kraft Heinz

Kraft Heinz acquired **BOCA**, an early pioneer in plant-based meat, in 2000. The company also runs an incubator, **Springboard**, which **incubated** a plant-based yogurt company and several plant-based snack companies in spring 2019.

*These companies are the five largest according to **foodprocessing.com**.

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Biggest Retail Sellers

Tables 1–3 provide alphabetized lists of the top 10 plant-based meat, milk, and cheese brands according to U.S. 2019 retail dollar sales as reported by SPINS.[9] Year over year, the top brands across the plant-based meat, milk, and cheese categories showed little change. Nine of the 10 brands maintained their 2018 status by retail sales in each of the three categories. The 10 top-selling brands in plant-based meat make up 89% of retail category sales, just slightly below 90% in 2018. Notably, almost all of the 10 top-selling plant-based meat brands focus on products that aim to match animal-based meat in taste, texture, and appearance. Such products make up roughly 63% of total universal product codes (UPCs) for plant-based meat but are responsible for 84% of the category's dollar sales, highlighting consumer interest in plant-based meat products that closely resemble animal-based meat. In the plant-based milk category, the top 10 brands make up 82% of retail sales, a slight decrease from 83% in 2018. Finally, the top 10 brands in the emerging plant-based cheese category make up 94% of retail sales, holding steady from 2018.

GFI's SPINS dataset reports all private labels as one number, showing that total private label sales make up 1.6% of the plant-based meat market.[10] Private-label products play a larger role in the more developed plant-based milk category: Aggregated private-label plant-based milk products compose 13.9% of the category. If counted as a brand, they would be the third-largest by retail sales. Of the less developed plant-based cheese category, private-label products compose only 2%.

Several plant-based brands operate across the three categories. Field Roast is among the 10 top-selling brands for plant-based meat and plant-based cheese products, while smaller brands, such as WestSoy and Pacific Natural, are among the top 10 for plant-based meat and plant-based milk products. The future may bring more instances of brands playing in multiple categories as they look to expand their product portfolios with complementary items.

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Table 1: Top 10 Plant-Based Meat Brands by Dollar Sales in U.S. Retail (alphabetized)

Company	Parent Company	State	City	Founder/ CEO	Date Founded	Category	Example Products	
Beyond Meat	N/A	CA	El Segundo	Ethan Brown (founder, CEO)	2009	Frozen, refrigerated		
Boca	The Kraft Heinz Company	WI	Madison	Max Shondor (founder)	1993	Frozen		
Dr. Praeger's	N/A	NJ	Elmwood Park	Peter Praeger (founder) Eric Somberg (founder) Larry Praeger (CEO)	1992	Frozen		
Field Roast	Maple Leaf Foods	WA	Seattle	David Lee (founder) Dan Curtin (president)	1997	Refrigerated		
Gardein	Conagra	BC	Richmond	Yves Potvin (founder) Sean Connolly (parent company CEO) Tara Rozalowsky (brand GM)	2003	Frozen		
Lightlife	Maple Leaf Foods	MA	Turners Falls	Michael Cohen (founder) Patricia Collins (founder) Dan Curtin (president)	1979	Refrigerated		
MorningStar Farms	Kellogg's	MI	Battle Creek	Steven Cahillane (parent company CEO) Sara Young (brand GM)	1975	Frozen, refrigerated		
Quorn	Monde Nissin		Stokesley, UK	Kevin Brennan (CEO) Henry Soesanto (parent company CEO)	1985	Frozen		
Sweet Earth	Nestlé	CA	Moss Landing	Kelly Swette (founder, CEO) Brian Swette (founder)	2011	Frozen, refrigerated		
Tofurky	N/A	OR	Hood River	Seth Tibbot (founder) Jaime Athos (CEO)	1980	Refrigerated		

* Note: This list represents the top 10 plant-based meat brands by U.S. retail sales and does not include foodservice sales. Impossible Foods, a leading plant-based meat brand in foodservice, made their retail debut only in late 2019, but in view of their rapidly expanding retail portfolio, we expect Impossible to make the top 10 list in 2020.

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Table 2: Top 10 Plant-Based Milk Brands by Dollar Sales in U.S. Retail (alphabetized)

Company	Parent Company	State	City	Founder/ CEO	Date Founded	Category	Example Products
Blue Diamond	N/A	CA	Sacramento	Mark Jansen (CEO)	1910	Refrigerated, shelf stable	 
Califia Farms	N/A	CA	Los Angeles	Greg Steltenpohl (founder, CEO)	2010	Refrigerated, shelf stable	 
Dream	Hain Celestial	MO	St Louis	Robert Nissenbaum (founder) Mark Schiller (parent company CEO)	1971	Refrigerated, shelf stable	 
Good Karma	Dean Foods	CO	Boulder	Loren Wallis (founder) Doug Radi (CEO) Ralph Scozzafava (parent company CEO)	1996	Refrigerated, shelf stable	 
Oatly	Privately owned		Malmö, Sweden	Rickard Öste (founder) Toni Petersson (CEO)	1994	Refrigerated, shelf stable	 
Planet Oat	HP Hood LLC	MA	Lynnfield	John A. Kaneb (CEO)	2018	Refrigerated	 
Pacific Foods	Campbell Soup Company	OR	Tualatin	Chuck Eggert (founder, CEO) Mark Clouse (parent company CEO)	1987	Shelf stable	 
Ripple	N/A	CA	Emeryville	Adam Lowry (founder, CEO) Neil Renninger (founder, CEO)	2015	Refrigerated, shelf stable	 
Silk	Danone	CO	Broomfield	Steve Demos (founder) Emmanuel Faber (parent company CEO)	1978	Refrigerated, shelf stable	 
So Delicious	Danone	CO	Broomfield	Mark Brawerman (founder) Emmanuel Faber (parent company CEO)	1987	Refrigerated, shelf stable	 

* Note: This list represents the top 10 plant-based milk brands by U.S. retail sales and does not include foodservice sales. All private-label products are combined and treated as a single "brand" in the SPINS dataset, and this private-label "brand" ranks among the top 10 plant-based milk brands. But because it represents an aggregate of smaller store brands, we excluded it from this list.

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Table 3: Top 10 Plant-Based Cheese Brands by Dollar Sales in U.S. Retail (alphabetized)

Company	Parent Company	State	City	Founder/ CEO	Date Founded	Category	Example Products
Daiya	Otsuka Pharmaceutical Co., Ltd.	BC	Vancouver	Greg Blake (founder) Andre Kroecher (founder) Michael Watt (CEO) Kazumichi Kobayashi (parent company CEO)	2008	Refrigerated	 
Field Roast	Maple Leaf Foods	WA	Seattle	David Lee (founder) Dan Curtin (president) Michael McCain (parent company CEO)	1997	Refrigerated	 
Follow Your Heart	N/A	CA	Canoga Park	Bob Goldberg (founder, CEO) Michael Besançon (founder) Paul Lewin (founder) Spencer Windbiel (founder)	1970	Refrigerated	 
Go Veggie!	GreenSpace Brands	RI	North Kingstown	Angelo Morini (founder) Matthew von Teichman (parent company CEO)	1980	Refrigerated	 
Kite Hill	N/A	CA	Hayward	Monte Casino (founder) Tal Ronnen (founder) Pat Brown (founder) Rob Leibowitz (CEO)	2010	Refrigerated	 
Lisanatti	N/A	OR	Oregon City	Phil Lisac (founder) Norma Lisac (founder)	1978	Refrigerated	 
Miyoko's Creamery	N/A	CA	Petaluma	Miyoko Schinner (founder, CEO)	2014	Refrigerated	 
Tofutti	N/A	NJ	Cranford	David Mintz (founder, CEO)	1980	Refrigerated	 
Tree Line	N/A	NY	Kingston	Michael Schwarz (founder)	2012	Refrigerated	 
Violife	Upfield Group		Thessaloniki, Greece	Anthimos Misailidis (founder) David Haines (parent company CEO)	1990s	Refrigerated	 

* Note: This list represents the top 10 plant-based cheese brands by U.S. retail sales and does not include foodservice sales. The SPINS dataset combines all private-label products and treats them as one "brand," and this private-label "brand" ranks among the top 10 plant-based cheese brands. But because it represents an aggregate of smaller store brands, we excluded it from this list.

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Early-Stage Companies

Proven consumer demand, a growing interest in socially responsible business, and advances in enabling technology areas, such as new functional ingredients and 3-D printing, have created overwhelming interest in plant-based food innovation. The recent cultural proliferation and commercial success of food innovators like Beyond Meat and Impossible Foods are inspiring another wave of entrepreneurship. Now that biomimicry of conventional meat is clearly achievable and in demand, entrepreneurial activity in plant-based food innovation has hit an inflection point, with an acceleration in new company formation.

Like their forerunners, new-generation plant-based products are offered as replacements for conventional animal products. However, biomimicking (or even improving upon) the sensory experience of eating animal products is now a key focus. Entrepreneurs continue to explore new production methods, plant protein sources, and product formulations to satisfy demand for new plant-based products.

2019 saw innovation accelerating yet again. For example, startups used advanced mycology to create structured fungi-based products and ingredients with clean labels and excellent nutritional value—possibly inspired by Quorn, the company that pioneered the use of mycoprotein in food formulation decades ago. Companies also advanced novel technologies for imparting structure and texture to plant-based meat without extrusion, such as 3-D printing. Additionally, to avail themselves of the monumental vertical opportunities presented by transformation of the meat industry, companies invested across the entire plant-based food value chain, including new protein sources, such as **Mankai**, and new functional ingredients, such as those created by **Shiru**.

Plant-based food startups enjoyed exceptional fundraising success in 2019. Table 4 highlights some of the year's largest fundraising rounds for plant-based meat, egg, and dairy companies in the United States. While not represented in this table, substantial investments were also made outside the country, such as Chile's **The Not Company's $30 million** fundraising round led by Bezos Expeditions, and Australia's **v2food $35 million** fundraising round.

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Table 4: Top 10 U.S. Plant-Based Food Producer Fundraising Rounds of 2019 by Capital Raised

Company	Year Founded	Product Focus	Founders	Lead Investors	Capital Raised (USD)	Total Raised (through 2019)
Impossible Foods	2011	Beef patties, pork	Patrick Brown Monte Casino	Temasek Holdings Horizons Ventures	$300MM (Series E)*	$672MM*
Beyond Meat	2009	Beef patties, chicken	Ethan Brown	N/A	$289.9MM (IPO)	$482.75MM
Nutpods	2013	Milk (beverage creamer)	Madeline Haydon	VMG Partners	$33.61MM	$36.78MM
Alpha Foods	2015	Chicken nuggets	Cole Orobetz Loren Wallis	AccelFoods New Crop Capital / Unovis Partners	$7MM (seed) $23.59MM (Series A)	$35.94MM
Ripple Foods	2014	Milk and other dairy (pea protein base)	Adam Lowry Neil Renninger	Undisclosed	$11.92MM (Series C+)	$120.56MM
Gathered Foods Corp. Good Catch	2016	Seafood	Chad Sarno Derek Sarno Chris Kerr	New Crop Capital Stray Dog Capital	$10MM (Series B1)**	$18.7MM
Kite Hill	2013	Milk and other dairy	Monte Casino Tal Ronnen Pat Brown	Undisclosed	$10MM (Series C+)	$84.85MM
NüMilk	2018	Milk (self-serve almond)	Ari Tolwin	FusionX Ventures Groundswell Ventures	$10MM (seed)	$10MM
Mooala	2012	Milk (banana, oat, almond)	Jeffrey Richards	Sweat Equities	$8.33MM (Series A)	$13.33MM
Koia	2013	Milk (almond, coconut)	Christopher Hunter Maya French Dustin Baker	Undisclosed	$7.03MM (Series A+)	$15.21MM

Note: This table lists only those companies that are producing plant-based foods and are headquartered or selling in the United States. It does not include plant-based food ingredient companies, such as **Shiru** (which raised a $3.5 million seed round in 2019) and **Motif FoodWorks** (which raised a $117.5 million Series A in 2019). This table also excludes substantial investments made by established food companies in plant-based product lines, such as Cargill's $75 million **investment** in pea protein maker Puris. Also important to note is that this table excludes deals and deal sizes that were not available on PitchBook at the time of publication, such as fundraising rounds by Before the Butcher, Eclipse Foods, Fora, LAVVA, New Wave Foods, Rebellyous Foods, and The Meatless Farm Co., although most of these amounts are probably not large enough to make this list. In this table "capital" is "venture capital" as defined in Section 4 plus funds from the public issuance of net new stock shares.

*In early 2020, Impossible Foods announced a $500 million fundraising round led by Mirae Asset Global Investments, bringing their total investments to date to $1.3 billion. This fundraising round is not included in this report's calculations.

**Gathered Foods, maker of Good Catch, raised a $32 million Series B round, $22 million of which closed in March 2020. Of that Series B, $10 million closed as a convertible note in 2019. We refer to this convertible note as the "B1" round and include it in these calculations.

Global Snapshot: Plant-Based Food 2.0 Is Global but Concentrated in Supportive Innovation Hubs

Although plant-based food companies operate in many countries around the world, seven countries remain leaders in plant-based food innovation: the United States, the United Kingdom, Canada, Germany, the Netherlands, Brazil, and Israel. Given that much of modern food is a result of technology, it is not surprising that countries with a history of technological innovation have been among the first to house robust innovation ecosystems for plant-based meat, eggs, and dairy.

According to the community capitals framework, for an innovation ecosystem to thrive, seven kinds of capital must be present: financial, human, cultural, political, social, natural, and built.[11] Therefore, a thriving alternative protein ecosystem requires investors, talent (usually from universities), local demand (flexitarians), a supportive government, a business community, access to resources, and infrastructure. Israel, for example, has taken huge strides in establishing innovation hubs in the country. The Israeli government has established multiple accelerators and incubators backed by large companies, including **The Kitchen FoodTech Hub** and the **Fresh Start** incubator. Israel has also built shared work spaces, launched a **FoodTech community** initiative, **subsidized salaries** to bring in the best talent, and funded an academic research institute with an analytical lab and pilot lab equipment.

Brazil's mature private sector companies have helped establish the country as a food technology leader. JBS, the world's largest meat company, recently launched a plant-based burger, and meat giant Marfrig **teamed up** with ADM to produce a plant-based burger. Brazil's largest egg producer, Grupo Mantiqueira, launched a **plant-based egg** in 2019.

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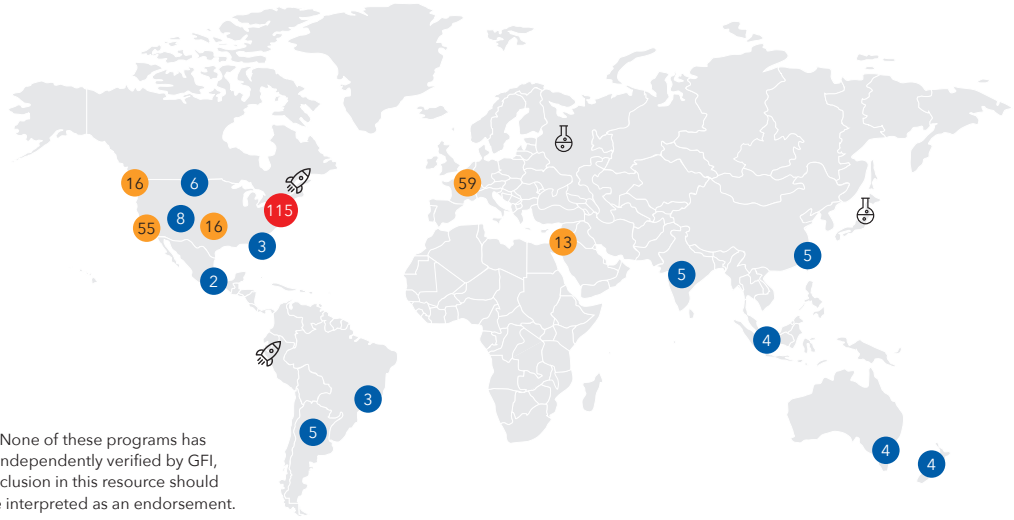
GFI Resource: Map of Accelerators and Incubators

Incubators and accelerators often significantly contribute to entrepreneurial ecosystems, serving as a "heat map" for clusters of innovation. They often provide the financial investment, mentorship, physical infrastructure, and sense of community essential to the success of early-stage businesses. To discover accelerators and incubators who provide early-stage resources for alternative protein entrepreneurs, see GFI's interactive map at **gfi.org/map**.



Note: None of these programs has been independently verified by GFI, and inclusion in this resource should not be interpreted as an endorsement.

Box 3: Top Accelerators Helping Lead the Way

SOSV, one of the world's top multi-industry venture capital firms and progenitor of the IndieBio, Food-X, RebelBio, Hax, Chinaccelerator, and Mox accelerator programs, has invested heavily in plant-based 2.0. SOSV or their accelerators have invested in **The Abbot's Butcher**, **Kojo**, **Naughty Noah's Vietnamese Pho Noodles**, **New Wave Foods**, **Magellan Life Sciences**, **Spira**, **The Not Company**, and **Planetarians**, in addition to investing in several cultivated meat and protein fermentation startups. SOSV, which raised $277 million in 2019 for their fourth venture fund,[12] sees the future of food as a post-animal system that is sustainable, personalized, and cellular.[13] Their accelerator, Food-X, has incubated at least four plant-based food companies, clearly demonstrating that plant-based food is a core part of their mission: "To supercharge the best ideas & teams in the food business. To innovate and improve the food system. To provide food options that promote public health and sustainability. To provide more delicious, healthy, affordable, convenient food." Other leading accelerators have shown interest in the plant-based food space. For example, **Y Combinator** invested in **Eclipse Foods** and **Shiru**, as well as selected GFI for inclusion in the summer 2018 cohort.

Looking Ahead

The plant-based food sector is poised for accelerated growth in 2020 and beyond. Evidence indicates that consumer interest in plant-based products is both durable and increasing, driven by rocketing flexitarianism within the general population, especially among the youngest generations.[14] The growth of the plant-based food market fuels investment, resulting in more R&D spending and better products, which further increases consumer demand. This virtuous cycle of plant-based food innovation will be reinforced as plant-based products move even closer to cost parity with conventional animal products due to increasing returns to scale and technological improvements—for example, better, less expensive extruders. Corporate, government, and entrepreneurial prioritization of plant-based meat to address environmental goals, such as reduced carbon emissions, cleaner water, and slowed deforestation, will further fuel improvements in production efficiency and product quality. Governments and industry increasingly recognize the importance of achieving these goals through public-private partnerships, such as the European Union's **EIT Food** initiative and Israel's **The Kitchen FoodTech Hub**.

Although most of the headline-driving products of 2019 were plant-based burgers, we expect 2020 to be a breakout year for less developed product types, such as plant-based chicken and sausages. Plant-based seafood is another emerging category with significant room for growth. Given the relatively small size of the plant-based seafood category—and the massive number of species and products available in conventional seafood—many market opportunities remain untapped. For example, at the **Good Food Conference**, Maisie Ganzler, chief strategy and brand officer for Bon Appétit Management Company, highlighted whitefish as a major opportunity in plant-based seafood: "From a culinary perspective, … what started out as cod became pollock became tilapia became pangasius all without menus changing. … That's a real opportunity for a plant-based option because no one goes into a restaurant to order pangasius. But they might really like a fish sandwich or a fish taco."

Box 4: Plant-Based Seafood Goes Global

The future looks bright for plant-based seafood around the world. Thai Union, one of the world's largest seafood companies, has **joined the Smart Protein project**, which is led by the School of Food and Nutritional Sciences at University College Cork in Ireland. The four-year project, which began in January 2020, receives most of its $10.5 million in funding from the European Commission and is intended to foster the development of plant-based products, with an emphasis on byproducts and residues typically used in the production of animal feed. French brand Odontella **launched their plant-based salmon, "Veggie Marine Salmon," in London** in February 2019. Osaka-based Fuki Oil Holdings Inc. introduced a blended sea urchin roe, or uni, product last fall. Ninety-five percent plant-based, the product is marketed toward food processors and institutional customers. U.S.-based startups are also looking at international markets. Ocean Hugger Foods, whose products had already launched in Canada and the Caribbean, **moved into European markets** with a debut at the 2019 Hyper Japan Festival in London. Atlantic National Foods' Tuno also moved into European markets last year.

Accelerators are taking note of plant-based seafood as well. Plant-based seafood company Sophie's Kitchen was **selected for the Chipotle Cultivate Foundation mentorship program** in early 2019.

Despite this recent growth, the plant-based seafood category is ripe with opportunity; the IPCC's ***Special Report on the Ocean and Cryosphere in a Changing Climate*** has demonstrated the need for additional production methods for seafood. Entrepreneurs, companies, and investors are beginning to respond. GFI provides an in-depth look at these opportunities in ***An Ocean of Opportunity***.

Section 3: Science and Technology

Overview

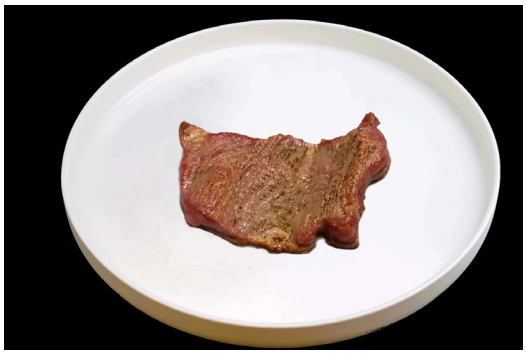
Plant-based meat offers a multitude of **customizations** beyond those offered by conventional meat products, such as modifications to texture, function, flavor, or nutrition. The boundary-pushing product launches and reformulations of 2019 foreshadow exciting innovations to come.

Production of plant-based meat continues to rely on twin-screw **extrusion** for high-moisture applications. However, other novel production methods, including Couette (shear) cell technology and 3-D printing, are advancing toward viable solutions for both quality and capacity. A deeper understanding of protein texturization has enabled restructured meat products to progress from crumbles (used in patties) to shreds and chunks that are ideal for pulled, shredded, and diced meat applications. This offers versatility equal to, or potentially greater than, that of animal-based meat for stir-fries, salads, pot roasts, sandwiches, casseroles, and more. While plant-based meat taste and texture have been key drivers of consumer adoption, food innovators are designing products to mimic the full meat experience—from appearance at point of purchase to aroma upon cooking to protein content when consumed. In addition, there are opportunities to build on the aroma, taste, mouthfeel, and protein content of conventional meat to create **products that consumers actually like more**.

Photo credit: Impossible Foods

Box 5: New Manufacturing Innovations for Plant-Based Meat 2.0

Extrusion has long been the primary method of producing plant-based meats—namely, the textured vegetable proteins that constituted the first wave of plant-based meats of the past several decades (see **GFI's plant-based meat manufacturing guide** for more information). Extruders continue to play a vital role in producing high-quality and biomimicry-focused plant-based meat and are expected to grow in importance, especially as extrusion technology improves and extruders become cheaper to produce. However, innovators have developed additional processes to produce plant-based meat with exceptional structure and taste at a competitive cost. For example, Wageningen University in the Netherlands and companies Avril, Ingredion, Givaudan, the Vegetarian Butcher, Unilever, and others entered into the **Plant Meat Matters** consortium in 2017 to research plant-based meat production methods. One of these methods, **shear-cell technology**, allows for layering of fibrous vegetable protein and is now being commercialized by **Rivals Foods**. 3-D printing has also emerged as a promising production method, with startups like **Redefine Meat** and **NOVAMEAT** capitalizing on the huge investments in the technology for other applications. Some startups are eschewing mechanical processes altogether in favor of biological processes, such as fermentation. **Emergy Foods**, **Prime Roots**, and **Atlast Food Co.** are using mycelium, the root structure of mushrooms, to create the structure and protein for fungi-based meats. These are some of the innovative approaches to plant-based meat production currently being undertaken by researchers and companies, and we expect many more to arise.



Top: 3-D printed meat from Redefine Meat.
Bottom: Shear-cell meat from Rival Foods.

Top: 3-D printed steak 2.0 from NOVAMEAT.
Bottom: Meati, Emergy Foods' mycelium steak.

Section 3: Science and Technology

Plant-based dairy continues to diversify by tapping into novel **ingredient sources** spanning seeds, legumes, pulses, grains, and nuts. Oat-based dairy products in particular surged in 2019, a trend that is continuing. For example, Chobani, the multibillion-dollar Greek yogurt producer, **announced** that an oat-based lineup of yogurts, creamers, and milks will hit shelves in 2020. Plant-based dairy products increasingly highlight protein content, calcium, vitamins, DHA omega-3 fatty acids, and functional qualities, allowing consumers to select the best fit for their nutritional and functional preferences. With the limited commercial launch of Perfect Day's ice cream made with recombinant casein proteins, 2019 also presented a preview of how fermentation-derived ingredients provide plant-based meat, eggs, and dairy with the organoleptic properties of their animal-based counterparts.

Plant-based eggs gained significant traction in application-specific solutions for stand-alone purposes, such as scrambles and omelets, while showing room to grow across a multitude of cooking and baking applications. Fermentation-based companies, such as Clara Foods, BioScienz, and Fumi Ingredients, are developing a variety of egg protein options for a range of applications.

Numerous products featuring new ingredients launched in 2019. Field peas, chickpeas, sunflower seeds, and marine plant extracts joined more familiar base ingredients, such as soy and wheat. More specifically, some products incorporated flours, concentrates, and isolates of pulse and legume crops; starches in lieu of traditional binders; vegetable fiber, mushrooms, and tomatoes for product bulk, texture, and flavor; and proprietary blends of seed and marine algae and seaweed oils. Yet with all this diversification and innovation, plant-based ingredient sources and production processes still present many opportunities, such as exploring protein-dense plants (e.g., fava, a potential ingredient for plant-based meat and dairy products) and possibly more-sustainable finished concentrates (e.g., those derived from chickpeas, which may require less water and chemical intensiveness compared with other pulses).

Box 6: Flexitarian-Focused Product Improvements

Product improvements from America's frontrunners in the plant-based burger arena are honed to capture the full meat experience. The 2.0 versions of both the Beyond Burger and the Impossible Burger demonstrate how companies are improving appearance and cooking cues while refining taste and protein delivery. In its latest iteration, the Beyond Burger displays marbled specks of plant-based fat (coconut oil and cocoa butter) for a "marbled juiciness" and sizzle on the griddle. Apple extract now provides a red-to-brown color transition upon cooking, another beef-like cue. Additionally, the new Beyond Burger delivers a complete protein source through a combination of pea, mung bean, and rice protein ingredients. Impossible Foods' 2.0 burger embraces soy and potato protein over wheat, fine-tuning its texture and chew. A combination of sunflower and coconut oils imparts a beef-like sizzle, while leghemoglobin catalyzes many of the aromas and flavors of cooking beef. When cooked, leghemoglobin produces free heme, which provides the visual cooking cues of turning from bleeding red to brown as a natural function of its pigment.

Global Snapshot: Building a Global Supply for Plant-Based Protein

The global plant-based meat market, like the U.S. plant-based meat market, is propelled by burgers catering to the desires of meat-eating flexitarians who are concerned about the environment and their health. Around the world, protein content, nutritional profile, and environmental claims are emphasized on plant-based meat labels, with some companies even **pioneering carbon labeling**. Niche plant-based products also showcase regional flavors, formats, and culinary flexibility, capturing more-exotic local desires and needs.

An exciting year for developing the global supply chain of plant-based protein, 2019 saw these portfolios gain traction and investment from top food ingredient suppliers. This also drove the growth of new infrastructure for production of plant-based protein. Burcon NutraScience Corporation announced a joint venture partnership to construct a $65 million (CAD) pea protein and canola protein production facility in Western Canada, expecting to process 20,000 tonnes of peas per year starting in mid-2020. The European Union and Bio-based Industries launched **Plenitude**, a first-of-its-kind plan for large-scale production of plant-based proteins using a zero-waste refinery process. This project aims to produce both plant-based protein and bioethanol from low-cost crops. In addition to increasing scale, ingredient manufacturers continue to improve on protein concentrates' and isolates' functionality and taste. Ramping up investment and infrastructure to provide a large-scale global supply of plant-based proteins will fuel the worldwide advancement of plant-based meat, eggs, and dairy.

Looking Ahead

We are on the cusp of innovations in whole muscle products—products that resemble premium animal cuts and their muscle striata. Extrusion technology remains a chief component of plant-based meat manufacturing, and existing brands are exploring opportunities to use their current infrastructure to produce more-diverse offerings, including whole muscle products. GFI expects an emergence of high-moisture twin-screw extrusion processes to deliver ready-to-eat refrigerated or reheat-friendly frozen whole muscle product innovations—especially chicken and fish—in the near future.

Other promising prospects for product texturization include microbial fermentation (e.g., tempeh), enzymatic structuring, and leveraging natural sources of fibrous edible materials (e.g., mushroom hyphae and jackfruit). New plant-based ingredients will continue to penetrate the market as more untapped protein sources become accessible and ingredient processing technology advances. Developing plant fractions that exhibit superior functionality in plant-based matrices while retaining healthy fiber and secondary metabolites may improve nutritional features. Functional protein fractions can be recovered from a variety of processes in the food system, and we expect greater use of protein upcycling to create more ingredients. Systems that hybridize plant-based products with exciting innovations in recombinant proteins, algae biomass, seaweed cultivation, and fermentation will further advance product innovation in plant-based meat, eggs, and dairy.

Section 4: Investments

Overview

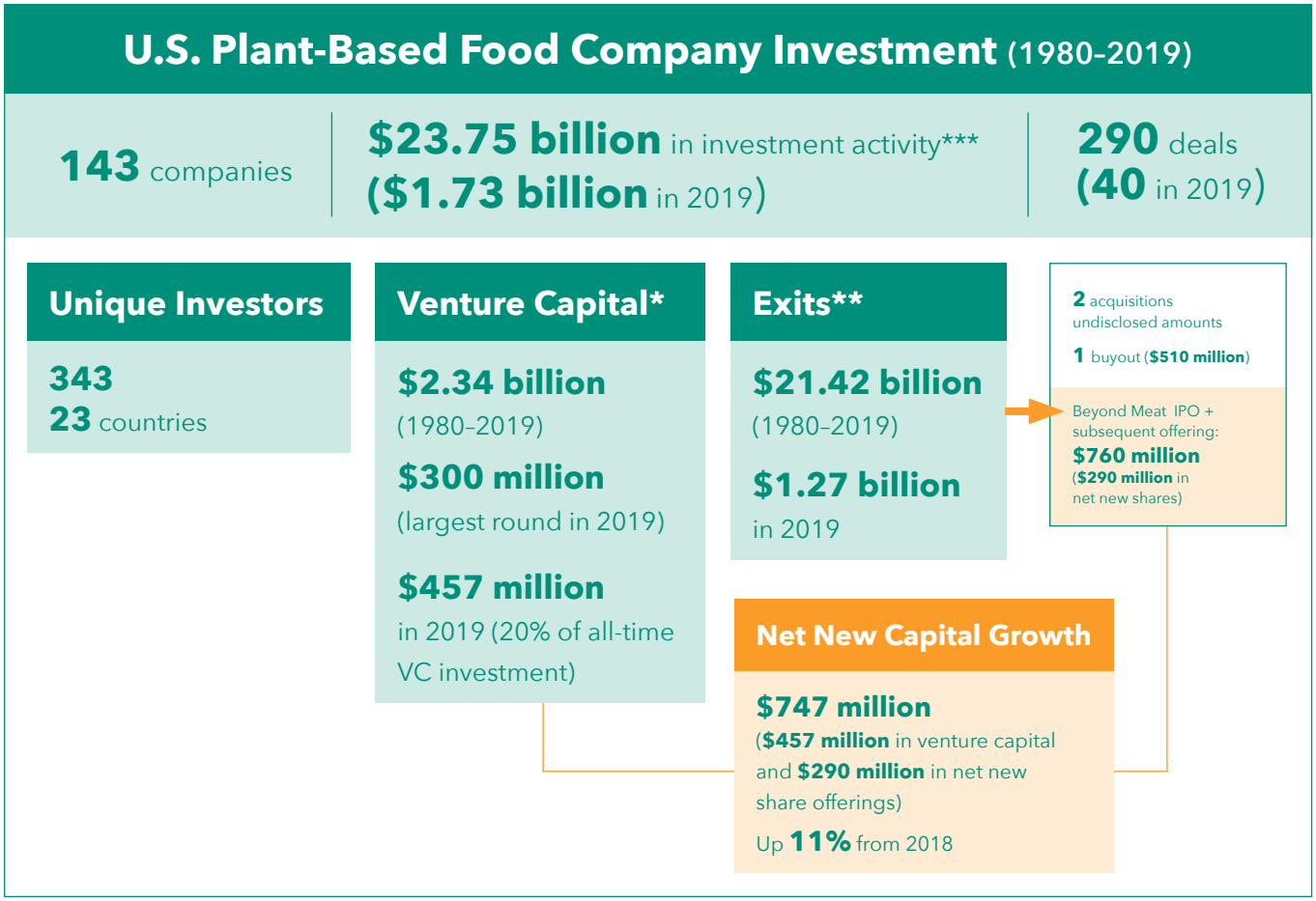
The past decade has brought exciting growth and extraordinary firsts for plant-based food investments. Substantial venture capital[15] investment has started flowing into plant-based food companies. GFI estimates that in this time about $2.3 billion in venture capital has been invested in these businesses, with 204 of all 210 venture financing rounds—over 99 percent of all venture dollars—since 1980 closing between 2010 and the end of 2019.

In 2019 alone, venture investments reached approximately $457 million. This means that about 20% of all venture capital investment in U.S. plant-based food companies since 1980 occurred in 2019. Additionally, Beyond Meat went public in 2019, bringing in over $760 million for the company and **their investors** through the IPO and a subsequent public issuance of shares. Of this $760 million, an estimated $290 million went to the company itself through the issuance of new company-owned shares.[16] Impossible Foods also attracted significant capital in 2019, raising an estimated $300 million in their Series E round—the single largest funding round in the sector that year—contributing to a total of $770 million raised by the company through 2019.[17]

Combining $457 million in venture capital investments and $290 million in net new public share offerings yields $747 million in net new capital flowing directly into plant-based food companies that they can use to grow. This is an 11% increase from $673 million raised in venture capital and public offerings in 2018.

Photo credit: JUST

Figure 1: U.S. Plant-Based Food Company Investment (1980–2019)



Box 7: Investment Data Collection Methodology

In calculating investment figures for this report, GFI used its **company database** to create a custom list of U.S.-based or U.S.-selling plant-based food companies on PitchBook. This yielded a PitchBook list of 143 qualifying companies that focus primarily on producing plant-based food as defined in the introduction of this report. We did not include several qualifying companies, especially those in the early stages of development, because they did not have profiles on PitchBook. As used in this section, "investments" includes venture capital, mergers, acquisitions, and buyouts but not secondary transactions or grants. Investments are further divided into venture capital (which includes angel funding, seed funding, crowdfunding, early-stage venture capital, late-stage venture capital, accelerator or incubator funding, private equity growth/expansion, capitalization, corporate venture, and convertible debt) and exits (which include mergers, acquisitions, IPOs, subsequent share offerings, and buyouts).

Source for above figure: GFI custom PitchBook analysis of plant-based food companies (including fungi and algae) based or selling in the United States. Last updated March 5, 2020.

*"Venture capital" is broadly defined to include angel funding, seed funding, crowdfunding, early-stage venture capital, late-stage venture capital, accelerator or incubator funding, private equity growth/expansion, capitalization, corporate venture, and convertible debt.

**"Exits" is broadly defined to include mergers, acquisitions, public offerings, and buyouts.

***"Investment activity" is broadly defined to include both venture capital and exits.

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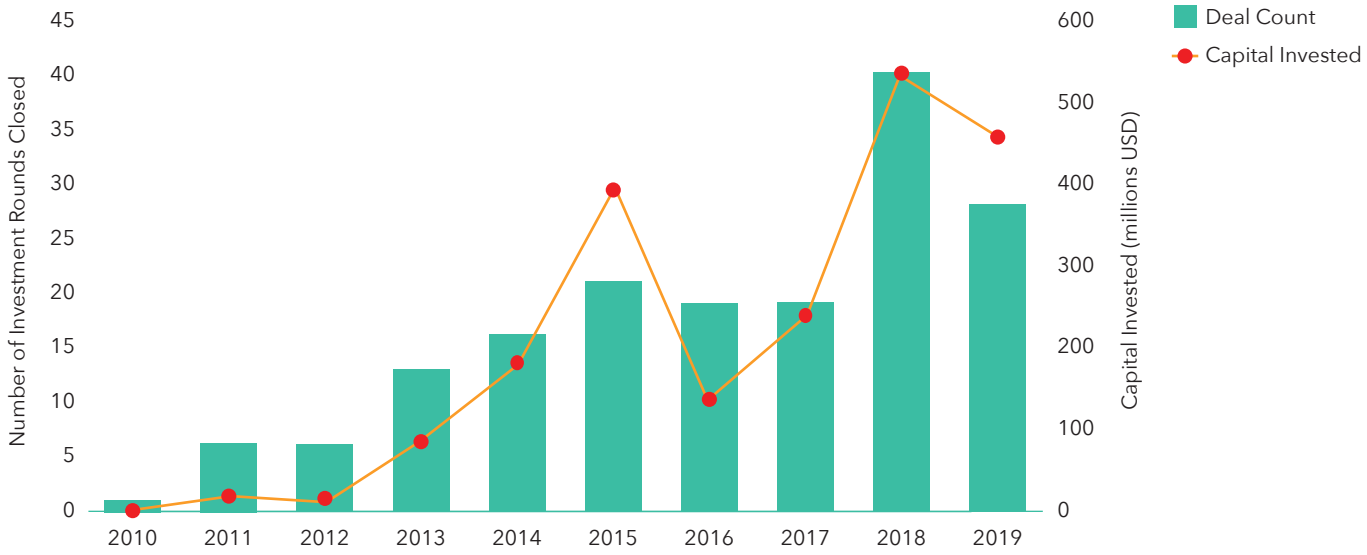
Section 4: Investments

Figure 2: Venture Capital Investments in Plant-Based Food Companies (2010–2019)



Source: PitchBook Data, Inc.

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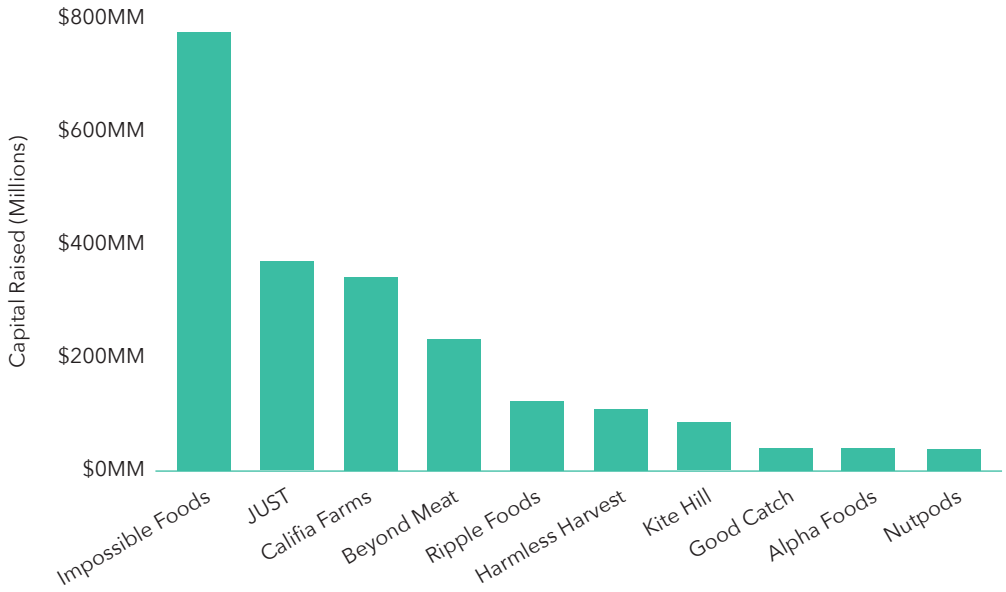
*This chart provides the total number of disclosed deals and total venture capital raised for plant-based food companies based or selling in the United States. This figure includes venture capital but excludes mergers and acquisitions, buyouts, IPOs, and leveraged buyouts. Last updated March 20, 2020.

While Beyond Meat and Impossible Foods are high-profile innovators for this fast-growing industry, nearly 150 plant-based food companies in the United States alone are contributing to industry growth. In 2019, these companies raised funds at all stages, from angel investments to initial public offerings. Over that year, early-stage funds, including accelerators and seed rounds, amounted to over $83 million in capital for up-and-coming startups, such as plant-based ice cream company **Eclipse Foods**, which Y Combinator incubated and raised the seed round funding for in 2019.[18]

Section 4: Investments

Figure 3: Most Funded Plant-Based Food Companies by Venture Capital Raised (1980–2019)



Source: GFI custom PitchBook analysis of plant-based food companies (including fungi) based or selling in the United States, excluding mergers and acquisitions, buyouts, and leveraged buyouts. Last updated February 13, 2020. Note: JUST is developing cultivated meat in addition to its plant-based food lines. This graphic does not include Califia Farms' $225 million private equity investment fundraising round led by the Qatar Investment Authority that closed in January 2020.

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Exits

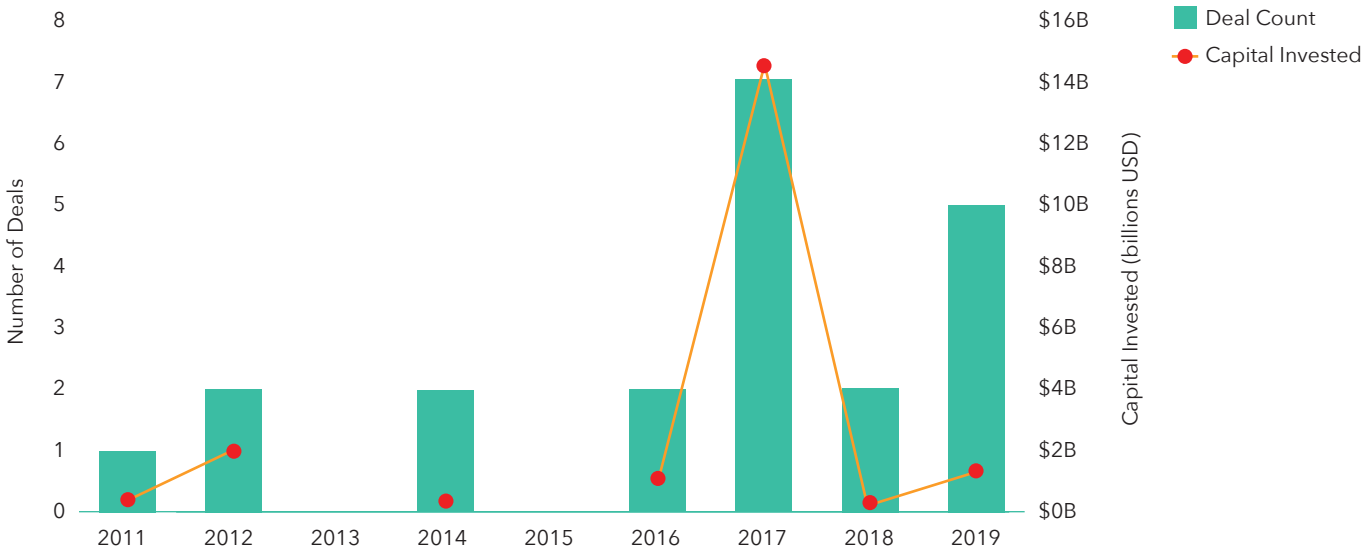
An exit—the sale of an equity owner's interest in a company typically in the form of a merger, acquisition, buyout, or IPO—does not necessarily create investment capital for a business, but exits do drive the venture capital investment model. Therefore, exits—also known as liquidity events—play an important role in motivating investment in the industry. The past five years have seen at least 20 exits in the U.S. plant-based food industry, the vast majority of them acquisitions (Figure 5). The largest to date is Danone's acquisition of WhiteWave Foods, the plant-based milk market leader, for $12.5 billion in 2017.

Section 4: Investments

In 2019, there were four major liquidity events: Jensen Meat, a subsidiary of Hamann Companies, acquired California-based company Before the Butcher for an undisclosed amount. Nature's Soy acquired WestSoy for an undisclosed amount. Campbell Soup Company sold Bolthouse Farms to Butterfly Equity and Apollo Investment through a $510 million leveraged buyout. Beyond Meat went public, selling over $760 million in shares to the public through an IPO and subsequent offering.[19] This means there was at least 1.27 billion dollars' worth of exits in 2019, although the precise figure is much higher due to the two acquisitions for undisclosed amounts.

Since 1980, U.S. plant-based food companies and their investors have generated more than $21.4 billion through exits, $1.264 billion of which through IPOs and subsequent public offerings of new shares. Mergers, acquisitions, and buyouts generated the rest.

Figure 4: Plant-Based Food Exits (M&A, buyout, and public share offerings) 2010–2019



Source: PitchBook Data, Inc.

PitchBook

Section 4: Investments

Figure 5: Recent M&A Activity in the Plant-Based Food Industry (October 2014–December 2019)

Source: GFI custom PitchBook analysis of plant-based food companies (including fungi) based or selling in the United States. Last updated February 11, 2020. Note: Conagra Brands acquired Pinnacle Foods for $10.9 billion in 2018. This acquisition is not included in this report because plant-based food is not Pinnacle's primary business, although the company owned Gardein and Boulder Brands.

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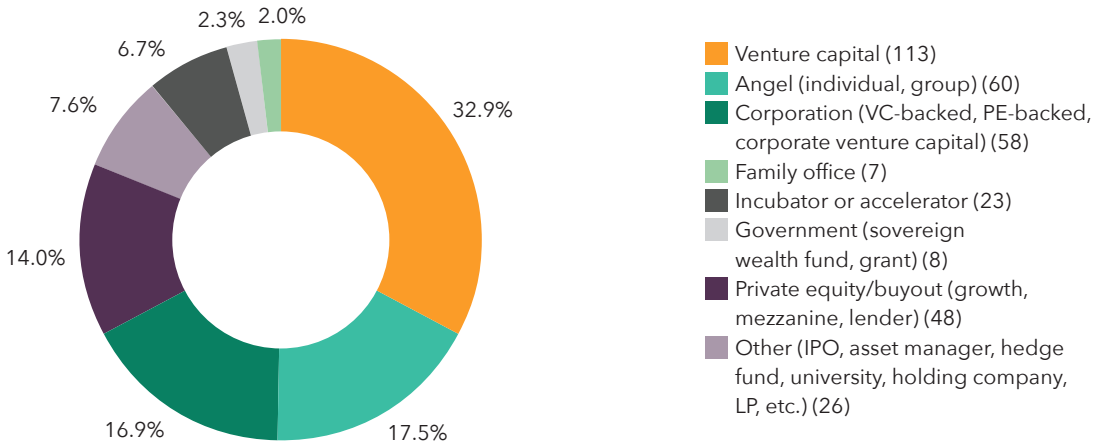
Photo credit: Beyond Meat

Section 4: Investments

Investors

There have been at least 343 unique investors in U.S plant-based foods since 1980. The most active investment types in this space are venture capital, followed by angels and angel groups, corporations and corporate venture capital, and private equity/buyout (Figure 6). Venture capital represented a plurality of deals in plant-based food companies in 2019. Additionally, investment trends indicate further maturity of the plant-based food category. For example, nearly four times as many late-stage venture capital deals transpired in the past five years compared with the previous five.

Figure 6: Plant-Based Food Company Investor Composition by Deal Count (1980–2019)



Source: GFI custom PitchBook analysis of plant-based food companies (including fungi) based or selling in the United States. Last updated February 11, 2020.

The most active venture capital investors in this industry are New Crop Capital, Stray Dog Capital, Blue Horizon, and Khosla Ventures. Many of these investors are members of the **GlassWall Syndicate**, a network of investors with a shared mission to "invest in companies and products that will make a difference in the lives of animals, people and the planet."

Other investors in plant-based food companies include large corporations, top accelerators, business icons, legendary VC firms, and governments alike (Figure 7). Some notable names not included in Figure 7 are Dean Foods, Eduardo Saverin, Alexis Ohanian, Serena Williams, Jack & Suzy Welch, Li-Ka Shing, Lori Greiner, Marc Benioff, Mario Batali, Jaden Smith, Leonardo DiCaprio, Draper Associates, Viking Global Investors, Goldman Sachs, Qatar Investment Authority, and the USDA.

Global Snapshot: Plant-Based Companies Catch Attention of Investors Worldwide with North America Leading the Pack

Of investors in plant-based food companies headquartered or selling in the United States, nearly two-thirds (63.3%) are U.S.-based. But investors in U.S. plant-based food companies span at least 23 countries.[20] These investors each have their own regional networks and local knowledge, which is invaluable to their U.S-based portfolio companies as they seek partners and navigate scaling internationally.

Table 5: Countries Investing the Most in U.S. Companies by Number of Unique Investors (1980–2019)

Country	Number of Investors	Top Three Most Active Investors in Country by Deal Count (VC unless otherwise noted)
United States	217	Unovis Partners (including New Crop Capital); Stray Dog Capital; Khosla Ventures
Canada	18	InvestEco Capital (growth/expansion); District Ventures Accelerator and Capital (accelerator/incubator); Maple Leaf Foods
United Kingdom	16	CPT Capital; multi-way tie for second
China (incl. Hong Kong)	9	Horizons Ventures; Green Monday Ventures (private equity/buyout); Sailing Capital (private equity/buyout)
Singapore	6	Temasek Holdings (sovereign wealth fund); Proioxis Ventures; multi-way tie for third
Germany	4	Doehler Ventures; Katjesgreenfood (impact investing); Oyster Bay; PHW-Gruppe (corporation)
Sweden	3	Industrifonden; Leapfrogs (accelerator/incubator); Östersjöstiftelsen (government)
Switzerland	3	Blue Horizon; Beyond Investing; UBS (asset manager)

Figure 7: Most Active Investors in Plant-Based Food by Deal Count (1980–2019)

Unovis Partners (New Crop Capital)	19
Stray Dog Capital	14
Blue Horizon	13
Khosla Ventures	12
Clear Current Capital	11
VegInvest	9
Collaborative Fund	8
CPT Capital	8
301	6
CircleUp Network	6
Everhope Capital	6
Horizons Ventures	6
AccelFoods	5
Gates Ventures	5
ImpactAssets	5
M3 Ventures	5
Powerplant Ventures	5
SOSV	5
Dean Foods	4
General Mills	4
Green Monday Ventures	4
GV	4
KBW Ventures	4
Obvious Ventures	4
Prelude Ventures	4
Radicle Impact	4
S2G Ventures	4
Y Combinator	4
Baleine & Bjorn Capital	3
CAVU Venture Partners	3
Evolution VC Partners	3
Five Seasons Ventures	3
Founders Fund	3
InvestEco Capital	3
Kleiner Perkins	3
Strand Equity	3
Temasek Holdings	3
Tyson Ventures	3
Union Grove Ventures	3

Source: GFI custom PitchBook analysis of plant-based food companies based or selling in the United States. This graphic includes only investors with at least three investments. A follow-on investment counts as an additional investment. Last updated February 13, 2020. Note: GFI participated in the founding of New Crop Capital and Clear Current Capital.

PitchBook

Section 4: Investments

Looking Ahead

As plant-based foods become increasingly mainstream, restaurants, retailers, and entrepreneurs are shifting their focus to meet the growing consumer demand. This demand, along with the **economic efficiencies** of plant-based foods and the unprecedented success of Beyond Meat's IPO, has sparked massive interest among the investor and corporate communities. In fact, every one of the top five largest meat companies in the United States has invested in plant-based meat, through partnerships, product launches, or financial stakes in other companies. These experienced large corporations will further accelerate the arrival of innovative new products to market.

Opportunities in plant-based food go well beyond production of the next great plant-based burger. As the industry matures, the potential for new products, as well as new ingredients and manufacturing processes, will further drive innovation, growth, and investment opportunities. Additionally, as the trillion-dollar-plus meat industry transforms, new supply chains will need substantial investment.

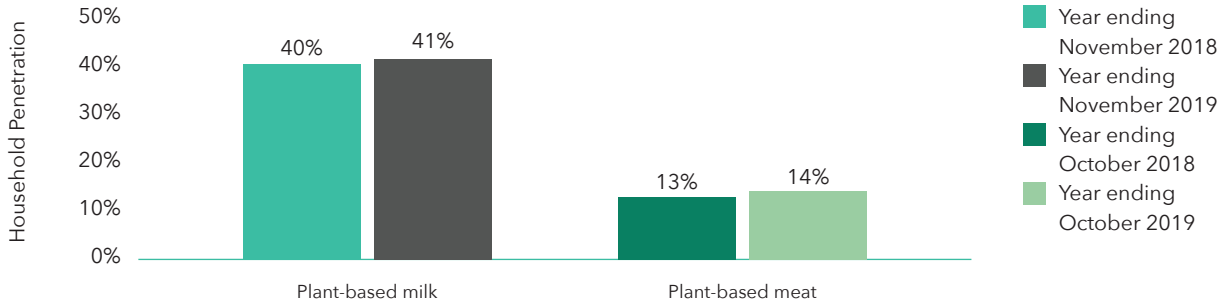
Photo credit: Impossible Foods

Section 5: Retail

Overview

The history of plant-based milk is a good sign for plant-based meat. Plant-based milk began to gain popularity in the early 2000s[21] due to a mix of product innovation and a strategic change in merchandising.[22] Indeed, the greatest factor in the growth of plant-based milk was probably selling it in traditional gable-top packaging alongside cow's milk in the refrigerated dairy case, as opposed to aseptic cartons in a segregated center-of-store section.[23] In 2019, retail sales of plant-based milk reached **$2 billion**, which equates to 14% of the total U.S. retail milk market. Household penetration is currently 41%, meaning more than four out of 10 U.S. households purchase plant-based milk.[24]

Figure 8: Household Penetration of Plant-Based Milk and Plant-Based Meat



Source: IRI panel, total store view, all outlets, 52 weeks ending 12-01-2019; IRI panel, all outlets, NBD-aligned, 52 weeks ending 11-03-19.

Other plant-based food categories are also in the beginning stages of explosive growth. Retail dollar sales of plant-based meat, the second-largest category behind plant-based milk, grew by 18% last year to $939 million. Over the past two years, plant-based meat dollar sales have grown an impressive 38%. Further illustrating the momentum of emerging plant-based categories, over the past two years retail dollar sales of plant-based ice cream and frozen novelty grew by 34%; plant-based yogurt grew by 95%; and plant-based dairy spreads, dips, sour cream, and sauces grew by 135%.

Last year was a strong one for U.S. retail sales of plant-based foods. In total, plant-based food sales grew by 11% to more than $4.98 billion (Table 6).[25] Total U.S. retail food sales grew by just 2% during the same period. In the three years since GFI began analyzing retail sales data, the plant-based food market has grown by $2 billion, up 27.69% since the end of 2017.

Box 8: Retail Market Data Collection

To size the U.S. retail market for plant-based foods, GFI and the Plant Based Foods Association commissioned retail sales data from the market research firm SPINS. The firm built the dataset by first pulling in all products with the SPINS "plant-based positioned" product attribute, as well as any products from the 100 largest plant-based food companies that were not coded with the plant-based positioned product attribute. SPINS refined the dataset by removing any products that were not a direct replacement for animal products (meat, seafood, eggs, and dairy, as well as meals that contain animal product replacements). Inherently plant-based foods, such as chickpeas and kale, are not included. These semi-custom product categories are described in Box 1. SPINS obtained the data over the 52-week and 104-week periods ending December 29, 2019, from the SPINSscan Natural, Specialty Gourmet, and Conventional Multi Outlet (powered by IRI) grocery channels. SPINS defines these channels as follows:

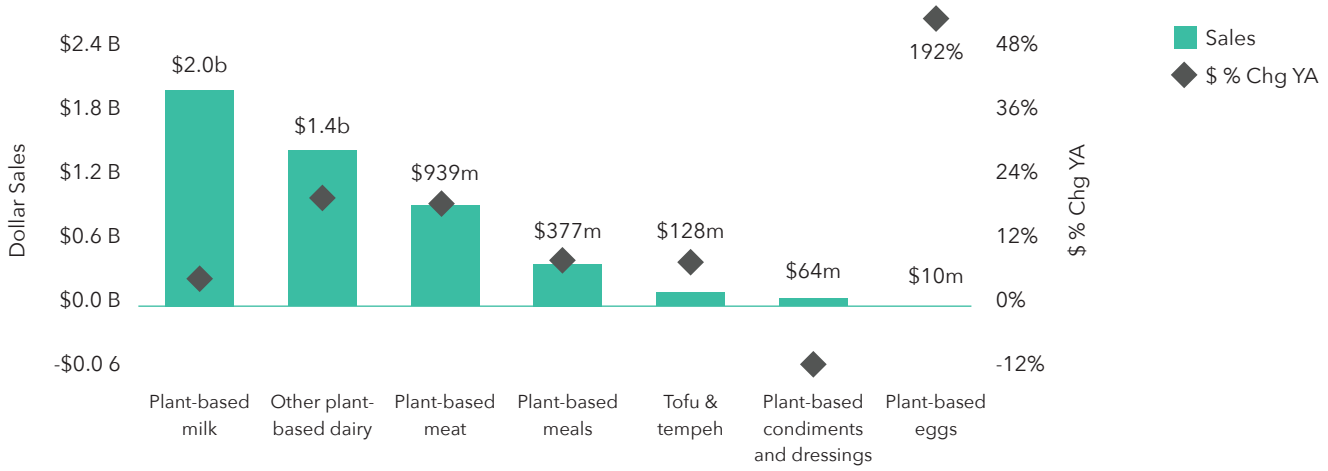
- **Conventional Multi Outlet (MULO):** Over 104,000 retail locations spanning grocery, drug, mass, dollar, military, and club.
- **Natural:** Full-format stores with $2 million+ in annual sales and at least 50% of sales from natural and organic products; includes co-ops, associations, independents, and large regional chains (excluding Whole Foods and Trader Joe's).
- **Specialty Gourmet:** Full-format supermarkets with more than $2 million in annual sales and 25% overall volume comprising SPINS-defined specialty items; high-end, experiential stores featuring full-service and fresh departments, such as prepared foods, butchers, and on-site bakeries.

This is generally considered the broadest available view of retail food sales, although not all retailers are represented. Some, such as Whole Foods, Trader Joe's, and Costco, do not report their scanner data to SPINS or IRI.

Section 5: Retail

Figure 9: Retail Plant-Based Food Market Overview

Total U.S. Plant-Based Food Dollar Sales and Dollar Sales Growth by Category 2019



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

Table 6: Retail Plant-Based Food Dollar Sales by Category

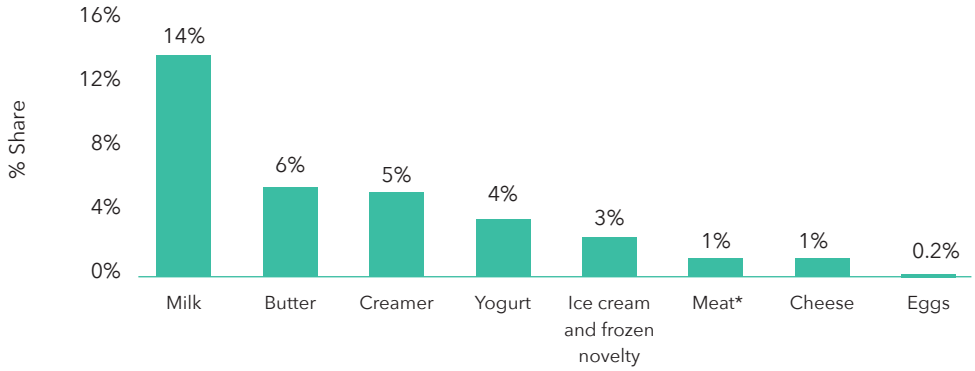
Category	2017 Sales (values in 000's)	2018 Sales (values in 000's)	2019 Sales (values in 000's)	$ Sales Growth (2018–2019)	$ Sales Growth (2017–2019)
Plant-based milk	$1,765,971	$1,920,579	$2,016,540	5.0%	14.2%
Plant-based meat	$681,763	$793,614	$939,459	18.4%	37.8%
Plant-based meals	$300,464	$348,102	$376,972	8.3%	25.5%
Plant-based ice cream and frozen novelty	$250,513	$317,575	$335,549	5.7%	33.9%
Plant-based creamer	$148,809	$213,381	$286,662	34.3%	92.6%
Plant-based yogurt	$144,906	$215,156	$282,502	31.3%	95.0%
Plant-based butter	$173,053	$183,070	$198,359	8.4%	14.6%
Plant-based cheese	$125,377	$159,783	$189,099	18.3%	50.8%
Tofu and tempeh	$111,823	$118,807	$127,856	7.8%	14.6%
Plant-based ready-to-drink beverages	$87,862	$103,242	$122,276	18.4%	39.2%
Plant-based condiments, dressings, and mayo	$62,841	$71,465	$63,696	-10.9%	1.4%
Plant-based dairy spreads, dips, sour cream, and sauces	$12,543	$19,206	$29,513	53.7%	135.3%
Plant-based eggs	$3,001	$3,377	$9,851	191.7%	228.2%
Grand Total	**$3,868,925**	**$4,467,358**	**$4,978,587**	**11.4%**	**28.7%**

Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 104 weeks ending 12-29-2019

Section 5: Retail

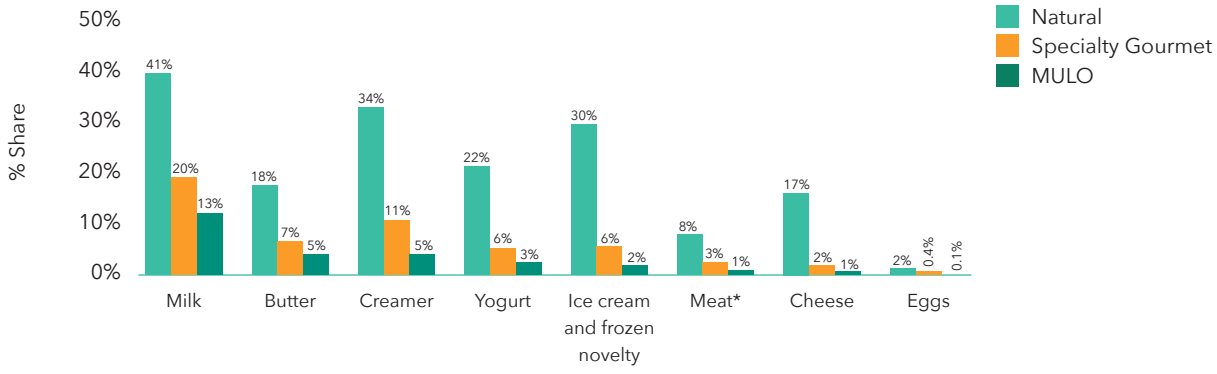
Plant-based foods are steadily gaining share in their respective categories (Figure 10). Plant-based milk stands at 14% share in the total milk category, and plant-based meat is 1%[26] of the total meat category. The share of plant-based foods in each category is significantly higher in the Natural channel (Figure 11). Plant-based milk accounts for 41% share of all milk sales in the Natural channel, while plant-based meat holds 8% share of all meat sales in that channel. This is important because the Natural channel is where trends first emerge before disseminating into MULO, often serving as a signal. On this basis, we expect plant-based foods to continue to gain market share in the total marketplace.

Figure 10: Plant-Based Dollar Share of Total Category



Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019;* Nielsen (2019), **The F word: Flexitarian is not a curse to the meat industry**

Figure 11: Plant-Based Dollar Share of Total Category by Channel



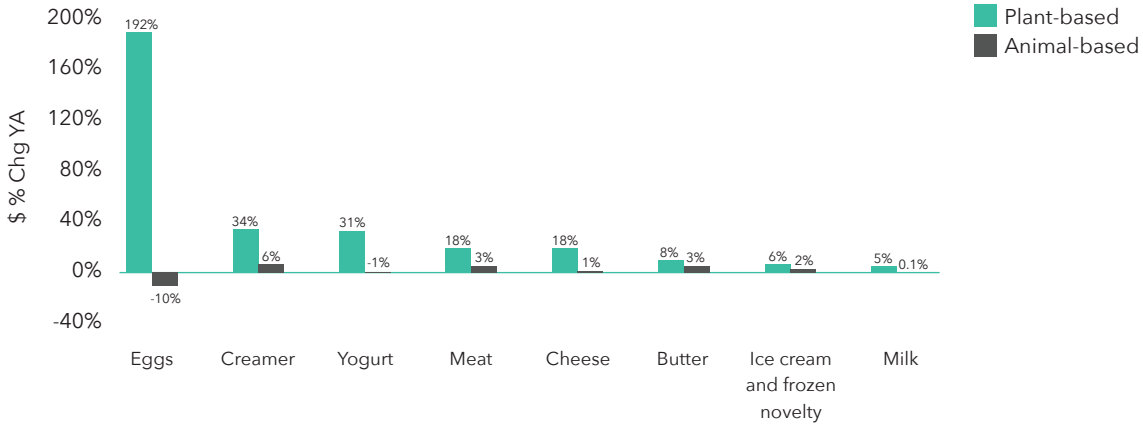
Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019;* Nielsen (2019), **The F word: Flexitarian is not a curse to the meat industry**

*Note: SPINs does not report non-UPC meat counter sales. To account for this, the plant-based meat total retail share calculation uses the $95 billion total meat market size reported by Nielsen, as this number includes both retail packaged meat sales and non-UPC meat counter sales.

Section 5: Retail

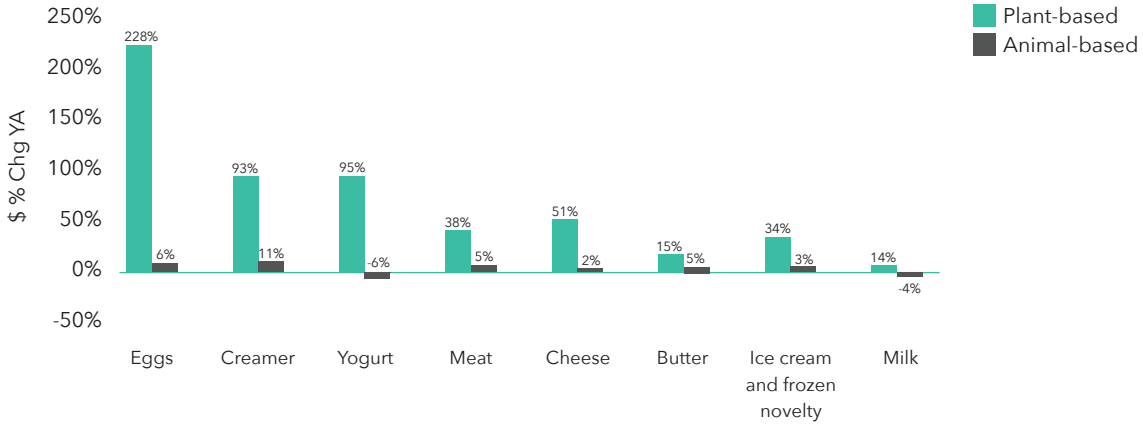
As they gain share, plant-based foods continue to significantly outpace the sales growth of animal-based foods across all categories (Figure 12). In the yogurt and milk categories, animal-based sales are now flat or declining. This trend was especially pronounced over the SPINS two-year time frame (Figure 13), during which several plant-based categories experienced increases in growth that are 9–10 times greater than those of their animal-based counterparts.

Figure 12: One-Year Dollar Sales Growth in Plant-Based Categories Compared with Conventional Categories



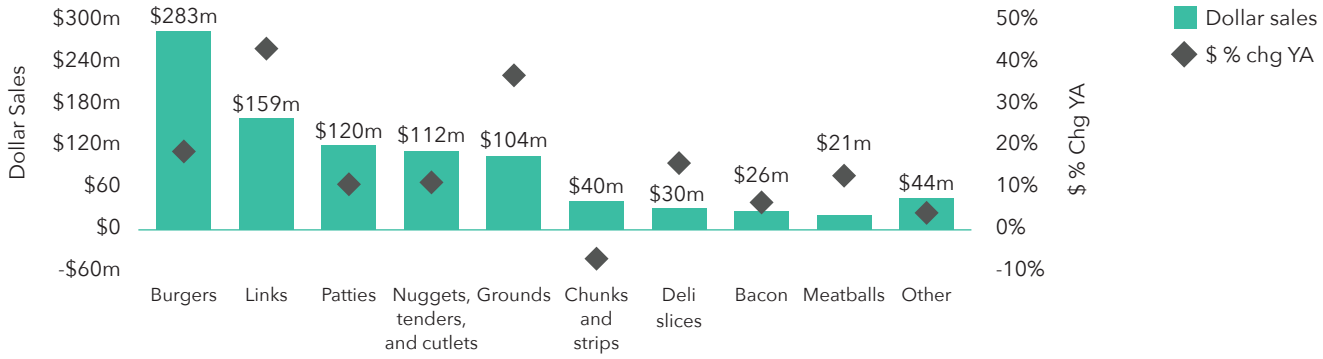
Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019

Figure 13: Two-Year Dollar Sales Growth in Plant-Based Categories Compared with Conventional Categories



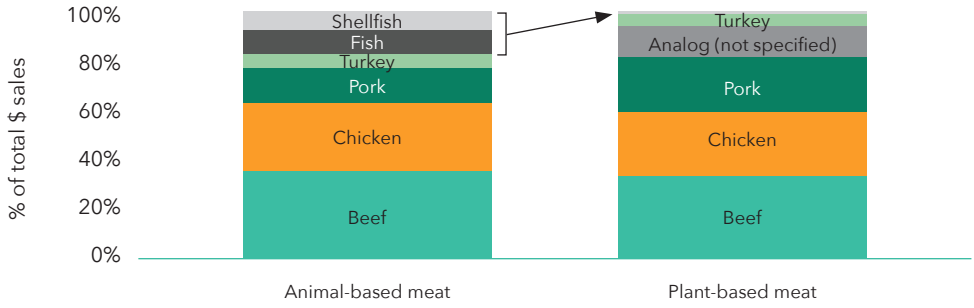
Source: SPINSscan Natural and Specialty Gourmet (proprietary), SPINSscan Conventional Multi Outlet (powered by IRI), 52 weeks ending 12-29-2019

Figure 14: Plant-Based Meat Dollar Sales and Dollar Sales Growth by Product Type



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

Figure 15: Conventional and Plant-Based Meat Comparison: Dollar Sales by Animal Type



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

Note: Animal-based meat dollar sales for year ending August 2018; plant-based meat dollar sales for year ending December 2019

Good Food Retail Report

GFI has launched a new initiative to evaluate the top 15 U.S. food retailers by revenue on their assortment, marketing, and merchandising of plant-based foods.

The *Good Food Retail Report* identifies the following:

- Which retailers have the broadest selection of plant-based meat, eggs, and dairy products.
- Which retailers have implemented successful marketing efforts to promote plant-based eating.
- Which retailers are leading the way in innovative merchandising solutions for plant-based products.

Culminating in special awards celebrating plant-based grocery leaders, the *Good Food Retail Report* is the definitive plant-based benchmark in the retail industry and spotlights the most innovative approaches to selling plant-based products. The report rates retailers using a tier system to highlight excellence and opportunities in three areas:

Area	% of Overall Score	Considerations
Product Assortment	60%	• Number of SKUs of plant-based products by category • Number of private-label plant-based products by category • Number of plant-based prepared food options
Merchandising	25%	• Adjacency of plant-based and animal-based products • Aisle signage and shelf tags
Marketing	15%	• Cross-category promotions across channels

Preview: 2019 *Good Food Retail Report* Stats:

- One hundred percent of the top 15 U.S. retailers have at least one plant-based refrigerated meat SKU.
- Sixty-five percent of retailers merchandise at least some refrigerated plant-based meat products adjacent to or integrated with conventional meat.
- Wegmans, the retailer with the most plant-based meat, egg, and dairy product SKUs, offers more than 500 products across these categories.

Stay tuned: The *Good Food Retail Report* will be published in spring 2020.

The Democratization of Plant-Based: Private-Label Launches

In foodservice, 95% of plant-based-burger buyers have also made a beef burger purchase within the past year,[27] demonstrating that the market for plant-based products largely comprises omnivores and flexitarians. Retailers can capitalize on the mainstreaming of flexitarianism by ensuring their private-label brands include plant-based products across categories. For example, the launch of Kroger's **Simple Truth®** Plant Based collection, announced at the 2019 Good Food Conference, is a direct response to increasing demand for plant-based food from mainstream consumers. The collection consists of a new Emerge line of pea-based fresh burger patties and grounds, as well as plant-based cookie dough, pasta sauces, sausages, deli slices, dips, and other items. With products like Bolognese sauce, turkey-style deli slices, and cream cheese that directly replace animal-based items, this line appeals to the consumer's desire for familiar, easy-to-prepare products.

Simple Truth® Plant Based features packaging strategies such as vivid, in-context photographs of the product in contrasting colors, resulting in increased positive taste associations, according to GFI and Mindlab's 2019 study on driving plant-based food purchasing. The study also supports using "plant-based" in on-label descriptive language—a term that increases purchase likelihood compared with terms such as "vegan" or "vegetarian"—as Kroger has done with their line.

Image courtesy of Kroger

As name brands and premium-priced products have long dominated plant-based foods, private-label collections present a significant opportunity to increase category affordability and accessibility. In dollar sales, private-label products overall accounted for $143 billion in 2019, with 3.7% year-on-year growth and a four-year CAGR of 2.5%, according to Nielsen sales data.[28] The same data show that branded products continue to compose most of the market—at $671 billion in sales—but are growing more slowly, at 1.9% year on year with a four-year CAGR of 1.0%. According to GFI's analysis, "private-label" already ranks in the top 10 brands by dollar sales in the more developed plant-based product categories, such as meat, milk, and ice cream.

Photo credit: Robert Kneschke / Shutterstock.com

Section 5: Retail

Global Snapshot: Plant-Based Across Regions

Significant growth in plant-based product distribution and sales is not limited to the U.S. market. This trend is apparent in regions around the world. Global plant-based milk sales reached an estimated $16 billion in 2018[29] and are projected to reach $38 billion by 2024,[30] while global plant-based meat sales hit an estimated $4.6 billion in 2018.[31]

Outside the United States, plant-based food manufacturers have focused much of their attention on Europe. Nestlé launched the Garden Gourmet Incredible Burger in Switzerland in 2019.[32] Beyond Meat announced that they would start plant-based meat production in the Netherlands in 2020,[33] and Impossible Foods filed an application with the EU to begin selling their products in Europe.[34]

Increasingly, European retailers are responding to the demand for plant-based meat with expanded plant-based product assortments and dedicated plant-based meat sets in the meat aisle. UK retailers Greggs, Marks & Spencer, Tesco, and Aldi all launched plant-based product lines in 2019. Greggs introduced a plant-based sausage roll in January as part of the global Veganuary movement and experienced a 9.6% rise in like-for-like sales for the seven-week period after the launch, compared with a 2.9% hike in like-for-like sales for the same period in the previous year.[35] Marks & Spencer debuted the Plant Kitchen product range in December 2018 and expanded it in October 2019 with plant-based versions of traditional meals.[36] Tesco added more plant-based meat products to their Wicked Kitchen range and placed them in the meat aisle. The company also launched another plant-based product line, Tesco Plant Chef, which includes plant-based macaroni and pizza.[37] Finally, Aldi UK introduced Mae's Kitchen, a plant-based meat product line,[38] and announced the launch of additional plant-based meals in preparation for Veganuary.[39]

2019 also brought about growing interest in plant-based food in the Asia-Pacific region. In October, Chinese ham producer Jinzi Ham launched a plant-based meat patty,[40] and in November, both Beyond Meat and Impossible Foods announced plans to expand operations into China in 2020.[41] Good Dot, an Indian plant-based meat company, debuted the Good Gurber plant-based chicken burger in January.[42] Sunfed, a plant-based meat company headquartered in New Zealand, expanded their reach to Australia in June[43] with their popular plant-based chicken. Borrowing a merchandising strategy from European retailers, Australian supermarket chains Coles and Woolworths now feature plant-based meat in the meat aisle.

Brazil also launched several plant-based products in 2019. JBS, the world's largest meat producer, introduced a plant-based burger under their Seara[44] brand, and Marfrig announced plans to partner with American agribusiness company ADM to produce and market a plant-based burger product in Brazil.[45] The country's plant-based product launches were not limited to plant-based meat. Brazil-based egg producer Grupo Mantiqueira introduced their first plant-based egg product: N.Ovo.[46]

Looking Ahead

A slew of plant-based meat products, most of which are still building distribution, debuted in the second half of 2019. As these products gain distribution and are increasingly integrated within the meat department (where more consumers shop), we expect the sales growth of plant-based meat to accelerate and bring the category to $1 billion in U.S. retail sales in 2020.

Also driving growth will be next-generation plant-based meat launches in additional product forms. Much recent innovation has focused on the burger, but ground beef accounts for under 40% of all beef sales and thus a fraction of the overall meat market.[47] Plant-based meat innovation across many other common product types and forms, such as chicken and whole muscle, presents significant opportunity. As these new products come to market, we expect that shelf space dedicated to the category will increase. Emerging plant-based dairy categories, such as cheese and yogurt, are also likely to see increased shelf space as plant-based milk consumers continue to branch out into other plant-based dairy products, increasing household penetration of these categories and driving more product innovation.

In addition to increasing shelf space, we expect to see greater inclusion of plant-based protein in prepared foods and in-store foodservice.

As interest in plant-based food grows among consumers, we also foresee the launch of more plant-based shopper marketing programs, such as the integrated "Plant-Based Tastes Great" promotion at Sprouts Farmers Market, which uses tactics such as in-store signage, plant-based shelf tags, digital newsletters, and weekly flyers to promote heavy discounts of plant-based products across the store. The plant-based butcher section at Bristol Farms, including fresh plant-based breakfast sausage, chicken patties, chorizo-stuffed potatoes, and vegetarian meatloaf, is another example of a leading-edge strategy that more retailers are likely to test. In-store foodservice is another area for growth—Whole Foods leveraged branded partnerships to launch JUST egg breakfast sandwiches with Lightlife bacon, Gardein sausage, and Good Planet cheese on its breakfast menu. Such promotions build consumer awareness and drive trial, further accelerating sales across plant-based categories.

Section 6: Foodservice

"The Impossible Whopper is a huge hit with our guests and has quickly become one of the most successful product launches in Burger King's history. What's especially exciting is that the sales of the Impossible Whopper have been highly incremental and have attracted new types of guests into our restaurants."

Jose Cil, CEO of Restaurant Brands International[48]

Overview

While retail-supplied eating at home is responsible for a much greater mass of food consumed, eating at restaurants and foodservice outlets represented over 54% of U.S. food expenditures last year.[49] The National Restaurant Association estimates that foodservice sales were $863 billion in 2019.[50] Foodservice is an important means of introducing plant-based foods to consumers and building long-term loyalty. Its signaling power, openness to experimenting with new trends, and higher margins make foodservice an attractive category for plant-based startups seeking a foothold in the marketplace along with critical early sales volume.

2019 was a banner year for plant-based foods in foodservice, with major launches or tests of plant-based meat, egg, and dairy products in these and other leading foodservice outlets:

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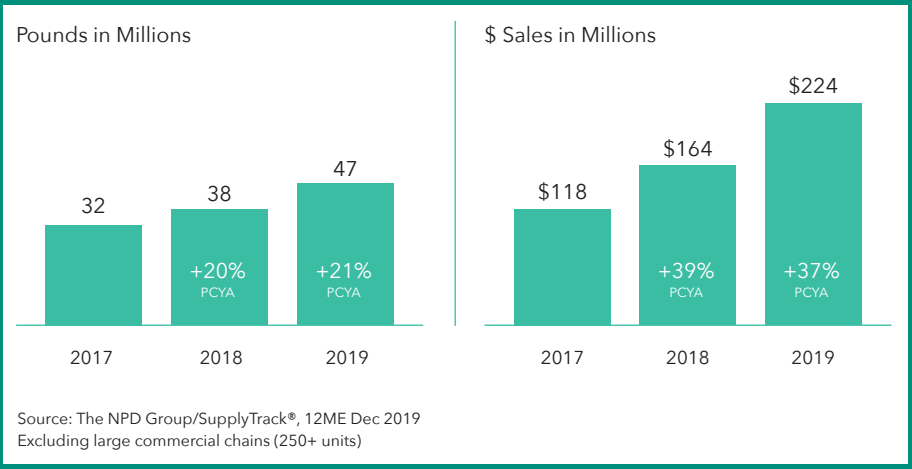
Box 9: 2019 Plant-Based Foodservice by the Numbers



Source: The NPD Group/SupplyTrack®, 12ME Dec 2019
Excluding large commercial chains (250+ units)

According to NPD's SupplyTrack, U.S. wholesale revenues from plant-based meat shipments from broadline foodservice distributors to operators grew 37% in 2019 to $224 million. Converting wholesale revenues to retail rates and extrapolating from broadline to the rest of the market yields an estimated total U.S. plant-based meat foodservice market size of $1.68 billion.[51]

NPD reports that even before many national fast-food launches, the U.S. quick-service restaurant channel (QSR) served plant-based burgers 228 million times in the 52-week period ending May 2019—up 10% from the year before. During the same period, the channel served 6.4 billion beef burgers, giving plant-based burgers a 3.5% market share.

Plant-based terminology on menus has increased by 2,462% in four years, growing 328% in 2019 alone (Datassential MenuTrends).

Plant-based dishes saw a 25% increase in orders on **GrubHub** in the first half of 2019. **GrubHub** also reported that vegetarian- and vegan-friendly dishes took over seven of the top 10 most ordered dishes in 2019, up from only three of the top spots in 2018.

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Plant-Based Meat in U.S. Broadline Foodservice

GFI recently partnered with **NPD's SupplyTrack** service to explore the sales of plant-based meat from broadline foodservice operators to non-commercial operators, independents, and restaurant chains with fewer than 250 locations. In addition to total pound and sales growth for the past two years, the report reveals the following:

1. While some plant-based burger gains have come from new customers, higher check averages, and increasing baseline protein consumption, NPD's modeling shows that a meaningful share of plant-based burger sales owes to shifts in demand for a variety of animal proteins.

2. Italian sausage, brats, fillets, and meatballs are some of the fastest-growing plant-based product formats, demonstrating the plant-based category's evolution beyond burger occasions and segments.

3. While plant-based burgers enjoy only a small plurality of the total plant-based protein market share, they were responsible for much more of the total plant-based category growth.

4. Plant-based burger analogs had significantly higher per-pound pricing and notably higher sales velocity than traditional veggie burgers.

5. Within broadline foodservice, plant-based meat purchase volume varied significantly according to foodservice operator size, with the most total volume purchased by small restaurants:

    a. 34%: total volume to independent restaurants (1–2 locations).

    b. 27%: total volume to non-commercial operators.

    c. 19%: total volume to small chains (20–99 locations).

    d. 14%: total volume to micro chains (3–19 locations).

    e. 5%: total volume to medium chains (100–249 locations).

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6. Operator segments that were strong for beef burgers were also the strongest for plant-based burgers by percentage of plant-based pound volume:

    a. 33%: casual dining bar and grills.

    b. 15%: QSRs.

    c. 5%: midscale family restaurants.

7. Omnivores and flexitarians are driving plant-based sales: Consumers who ordered plant-based burgers at restaurants also order beef burgers and chicken at times.

For more information about this report and plant-based protein wholesale purchasing in broadline foodservice, please **contact GFI**.

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Good Food Restaurant Scorecard

The annual ***Good Food Restaurant Scorecard*** ranks the *Nation's Restaurant News* Top 100 Restaurants according to the breadth and depth of their plant-based entree portfolio, as well as their promotion of plant-based eating. These top 100 restaurant chains represent about one-third of the locations and revenue of the restaurant sector. Highlights from 2019's scorecard include the following:

- More restaurants have at least one plant-based entree option, up from 55 in 2018 to 58 in 2019.
- Plant-based items have stayed on menus at early adopter chains, such as TGI Fridays, Carl's Jr., A&W Canada, and White Castle.
- Restaurant chains have invested big in marketing their plant-based items, through both traditional channels, such as television, and prominent in-store signage.
- Some chains have doubled down by adding more plant-based items, including Carl's Jr., A&W Canada, and Burger King.
- Plant-based has gained ground in multiple segments, including fast casual, QSR, burgers, Mexican chains, Asian concepts, and breakfast foods.
- Plant-based meat has taken a variety of forms in keeping with each restaurant chain's unique brand, operations, and menu mix. Some chains, such as Panera and Chipotle, have opted for clean-label, whole-food plant-based entrees, while other brands have focused on faithfully recreating the sensory experience of conventional meat, demonstrating that there is no one way to integrate plant-based into a menu.

Plant-based eating is a rapidly growing trend in these chains, with 17 of the top 100 improving their scores from 2018 to 2019. Other restaurant chains have yet to incorporate plant-based dishes into their menus, with 42 of the top 100 scoring zero on our rubric. This points to ample opportunity for foodservice operators to capitalize on this market shift.

The scorecard can be found at **goodfoodscorecard.org**. Additionally, GFI recently published a new **resource library** for foodservice operators, offering research-driven recommendations for marketing plant-based dishes to mainstream consumers. We also host a **product catalog of plant-based meat, egg, and dairy items** available in foodservice distribution.

Section 6: Foodservice

U.S. Snapshot

One of the most exciting developments of 2019 was the smashing success of Burger King's U.S. test and subsequent **national launch** of the Impossible Whopper. Burger King's largest U.S. franchise operator **reported** that their locations sold an average of 28 Impossible Whoppers per day, compared with 234 conventional Whoppers—a 10%+ plant-based share of Whopper sales. According to **Cowen**, checks including the Impossible Whopper tend to be $10 or more, while the average Burger King order in 2018 was $7.36. Burger King's **Q3 2019 earnings report** attributed 5% of comparable sales growth in the United States to the Impossible Whopper.

Burgers weren't the only plant-based success stories of 2019. After Dunkin' introduced the Beyond Sausage Sandwich nationwide in November 2019, same-store sales rose 2.8% in the fourth quarter—the highest increase in six years. According to **reports**, Dunkin' executives attributed much of the growth to the new Beyond Meat item, noting that it brought in new customers and increased average check size: Orders featuring the product averaged more than $9.

Plant-based protein has also been successful in smaller operations. Plant-based foods are a **top trend in independent restaurants**. JUST's plant-based egg became the bestselling breakfast item chain-wide at Gregory's, a 30-location, Mid-Atlantic coffee chain. Plant-based eggs now account for 40% of all of their breakfast sandwich sales, outpacing conventional egg options. According to

Photo credit: Tada Images / Shutterstock.com

the chain, JUST Egg sales didn't cannibalize other items, and average check size increased. JUST Egg customers have also proved loyal—while sales of other items fluctuate with traffic, JUST Egg sales are consistent and growing.

Global Snapshot

While plant-based protein has made some global inroads, international menu penetration generally still lags the United States. For example, Burger King's positive U.S. reception led to plant-based product introductions in **Europe** and **South America**, with additional markets expected in 2020. McDonald's remains the most significant holdout to the global plant-based burger trend. McDonald's serves an estimated **68 million people**—almost 1% of the world population—every day. A plant-based launch in the chain's top three **largest markets** (the United States, Japan, and China) would mark a considerable inflection point for plant-based foods. McDonald's does have some experience with plant-based menu items. In fact, more than **30%** of McDonald's India's sales come from the McAloo Tikki, a spiced potato and pea patty sandwich introduced in 2001 that outsells every other McDonald's product in India. Additionally, they have sold the McVegan in Sweden and Finland since 2018. McDonald's Germany (the chain's fourth-largest market) began offering the Big Vegan TS in April 2019, featuring a plant-based patty produced by Switzerland-based Nestlé. McDonald's Israel tested Nestle's Incredible Burger in several locations. McDonald's Canada (the company's fifth-largest market) conducted a small test of the Plant.Lettuce.Tomato (PLT), a Beyond Burger sandwich, at 28 locations in southwestern Ontario during Q4 2019.

Other large global chains, including Starbucks, Subway, KFC, Domino's, Pizza Hut, and Dunkin', have tested plant-based proteins regionally or in national rollouts, but most have yet to introduce plant-based protein items to their entire global networks. Given the success of plant-based meat in the United States, the UK, India, Germany, and other major markets, GFI expects an abundance of noteworthy international plant-based product launches in 2020.

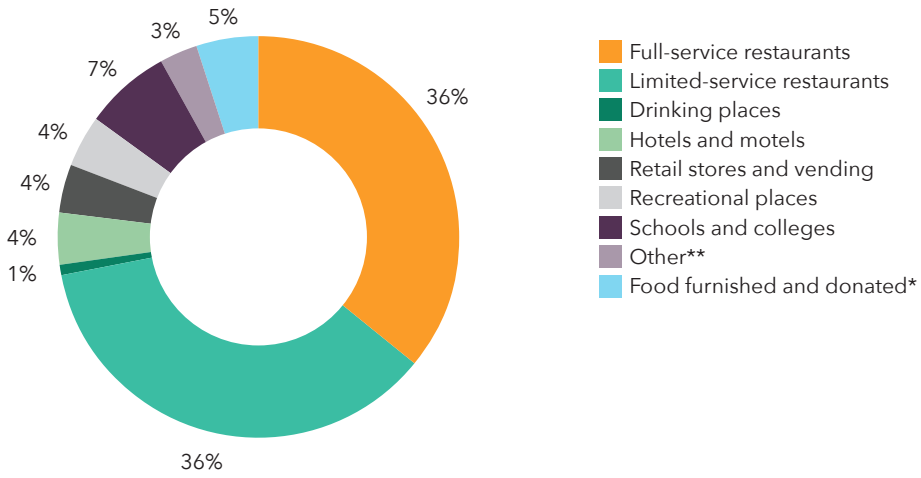
Looking Ahead

Plant-based will expand in non-commercial foodservice.

One of the most common strategies for scaling a novel food business is the Tesla model: selling early in high-margin, low-volume premium niches to passionate early adopters and then scaling production and business processes to reach the mass market. Impossible Foods used this model, launching in high-end restaurants **Momofuku** and **Jardiniere** before Burger King. Foodservice affords plant-based food startups a path for demonstrating product market fit and building crucial early sales volume by targeting highly profitable niche audiences. Non-commercial foodservice is a growth opportunity we see for plant-based companies in 2020 and beyond. While many institutional foodservice operators are price-sensitive, some sectors have less cost pressure and serve existing consumers who want plant-based foods. In particular, we see opportunities and growth for plant-based foods in the following dining sectors:

1. Colleges and universities.
2. Recreation, travel, and lodging establishments, such as amusement parks and airports.
3. Business and industry employee cafeterias.
4. Healthcare foodservice outlets, such as hospitals and nursing homes.
5. Groceraunts (restaurants located in grocery stores) and retail grab-n-go outlets.

Figure 16: Foodservice Dollar Sales by Segment



*Includes prisons, healthcare cafeterias, inpatient medical care facilities, military bases, and planes
**Includes trains, healthcare cafeterias, and corporate cafeterias

Data Source: **USDA**, 2018

Section 6: Foodservice

Foodservice Trends

The plant-based category will expand beyond burgers.

Milk was the first retail breakout plant-based category, showing the power of adjacency to animal-based milk in coffee and smoothie applications. Burgers are the second wave, demonstrating the power of plant-based products that are competitive with animal products on taste, price, convenience, familiarity, and accessibility. In 2020, we expect plant-based ground meats, particularly ground beef, chicken nuggets, and pork sausage, to lead the third wave. This will probably manifest in many new foodservice settings and applications, including the following:

Mexican segment	Plant-based ground beef and pork in burritos, tacos, and other dishes that traditionally feature beef or chorizo.
Hot dog chains	Plant-based sausages and brats.
Pizza segment	Plant-based meat pizza toppings.
Italian segment	Plant-based ground beef in meatballs and Bolognese-style sauces.
Sandwich segment	Plant-based meatball subs and deli meats.
Chicken segment	Plant-based nuggets and tenders.
Breakfast daypart	Plant-based meat and eggs in breakfast burritos and breakfast sandwiches.

Blended products gain traction.

Another exciting development is the launch of many plant- and animal-protein blends from major protein suppliers. We expect these products to be increasingly common in 2020 and beyond. While foodservice operators have long recognized the many health and sustainability benefits of blended proteins, the cost and operational challenges of custom on-site blending have been prohibitive. But a new generation of convenient, premade blended meat products from companies such as Bush, Tyson, Hormel/Applegate, Perdue, and Smithfield is entering the market to meet foodservice demands. Former Perdue CMO Eric Christianson **framed** it this way: "By blending plants and vegetables with the Perdue chicken families love, not only are we helping to meet demands for millions of parents but we are appealing to the growing number of flexitarian families who have an increased commitment to getting more plants and vegetables in their families' diets." We also expect the Culinary Institute of America's "**Protein Flip**" concept to gain traction, which encourages chefs and recipe formulators to treat meat as a garnish rather than a center-of-plate protein.

Plant-based ingredient upgrades will become increasingly common.

Heightened demand for plant-based foods will increase pressure on operators to swap out the animal ingredients in their dishes so as not to lose flexitarian or vegetarian consumer segments. We already see noteworthy plant-based meat, egg, and dairy inclusions in lasagna, soups, pizzas, burritos, and other prepared foods. Operators may decreasingly stock animal butter and plant-based butter together, instead reformulating dishes to stock just one SKU of plant-based butter that appeals to the entire population.

Kosher is a good case study: Less than 2% of Americans are Jewish, and only a minority of Jews keep kosher. However, more than 40% of packaged foods and beverages sold in the United States are kosher. This is because many foods can be made kosher relatively inexpensively, and the asymmetry of appeal is large—almost anyone can eat kosher foods, but kosher eaters cannot eat non-kosher foods. Similarly, if a food product or dish can easily be produced with plant-based inputs, many operators will use the ingredients that appeal to the widest possible audience and avoid excluding any groups. Another prominent example is MorningStar Farms' commitment to **removing all animal products** from their food, eliminating about 300 million egg whites per year. Plant-based ingredients are a way to meet everyone's needs.

Photo credit: ccpixx photography / Shutterstock.com

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Conclusion

The plant-based category has demonstrated staying power through **high-repeat purchase rates** and longevity on menus. Most of the major plant-based menu launches in the past several years have sustained their success or even resulted in the addition of more plant-based menu items. Restaurant brands have also increased investment in advertising plant-based options both in and out of stores, including a **Super Bowl LIII ad** for Carl's Jr.'s Beyond Famous Star.

We expect this to continue and expand. **Numerator reports** that 80% of consumers will replace at least a small portion of their conventional meat consumption with plant-based meat consumption over the next year. Certainly some sales are coming from existing customers switching to new plant-based items, but plant-based foods are attracting new customers, increasing check sizes, and improving visit frequency. Since plant-based still has a relatively low menu penetration, the success of recent launches and the enthusiastic embrace of plant-based foods by younger consumers are encouraging indicators that this category has a lot of growth ahead in foodservice.

The operational appeal of plant-based foods is also improving. More plant-based foods have become one-to-one replacements for animal-based foods, helping restaurant workforces adapt to new plant-based ingredients and items, reducing the need for retraining, and minimizing wait times for customers. Plant-based ingredients also inexpensively boost menu variety—one plant-based item added to a restaurant's inventory can create many new dishes. Like chicken, ground beef, and most other animal proteins, plant-based proteins are extremely versatile. For example, plant-based ground beef can be used in burgers, breakfast sausages, burritos, soups, pizza toppings, tacos, lasagna, meatballs, Bolognese sauce, and dumplings. Many chains have already taken advantage of this versatility by adding a plant-based burger patty as an optional upgrade on all burger builds or making plant-based a protein option on all salads and pasta dishes.

Consumers expect beef, pork, seafood, chicken, eggs, and dairy on most menus, and they **increasingly seek** plant protein versions of all these animal products. **Plant-based meat is poised** to replace seafood as the fourth-most-popular meat within the next few years. This makes a plant-based strategy a business imperative for each foodservice operator—customers want plant-based, and competitors are embracing it.

Section 7: Consumer Insights

Overview

In addition to better products and more effective merchandising strategies, shifting consumer values are contributing to a favorable market for plant-based meat. Consumers increasingly consider factors such as health, sustainability, and social impact in making their food decisions.[52] A recent poll indicates that 66% of consumers are reducing consumption of at least one type of meat.[53] The largest U.S. target market comprises omnivores reducing meat consumption, primarily for health reasons. Nearly one-third of the U.S. population plans to reduce consumption, regardless of whether they identify as flexitarians or meat reducers.[54]

Rather than target the small vegetarian population, plant-based meat companies are using novel marketing strategies to target this much larger audience of meat reducers and even traditional meat eaters. The first significant step toward expanding the consumer base occurred in 2016, when the Beyond Burger became the first plant-based meat to be sold in the refrigerated meat case, where the vast majority of consumers are accustomed to shopping for their center-of-plate protein. Other companies have followed suit, as described in Box 2.

Generational shifts have also played a role in boosting plant-based meat sales. Younger generations are significantly more interested in plant-based meat than older generations, with 48% of people under 40 already eating plant-based meat, compared with 27% of people over 40.[55] Millennials, who are in their prime spending years, are poised to be the most populous generation, while members of Gen Z, who are just gaining purchasing power, consume plant-based meat at the highest rate.[56]

Box 10: Primary Driver Metrics

For most consumers, the primary food purchasing drivers are taste, price, and accessibility. Tracking how plant-based foods perform on these attributes provides a benchmark from which to measure category progress. While attributes such as flavor and familiarity are more qualitative and vary widely across products, certain quantitative measures of plant-based performance are available and reveal how plant-based meat is approaching parity with conventional meat on key price, taste, and accessibility metrics:

Price

NPD SupplyTrack reports that the average wholesale price per pound of plant-based meat in foodservice is $4.76. Conventional ground sirloin floated around **$3.20 per pound wholesale in 2019**. Market leaders like Impossible Foods, despite increasing demand, are **cutting their wholesale prices** as part of their strategy to achieve price parity with conventional meat.

According to SPINS, the average U.S. retail price for packaged plant-based meat was $4.52 in 2019, while the average U.S. retail price for packaged animal-based meat was $4.13.

Taste

According to a Gallup **poll**, 60% of Americans who tried plant-based meat were either "very" or "somewhat" likely to purchase plant-based meat again. This indicates a largely positive sensory experience. Some plant-based meats, like Impossible Foods' beef, have gotten so good that they are **practically indistinguishable** from their conventional counterparts.

Accessibility

Dining Alliance, a group purchasing organization with over 16,000 restaurant members, reports:

- The number of member restaurants serving plant-based meat jumped 26.4% from 2017 to 2019.
- Plant-based meat sales grew 268% from 2018 to 2019.

Total U.S. retail distribution points for plant-based meat increased by 16% in 2019 to almost 25,000. Comparatively, total U.S. retail distribution points for animal-based meat decreased in 2019 by -0.11% to approximately 161,000.

Section 7: Consumer Insights

Demographics and Dietary Patterns

Purchasing and interest in plant-based milk and meat are widespread across demographic groups, socioeconomic status, and consumption patterns. However, certain consumer segments do over-index.

For the refrigerated plant-based milk category, sales data show overrepresentation of a few demographic groups, including millennials, households in which the head of household is 25 to 44 years old, upper-income households, households with children, Hispanic households, and households with three or more people (Figure 17).

For the refrigerated plant-based meat category, sales data show similar overrepresentation of a few demographic groups, including millennials; households in which the head of household is 25 to 44 years old; and upper-income households, particularly those making over $100,000. The data also show overrepresentation of Gen X members for the plant-based milk category. Both categories significantly under-index boomers, other seniors, and households making less than $35,000 (Figure 18).

Figure 17: Plant-Based Refrigerated Milk Consumer Demographics

RFG Plant-Based Milk / Demographics / Total U.S. All Outlets / L52 WE 11-3-19

	Cohorts	Dollar Index	Dollar Share %	Buyer Share %		Cohorts	Dollar Index	Dollar Share %	Buyer Share %
Generation	Generation Z (born 1997 and after)		0.0%	0.0%	HH Size	1 Person HH	73	19.4%	22.1%
	Millennials (born 1981–1996)	124	30.9%	30.3%		2 Person HH	94	30.9%	31.4%
	Generation X (born 1965–1980)	111	32.6%	32.0%		3 Person HH	120	18.3%	17.2%
	Boomers (born 1946–1964)	85	28.4%	29.3%		4 Person HH	123	17.6%	16.5%
	Seniors and Retirees (born 1925–1945)	66	8.0%	8.1%		5+ Person HH	125	13.8%	12.8%
Income	Income <$15K	75	6.0%	6.5%	HH Head Age	HH Age 18–24	80	0.6%	0.8%
	Income $15–24.9K	80	8.4%	8.2%		HH Age 25–34	123	22.4%	22.3%
	Income $25–34.9K	87	9.8%	10.2%		HH Age 35–44	125	21.0%	19.8%
	Income $35–49.9K	91	11.9%	12.5%		HH Age 45–54	105	20.0%	20.1%
	Income $50–69.9K	106	15.2%	14.9%		HH Age 55–64	88	17.2%	18.1%
	Income $70–99.9K	112	18.2%	17.6%		HH Age 65+	73	18.8%	18.9%
	Income >$100K	115	30.6%	30.0%					
Children	Child – None	88	60.4%	63.2%	Hispanic Ethnicity	Total Hispanic	125	15.9%	15.2%
	Child – 1+	125	39.6%	36.8%		Non-Hispanic/Unknown	96	84.1%	84.8%

Source: FMI / IRI "Understanding the Plant-Based Food Consumer" (January 2020); IRI panel, total U.S. all outlets, 52 weeks ending 11-03-19, NBD aligned

Figure 18: Plant-Based Meat Consumer Demographics
Plant-Based Meat / Demographics / Total U.S. All Outlets / L52 WE 11-3-19

	Cohorts	Dollar Index	Dollar Share %	Buyer Share %		Cohorts	Dollar Index	Dollar Share %	Buyer Share %
Generation	Generation Z (born 1997 and after)		0.0%	0.0%	HH Size	1 Person HH	78	20.7%	24.4%
	Millennials (born 1981–1996)	118	29.5%	28.2%		2 Person HH	110	35.9%	33.8%
	Generation X (born 1965–1980)	124	36.3%	33.6%		3 Person HH	116	17.7%	16.5%
	Boomers (born 1946–1964)	82	27.6%	29.7%		4 Person HH	115	16.4%	14.9%
	Seniors and Retirees (born 1925–1945)	53	6.5%	8.2%		5+ Person HH	85	9.4%	10.4%
Income	Income <$15K	82	6.5%	6.1%	HH Head Age	HH Age 18–24		0.0%	0.0%
	Income $15–24.9K	63	6.6%	7.5%		HH Age 25–34	121	22.0%	20.8%
	Income $25–34.9K	78	8.8%	8.8%		HH Age 35–44	128	21.7%	19.2%
	Income $35–49.9K	95	12.5%	12.0%		HH Age 45–54	118	22.4%	21.7%
	Income $50–69.9K	104	14.9%	14.4%		HH Age 55–64	87	16.9%	17.9%
	Income $70–99.9K	100	16.3%	17.3%		HH Age 65+	65	16.6%	19.7%
	Income >$100K	129	34.4%	33.8%					
Children	Child – None	98	66.8%	68.4%	Hispanic Ethnicity	Total Hispanic	98	12.5%	14.3%
	Child – 1+	104	33.2%	31.6%		Non-Hispanic/Unknown	100	87.5%	85.7%

Source: FMI / IRI "Understanding the Plant-Based Food Consumer" (January 2020); IRI panel, total U.S. all outlets, 52 weeks ending 11-03-19, NBD aligned

Additional sales data demonstrate that animal-meat consumers make up the majority of plant-based meat purchasers, not vegans or vegetarians. This isn't because they buy more plant-based meat per capita than vegetarians but because animal-meat consumers compose a much larger population.

For example, Beyond Meat reports that 93% of consumers who purchase their products in conventional grocery stores also purchase animal-based meat.[57] Similarly, Impossible Foods reports that 95% of consumers who regularly order the company's products also regularly consume animal products.[58] This dynamic has also been examined by Nielsen, which reports that 98% of plant-based meat buyers purchase conventional meat as well.[59] Among U.S. consumers who already purchase plant-based meat, nearly half increased their consumption of plant-based meat over the past year.[60]

Section 7: Consumer Insights

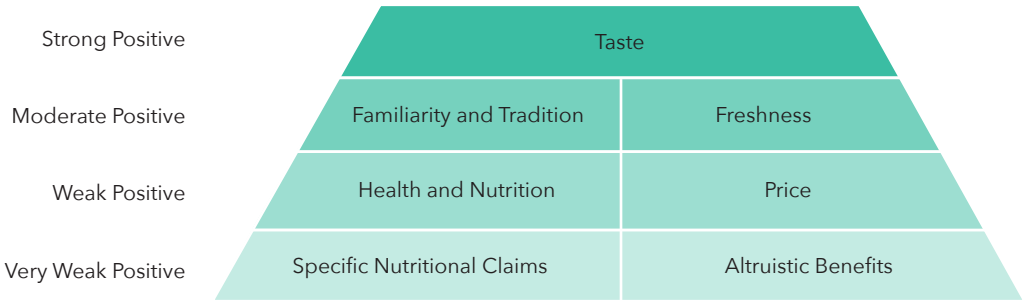
Meat reducers continue to drive growth in the plant-based meat category. Among sociodemographic and dietary variables, a person's self-reported status as a meat reducer is the strongest predictor of plant-based meat purchase intent.[61]

Overall, the data indicate that although plant-based meat accounts for a small percentage of total meat sales, plant-based foods have a rather broad appeal.

Purchase Motivations and Attitudes

A recent study of implicit consumer perceptions of the plant-based category found that taste was the attribute most likely to drive purchase intent for all age groups and diet types (Figure 19).[62] Familiarity and freshness made up the second tier of motivators. Health and price positively correlated with purchase intent but were not as strong as taste, familiarity, and freshness. Altruistic benefits, such as animal welfare and environmental impact, were low in the importance hierarchy and are unlikely to strongly influence point of purchase decisions, even though they rank higher among younger generations. Among category descriptors, language including the word "plant" was most successful for plant-based products, especially "plant" paired with "protein"—"plant-protein," "plant-based protein."

Figure 19: Hierarchy of Consumer Motivations for Plant-Based Purchasing



Note: For more information and marketing guidance based on a Mindlab study of implicit consumer perceptions of plant-based foods, see Parry and Szejda's strategic recommendations report.[63]

Looking Ahead

Although the plant-based food market seems socially ubiquitous, within the **Diffusion of Innovations Theory framework**, plant-based meat is in the early adoption stage on the basis of household penetration (14%). Plant-based milk is in the early majority stage, with 41% household penetration. Sales data show that plant-based meat currently captures 1% of the total meat market share and grew 37% in dollar sales over 2018 and 2019. In a representative sample of 987 U.S. consumers, 33% reported a high likelihood of regularly purchasing plant-based meat in the future, with 19% reporting a high willingness to pay more for plant-based meat than for conventional meat. These sales and survey data strongly suggest that most industry growth is yet to come.

Companies will need multifaceted strategies to accelerate consumer adoption of plant-based meat. The first step is to understand underlying consumer motivations, including those that are foundational (taste, convenience, and price) and those that are evolving in importance (health and sustainability), as well as the differing strength of these factors by consumer segment and **cultural background**.[64] Once target consumer segments are determined, a cohesive approach will include three influence strategies: (1) developing a product to meet these segments' unique needs and wants, (2) structuring consumer purchasing environments to nudge toward specific, desired selection in retail and foodservice environments, and (3) designing and disseminating messages to influence consumer behavior through product packaging and marketing efforts. Increasing familiarity will be important across all three strategies. GFI's **plant-based meat consumer adoption report** provides key recommendations for implementing each of these strategies.[65]

Section 8: Regulation

Overview

To some degree, the success of the plant-based food industry will depend on the regulatory landscape that manufacturers and consumers must navigate. For example, if laws prevent Beyond Meat or Dr. Praeger's from marketing their products as "meat" or "burgers" (even with clear plant-based labels), implications arise for marketing and distribution that could impact consumers' ability to find the products they desire. Therefore, plant-based foods must have clear, fair regulatory requirements.

State Label Censorship

2019 saw an uptick in proposed state legislation that would restrict plant-based meat producers' use of certain descriptors on their products. Similar past legislation, which has been found **unconstitutional**, attempted to restrict use of the term "milk" by plant-based milk producers.

After Missouri's 2018 enactment of a law prohibiting the use of meat terminology on plant-based meat labels, in 2019 many state legislators—aiming to protect their local conventional meat industries—introduced bills that would also unconstitutionally censor labels. Most of these bills were defeated, but not all.

Label censorship laws are opposed by a **wide range of groups**, including GFI, the Plant Based Foods Association (PBFA), libertarian and conservative think tanks, and free speech groups. They are also the subject of litigation in **Missouri** and **Arkansas** (GFI is co-counsel in both cases and also a co-plaintiff in Missouri). In an attempt to preempt such laws, PBFA has released **voluntary standards** for clear and consistent labeling of plant-based meat.
Until a resolution is reached, the uncertain legal status of plant-based food labels may be an artificial barrier to the industry's growth.

Section 8: Regulation

Box 11: Arkansas Label Censorship Litigation

"When the government plays word games to prevent businesses from communicating truthfully about their products, consumers are ultimately the ones who suffer."
Brian Hauss, American Civil Liberties Union (ACLU)

After passage of the Arkansas label censorship law, GFI, the ACLU, the Animal Legal Defense Fund, and the Arkansas ACLU filed a **lawsuit** in federal court on behalf of the Tofurky Company challenging the law. The lawsuit argues that the state's law violates the company's **First Amendment** right to clearly and truthfully label their products and other provisions of the U.S. Constitution. As with other plant-based meat products on the market, Tofurky's products are labeled with modifiers such as "plant-based," "meatless," "vegetarian," or "vegan" to clearly indicate that they do not contain animal meat.

The Arkansas law threatens plant-based producers with fines of up to $1,000 for every product marketed or packaged in violation of the law. Proponents claim that the law's purpose is to protect agricultural producers in the state.

In December 2019, the court issued a **preliminary injunction** against the state, holding that a reasonable consumer does not see the word "burger" or "sausage" on a label and disregard all other words.

Source: Tofurky

Photo credit: Tofurky

Section 8: Regulation

FDA Updates

Impossible Foods reached a significant regulatory milestone in July 2019 when the U.S. Food and Drug Administration (FDA) approved the company's use of soy leghemoglobin, which carries heme, as a color additive in their flagship Impossible Burger. This agency decision opened up retail groceries as a market channel for the company.

Before this approval, when only restaurants had offered the Impossible Burger, the FDA had stated that they had no questions about heme's status as "generally recognized as safe" for the purpose of optimizing flavor. Nonetheless, the agency determined that supermarket sales would trigger the requirement that heme be approved as a color additive under the theory that the ingredient contributed to the raw product's color at retail, not just its taste as a cooked product.

The Impossible Burger hit grocery shelves in September 2019 and is projected to accelerate the already rapidly growing plant-based meat sector. Plant-based or microbially produced molecules analogous to those found in animals, such as Impossible's heme, are expected to play an important role in generating another wave of high-quality plant-based foods.

Finally, as part of its multiyear **Nutrition Innovation Strategy**, the FDA held a public meeting and requested recommendations for modernizing existing standards of identity to accelerate innovative and healthier products. The FDA's desire to promote industry innovation is a promising step for plant-based producers, demonstrating the FDA's recognition that the marketplace is changing, with consumers demanding more options that are functionally similar to conventional animal products. As the FDA works through the strategy, the agency will continue to engage with stakeholders.

Section 9: Conclusion

"This [plant-based] segment has surged since we entered the space. We fully expect this is where the majority of the growth will reside in the future."

Michael H. McCain, CEO of Maple Leaf Foods, Canada's largest meat company and parent company to plant-based producers Lightlife and Field Roast[66]

Why Plant-Based Proteins Will Win

As the plant-based market continues to grow, we expect many plant-based foods to match and **eventually surpass** the functionality of animal-based foods. Given biological limitations, animals are about as cheap, delicious, efficient, and healthy as they're going to get, but plant-based proteins are just getting started and have nearly endless room for optimization. The animals people currently eat—cows, chickens, pigs, and so on—weren't selected for being the most delicious or nutritious. They just happened to be easy to domesticate. Plant-based protein innovation will enable foods that transcend the existing animal protein paradigms. The operational and functional benefits will probably take a variety of forms.

Customizability and Market Efficiency

The creative possibilities of plant-based proteins range from the fanciful—a steak with a brand's logo imprinted in the marbled fat or a custom meat blend, such as turkey-duck-chicken, that is unique to a brand—to the practical, such as only the highest-value meats. Inherent to animal-meat production is the "**carcass balancing problem**": Producers must grow an entire cow or pig—organs, hooves, hair, and all—to extract the highly profitable parts, such as meat.[67] Animals simply don't grow or produce in the proportions that meet consumption demands; consumers want a lot of some parts (e.g., sirloin) and not much of others (e.g., bones and eyeballs). Production of plant-based meat allows for targeted production of the most profitable components. Further, plant-based protein producers are not constrained by animal birth rates and the maturation time lag (up to 24 months for some species) as animals grow to slaughter weight. This shorter feedback loop between demand and supply will create faster market responsiveness, decreased prices, and less supply volatility. Supply shortages or gluts will become far less common. As plant-based protein producers attain additional economies of scale, we can expect to see even less price volatility and much lower prices. Additionally, as alternatives to non-meat animal products, such as **Modern Meadow's** cultivated leather or **Geltor's** collagen, displace their conventional counterparts, raising an entire animal will become even more economically dubious.

Section 9: Conclusion

Eventually, plant-based versions of today's premium conventional meats, such as sirloin, could cost the same as lower-grade animal protein products. This—combined with the ability to personalize nutrition and flavors, an increase in the diversity of protein choices, and opening the door for consumers to eat products that they cannot eat in their conventional forms, such as lactose-free plant-based milk or kosher plant-based bacon—will cause a dramatic shift in consumption patterns.

Improved Shelf Life and Food Safety

This level of control also carries exciting implications for shelf life and food safety. Plant-based proteins are produced in sterile environments with complete end-to-end operational control. With significantly less risk for contamination than the traditional farm-to-slaughterhouse process (which threatens exposure to **feces**), plant-based proteins are far less likely to carry foodborne pathogens. They also sidestep the risks of zoonotic disease outbreaks, such as SARS-CoV-2, bovine spongiform encephalopathy (mad cow disease), and avian flu.

Improved Public Health

Less foodborne illness isn't the only health advantage. Plant-based protein is antibiotic-free, in stark contrast to most conventional animal products. Indeed, 70%–80% of antibiotics used in the United States are fed to farm animals, which raises the risk of **antibiotic-resistant bacteria**. Animal-based meat is also typically high in saturated fat, which is known to increase risk of negative health outcomes, such as obesity, heart disease, and cancer. Although plant-based meat may still contain saturated fat, producers will be able to more finely control the fat ratio or someday even swap in healthier unsaturated fats. Plant-based foods are inherently free of dietary cholesterol, contain fiber (a nutrient that is deficient in 97% of American diets), and frequently include beneficial micronutrients. Plant-based meats can be formulated to achieve better nutritional outcomes in a way their conventional counterparts cannot. Impossible Foods' **plant-based pork**, for example, compared with conventional pork, packs 50%–70% more protein as a percentage of calories and contains zero cholesterol, half the total fat, and three times the iron.

Section 9: Conclusion

A Bright Future

As we have seen throughout this report, advances in plant-based meat production have yielded products that are more satisfying for many consumers. This, in turn, has led to increased investment in the space, an uptick in valuable exits, and fast-paced growth across retail and foodservice markets. Recent innovation with a focus on consumer familiarity and taste has accelerated a decades-old industry, reinforcing plant-based meat as a feasible, sustainable, and attractive solution for meeting the world's growing protein demands. These trends have led to one of the most promising developments imaginable for plant-based meat– the embrace of the world's largest meat companies.

At the **Good Food Conference**, the global innovation lead for the world's largest meat producer put it like this: "At JBS, we are the biggest protein company, and we will remain the biggest protein company. So whatever it takes to do that–and if plant-based becomes a meaningful part of the protein segment–we'll be there in a big way." And JBS is there, **joining** Tyson, ADM, and other iconic meat companies in launching major plant-based meat initiatives.

Studying the sales history of plant-based milk, the plant-based category with the highest sales and market share, helps frame the opportunity for plant-based meat and other plant-based categories. As discussed, plant-based milk currently represents 14% of the milk market in retail, compared with the current 1% market share for plant-based meat. If the plant-based meat retail and foodservice categories were to reach a market share comparable to that of retail plant-based milk, plant-based meat's market share would reach more than $37.8 billion of the $270 billion U.S. meat market.[68]

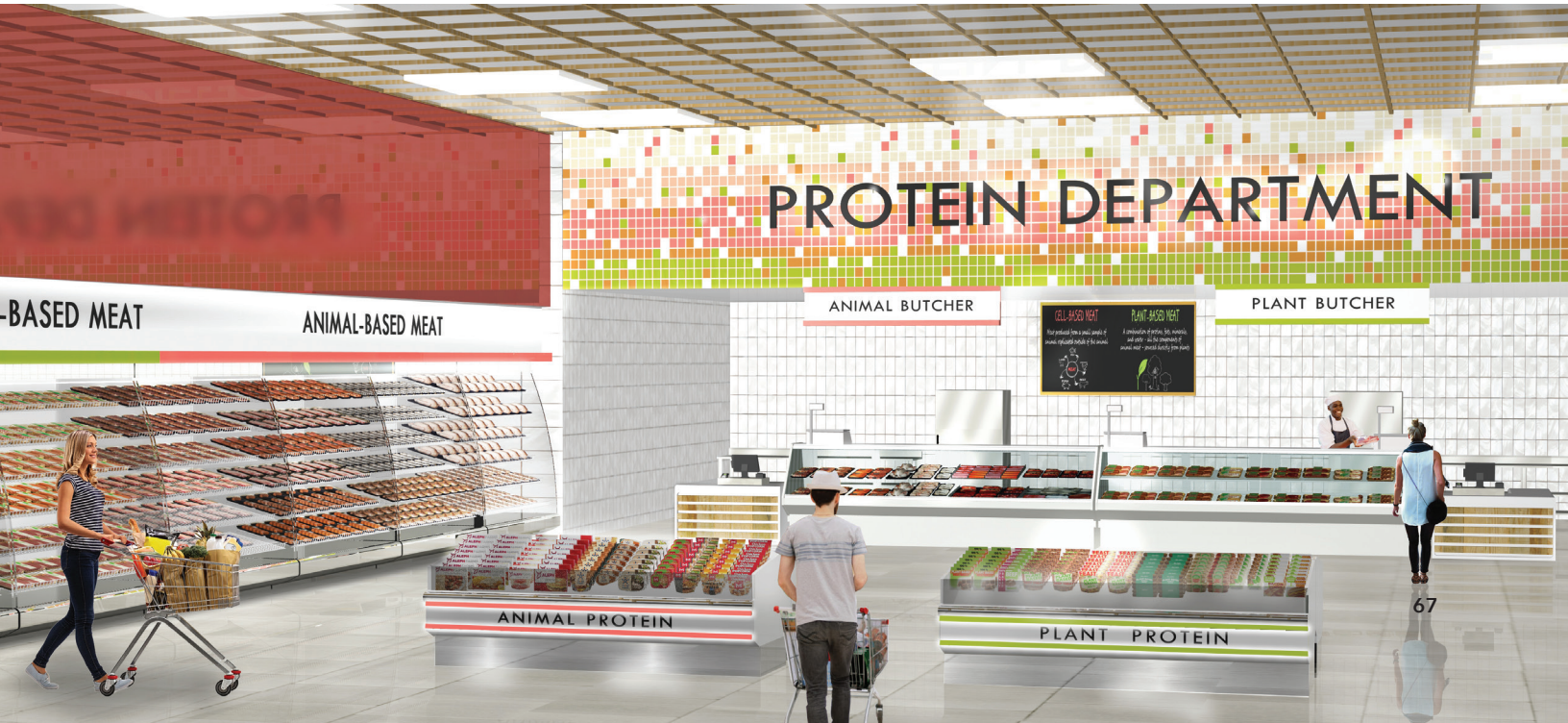
GFI's analysis indicates that plant-based meat is already well on its way, with over $2.62 billion in retail and foodservice sales in 2019. Increased emphasis on merchandising products alongside their animal counterparts, as well as growth that dramatically outpaces that of the conventional category, indicates strong potential for plant-based meat to continue along and beyond this trajectory.[69]

Despite major growth in sales, distribution, and investments, the total number and value of investments in the plant-based food industry so far is relatively small. To put this into perspective, the $457 million in investments in U.S. plant-based food in 2019 are just 17% of the $2.65 billion in venture capital invested in U.S. cannabis companies alone. The plant-based food industry is still very young from an investment standpoint, presenting ample opportunity for investors, entrepreneurs, and strategic partners to get involved at the early stages and capitalize on this global shift in meat production.

Section 9: Conclusion

In the coming years, we expect food companies to continue to invest in creating plant-based products that are increasingly analogous to their animal-based counterparts in terms of both taste and functionality. However, we also project that plant-based companies will increasingly allocate funds to scaling production capacity and expanding distribution reach to lower prices. This projection is consistent with Beyond Meat's highly successful IPO, which raised over $200 million and led to a secondary public offer a few months later.[70] The company's expressed intent was to allocate funds toward "innovation, supply chain capabilities, manufacturing and market initiatives." These investments will lead to cheaper, better products that raise rates of consumption and lead to more investment and even better products in a virtuous cycle.

Even though 2019 was the best year for plant-based food so far, we expect 2020 to be more successful yet. Impossible Foods **announced** in March 2020 a $500 million investment partly to accelerate commercialization of their plant-based pork. We look forward to seeing the plant-based meat industry evolve from a novel food to a mainstream staple just as the plant-based milk industry did before it. Already, the veggie burgers of the past have progressed by leaps and bounds to today's innovative but still relatively limited product offerings. We look forward to seeing plant-based meat continue to take its place next to conventional meat in the meat aisle and reflect the full variety and flavor of animal-based meat products. GFI also looks forward to further supporting this young industry's growth as the vision of a new, more sustainable food system is realized.



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9. Any reference to "top 10" or similar language in this report is not intended to be a qualitative ranking but rather an objective measure based on the available data.

10. GFI's semi-custom SPINS dataset does not capture all private-label sales. Private-label sales across all plant-based categories are probably higher than indicated.

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15. In the context of calculating investment amounts, "venture capital" means all types of risk capital investment traditionally associated with venture capitalism. This includes angel funding, seed funding, crowdfunding, early-stage venture capital, late-stage venture capital, accelerator or incubator funding, private equity growth/expansion, capitalization, corporate venture, and convertible debt as categorized by PitchBook.

16. Beyond Meat's IPO, occuring on May 2, 2019, marked a historic moment for the plant-based meat industry. Founded in 2009, California-based Beyond Meat began their journey with an initial funding round through an accelerator, continued with several rounds of capital raised through Series H, and culminated in their public offering (NASDAQ: BYND). Starting with over 11 million newly issued shares at a price of $25 each, Beyond Meat raised an estimated $252.4 million in capital in this IPO. Rising from $25 to $65.75 per share by the end of its first day, Beyond stock's 163% increase marked the largest first-day increase since 2000 for a company that raised over $200 million. Shortly after, Beyond made a second public offering, issuing 250,000 more shares, this time sold for $160 each, and raising an additional $37.5 million.

17. In early 2020, Impossible Foods announced a $500 million fundraising round led by Mirae Asset Global Investments, bringing their total investments to date to $1.3 billion. This fundraising round is not included in this report's calculations.

18. Eclipse Foods was founded by former GFI team member Aylon Steinhart.

19. In May 2019, plant-based meal delivery company Purple Carrot announced their acquisition for $30 million by Japan's largest food delivery and meal prep company, Oisix ra daichi Inc. In October 2019, Upfield Group B.V., a leading plant-based butter and spread company, announced their planned buyout of Arivia S.A., a plant-based cheese company and the owner of the brand VIOLIFE, for $619 million. Neither deal has closed, so they are not included in these calculations.

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24. IRI panel, total store view, all outlets, 52 weeks ending December 1, 2019

25. The U.S. plant-based food retail market size of nearly $5 billion was calculated using SPINS retail sales data covering the Natural and Specialty Gourmet channels, along with MULO channel data provided through IRI. However, this dataset does not capture sales from certain retailers who do not report their sales information to SPINS or IRI, including Whole Foods, Trader Joe's, Meijer, and Costco. It also does not include sales from e-commerce and convenience stores. While a U.S. plant-based food retail market size of $5 billion is impressive in itself, the actual market for plant-based foods is certainly even higher than we can report, given that segments of the total U.S. retail market are not covered by SPINS or IRI data.

26. SPINS does not report non-UPC meat counter sales. To account for this, the plant-based meat total retail share calculation uses the $95 billion total meat market size reported by Nielsen, as this number includes both retail packaged meat sales and non-UPC meat counter sales. Nielsen. (2019, July). The F word: Flexitarian is not a curse to the meat industry.

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GFI IS A NONPROFIT WORKING TO CREATE A SUSTAINABLE, HEALTHY, AND JUST GLOBAL FOOD SYSTEM. PLANT-BASED, CULTIVATED, AND OTHER ALTERNATIVE PROTEINS OFFER A BETTER WAY TO FEED THE WORLD.

The Challenge:

- Current meat production is unsustainable and inefficient. It is a key driver of climate change, environmental degradation, and antibiotic-resistant bacteria.
- Yet these facts have not sparked significant behavior change: People are eating more meat than ever, in the United States and around the world.

GFI's Solution:

- We can create meat from plants or cultivate it directly from cells more sustainably and efficiently.
- We will make more progress by changing the default choices than by trying to change every single person's mind.

GFI IS ACCELERATING THE TRANSITION OF THE GLOBAL FOOD SYSTEM TO ALTERNATIVE PROTEINS BY MAKING THEM MORE DELICIOUS, AFFORDABLE, AND ACCESSIBLE THAN CONVENTIONAL ANIMAL PRODUCTS.

Our Programmatic Priorities:

SciTech
Bridging gaps in scientific research, funding, and talent across the alternative protein sector.

Corporate Engagement
Helping the food industry and investor communities put delicious, affordable alternative proteins on every menu and in every food retailer.

Policy
Advancing government investment in sustainable proteins as well as fair regulation and legislation.

GFI works around the world with team members based in the United States, Brazil, India, Europe, Asia-Pacific, and Israel. We engage companies across the supply chain—from startups to conventional meat and food conglomerates, major chain restaurants, and retailers—as well as individual scientists, policymakers, investors, and entrepreneurs.

This transformational work is made possible through philanthropic support. Our supporters make reimagining protein possible.

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