- **Regarding if Impossible Foods provides financial support to Food Frontier:**

I have confirmed we have not provided financial or in-kind support to FoodFrontier.

- **Regarding Australian ingredients**

We do not currently have any major ingredients from Australia.

- **Regarding our Australian label:**

I do not yet have a final label I can share, but I have included our Hong Kong label which will be substantially similar to the Australia label. Any country of origin and all other regulations will be followed.

- **Regarding European labeling amendments:**

Here are a few articles on this issue. We were not directly engaged during the debate.

https://www.nytimes.com/2020/10/23/world/europe/eu-plant-based- labeling.html

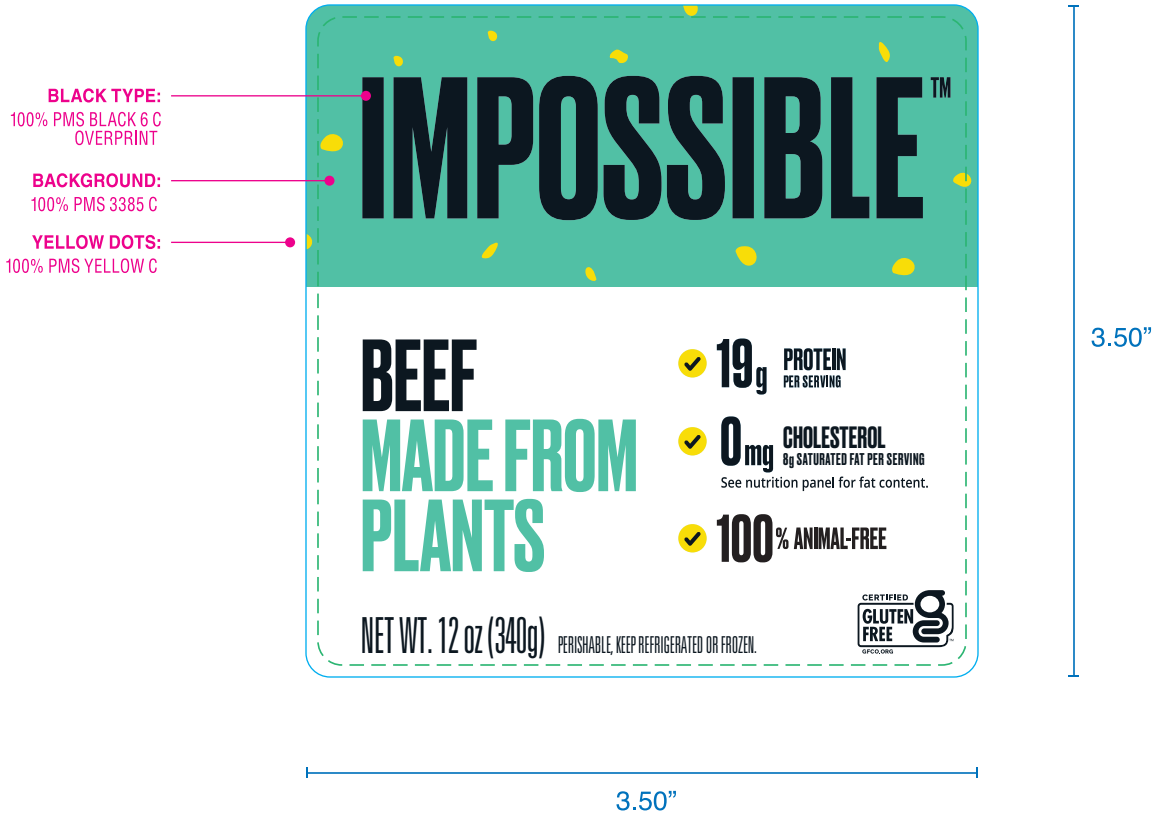
https://www.theguardian.com/environment/2020/oct/16/eu-ban-veggie- burger-label-parliament-vote-meat

- **Regarding projections for percentages of plant-based meat sales of Australian animal meat sales into the future:**

The best source of data our consumer insights team has is from FoodFrontier, attached.

- **Regarding internal animal meat displacement numbers.**

We do not yet have solid numbers to share. According to Chicago-based analytics company Numerator, all shoppers buying Impossible Foods products in grocery stores also buy animal-derived products.



IMPOSSIBLE™

PROJECT NAME: Hong Kong + SG Retail 12oz Brick Label	**DATE:** 11.03.20	**SPECS:** PANTONE® BLACK 6 C; PANTONE® YELLOW C; PANTONE® 3385 C
FILE NAME: 20-00090-R9_Impossible_Retail12ozBrick_HK-SG_Front.ai		
NOTES:		**FONTS:** ALL FONTS OUTLINED BEFORE RELEASE **All fonts subject to licensing restrictions.

2020 STATE OF THE INDUSTRY

Australia's Plant-Based Meat Sector

BONUS CHAPTER
Cellular Agriculture

FOOD FRONTIER

EXECUTIVE SUMMARY

In a year closing a few months into arguably the most consequential economic disruption in recent history – the global pandemic – one emerging industry held strong.

This report tells the story of Australia's plant-based meat sector over FY20. It's a story of a young industry on an upward trajectory, achieving impressive growth in the face of unprecedented adversity.

New economic modelling by Deloitte Access Economics (DAE) on Australia's still emerging plant-based meat sector reveals exciting, albeit complex, insights. Over FY20, consumer interest continued to increase, while plant-based meat companies, retailers and foodservice outlets swiftly reoriented business strategies amidst the pandemic. The industry's manufacturing revenue and jobs doubled, as did the number of products on supermarket shelves. These and other key growth metrics are outlined in **Australian Landscape 2020.**

These findings build on our inaugural economic modelling conducted with DAE in 2019, which is recapped in **Introduction**. This report considers how Australia's plant-based meat sector's growth over just one year, if continued, tracks towards realising DAE's moderate growth scenario, an almost $3 billion food category (read more in **Australian Landscape 2030**).

A GROWING GLOBAL CALL FOR PROTEIN DIVERSIFICATION

Rising interest in alternative proteins – domestically and abroad – comes amidst increasing demand for meat from our growing and increasingly prosperous global population.[1] Relying solely on current meat production systems, two planets' worth of resources would be needed to meet the world's projected demand for meat by 2050.[2]

To solve this challenge, environmental, economic and health authorities worldwide have called for a more diverse, sustainable and safe protein supply (read more in **Introduction**). Alternative proteins, including plant-based meat and cellular agriculture products such as cultivated meat, play a critical role in satisfying consumer demands, with fewer adverse impacts.

In the global market, alternative proteins offer a largely untapped economic opportunity to countries that move swiftly to capture market share. Plant-based meats – the most immediate commercial opportunity – are forecast to command up to 10 percent of the $1.4 trillion global meat market by 2029, up from less than one percent in 2019.[3] Governments to meat giants to savvy investors have taken notice, tipping investment in plant-based meat in 2020 to US$1.54 billion globally. With 42 percent of Aussies saying they are eating less meat, or none at all, according to 2019 Colmar Brunton research[4] – the market is ripe for convenient and familiar alternatives to continue their rapid growth.

A HOME-GROWN AUSSIE SUCCESS STORY

Amidst global and domestic upheavals, FY20 saw the Australian plant-based meat sector increase grocery sales 46 percent over the previous year, as well as double domestic manufacturing revenue and jobs. Products on grocery shelves doubled to more than 200, 42 percent of which are from Australian companies. Industry manufacturing is focused in NSW, with an estimated 68 percent of economic contribution, followed by Victoria with 28 percent.

It should be noted that the timeframe for DAE's data underpinning this report (FY20) does not include major developments in the Australian market across the latter half of 2020, from new products on grocery shelves to large new production facilities to export launches. With 22 companies comprising Australia's plant-based meat industry as of December 2020, up from 11 since our previous report for FY19, the industry continues its strong growth today.

46%

INCREASE IN GROCERY SALES

2X

DOUBLING OF PRODUCTS IN SUPERMARKETS

2X

DOUBLING OF INDUSTRY REVENUE & EMPLOYMENT

EYEING EXPORT OPPORTUNITIES ACROSS GLOBAL MARKETS

Developments across the plant-based meat sector worldwide offer a vision for the Australian sector's evolution. The breadth of international participation – from mission-driven start-ups to global FMCG leaders to agribusiness giants – demonstrates widespread understanding of the market opportunity.

Asia, representing the majority of the global rise in demand for meat[5] and which has long embraced meat alternatives, offers particularly attractive opportunities. In 2020, plant-based meat companies leveraged new partnerships with global restaurant chains including Starbucks, KFC and Taco Bell to debut their products to Chinese consumers. Companies including Zhenmeat, Omnipork and Beyond Meat launched products from plant-based pork to crayfish and more, developed to cater specifically to Asian tastes (read more in **Global Developments**).

Global trends for plant-based product demand are being keenly watched by Australian companies. With key export markets at their own doorstep, the domestic industry is preparing to leverage Australia's reputation for safe, premium food and its network of free-trade agreements and existing agri-food export supply chains.

INVESTMENT TO REALISE AUSTRALIA'S $3 BILLION OPPORTUNITY

Australian farmers, government, investors, businesses and consumers stand to benefit from the almost $3 billion opportunity that plant-based meat offers the nation, including the creation of an estimated 6,000 full-time Australian jobs. As a young and emerging industry – disrupted by the pandemic's wide-ranging impacts – the sector continues to face challenges, including maintaining exponential growth.

In **The Path Forward**, we explore a range of sector-wide interventions that will allow Australia to capitalise on its potential, leveraging its unique intellectual, infrastructure and natural assets to become an international leader in alternative proteins.

From the federal government supporting plant protein R&D to states enabling infrastructure investment and sectoral roadmaps, governments at all levels can realise the value chain developments required to grow new protein industries like plant-based meat.

Regulators play a critical role in ensuring a level playing field for plant-based meat products and protecting the emerging industry from attempts to restrict innovation and limit competition, particularly on key matters such as labelling.

Farmer representative groups can demonstrate positive and proactive policy leadership to maximise the potential that plant-based products offer Australia's primary producers. Investment in plant protein processing capacity is necessary to open up the supply chain to farmers of crops used as ingredients in plant-based meats, ultimately generating greater value at the farmgate.

Price competitiveness of plant-based meat remains a key consumer barrier, as Australians are some of the most price-sensitive grocery shoppers in the world.[6] Supply chain economies of scale will help to address this as the sector grows and retailers' efforts to improve the price, quality and marketing of their plant-based meat ranges can increase sales and category awareness. Despite foodservice's negative growth in FY20 due to COVID-19, it remains an area of significant untapped potential for plant-based products.

Australian plant-based meat companies must also evaluate whether their product quality and performance compete with imported products, which make up just over half of the products on shelves. This includes considering investment in product R&D and research to better understand consumer expectations.

These factors are explored in greater detail in **The Path Forward**.

AUSTRALIA'S TIME IS NOW

Australia has the right mix of agricultural capacity, commercial appetite, research capability and infrastructural know-how to be an international leader in the alternative proteins sector. This report quantifies the strong growth of Australia's plant-based meat industry in FY20, demonstrating an upward trajectory towards its $3 billion potential by 2030 that also aligns with enormous investments worldwide to scale this industry. The time is now right for government, agriculture and food businesses to come together, supercharge the sector's growth and ensure Australia becomes a successful international competitor in the new protein market.

Learn how products in the plant-based meat category are defined and other key terms in the **Glossary of Terms** (see **Appendix**).

Authors:

This report was authored by Food Frontier, the independent think tank and expert advisor on alternative proteins in Australia and New Zealand, with modeling data by Deloitte Access Economics. Learn more in **About Food Frontier**.

FOOD FRONTIER

Deloitte. Access Economics

CONTENTS

INTRODUCTION

THE OPPORTUNITY FOR AUSTRALIA

Plant-based meat is projected to be a $3B opportunity for Australia by 2030: this was the exciting announcement from Food Frontier's 2019 report, *Meat the Alternative*.[1]

ALMOST

$3B

IN DOMESTIC SALES EXPECTED BY 2030

That promising headline summarised findings from the report's world-first analysis and quantification of a plant-based meat sector and its impact on a national economy – Australia's – as conducted by economic consultancy Deloitte Access Economics (DAE).

With some predicting plant-based meats will command up to 10 percent of the $1.4 trillion global meat market by 2029 (from less than one percent currently),[2] this emerging sector offers vast potential. As its growth continues to accelerate globally, Australia is uniquely positioned to reap the economic benefits by becoming an industry leader. For those stakeholders in Australia who stand to benefit – farmers, government, investors, manufacturers and more – modelling the sector's potential was a necessary first step in equipping them with the data to pursue this ambition.

The DAE FY19 modelling reflected three scenarios for the growth of Australia's plant-based meat sector by 2030. Under the moderate scenario, the analysis confirmed this opportunity is sizeable – by 2030, a $1.1 billion manufacturing sector driven by almost $3 billion in consumer spend, employing over 6,000 Australians, and benefiting every state in the nation.[3]

These predictions solidified the sector's potential, and the report underscored significant and compelling calls to action for both businesses and policymakers. The findings have since been widely recognised and referenced by government and the agri-food sector as they explore opportunities in alternative proteins, including plant-based meat. Agricultural organisations AgriFutures Australia and the Australian Farm Institute mirrored the 2030 predictions and referenced the figures in their 2020 report on future protein production,[4] as has the Australian Institute of Food Science and Technology in a research report produced by RDS Partners exploring the growth potential of Australia's food manufacturing sector. Food Innovation Australia Limited also referenced the figures in their report with KPMG, which will guide creation of industry-designed-and-led roadmaps for 19 growth opportunities to double the size of Australia's food and agribusiness sector by 2030.

In the fiscal year following DAE's inaugural modelling, Australia's plant-based meat industry grew exponentially, keeping pace with growing consumer demand - explained in **Australian Landscape 2020**.

This report provides a comprehensive illustration of this impressive growth and the primary trends and developments underpinning it, with new data produced by DAE. The unprecedented market forces in FY20 spurred by the COVID-19 pandemic – from shocks to the global food supply chain to swift changes in consumer buying habits – impacted rising demand,[5] while also creating new avenues for plant-based meats. **Global Developments** outlines the international plant-based meat sector's evolution between FY19 and the end of 2020, including how these developments were impacted by the pandemic. Our analysis in **The Path Forward** details barriers to future growth and proposes solutions for a variety of stakeholders to act early and capitalise on the sector's anticipated growth trajectory to 2030.

Food Frontier will continue to support industry and policymakers through resources, events and partnerships, including measuring the sector's economic and social contributions to Australia in the years to come.

Read on to understand the case for protein diversification in the face of ever-increasing global challenges, and why plant-based meat is a critical part of the solution.

THE CASE FOR PROTEIN DIVERSIFICATION GLOBALLY

As the world continues its march towards 10 billion people by 2050, demand for meat is projected to rise by 73 percent,[6] driven by population growth and rising disposable incomes in developing countries, particularly within the Asia Pacific.[7]

The enormity of meeting this challenge, and the risks it poses to the sustainability and health of our global society, are coming into sharper focus. With current systems of industrial protein production already contributing to some of the greatest health, resource inefficiency and sustainability challenges facing our world,[8,9] there are clear and growing calls to diversify protein supply with safer and more sustainable options.

As global authorities on economic development, environmental sustainability and public health continue to urge Western countries to reduce their meat consumption and heavy reliance on systems of industrial animal agriculture,[10,11] big businesses, shareholders, media and the general public are taking notice.

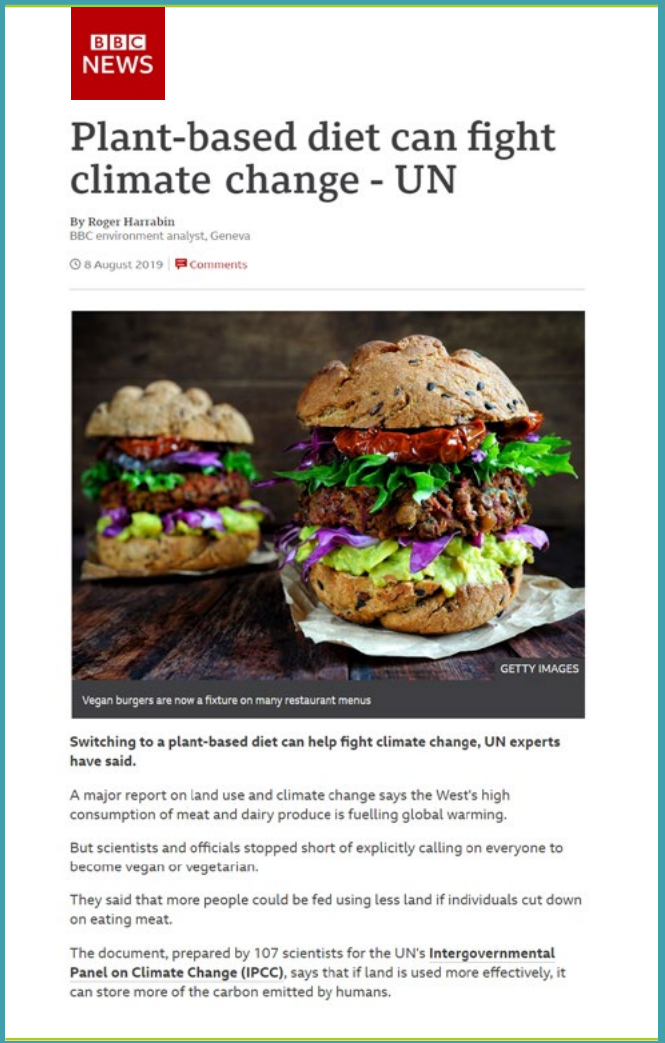
An increasing number of reports from the UN Food and Agriculture Organization, Intergovernmental Panel on Climate Change (IPCC), the University of Oxford's Environmental Change Institute and other world-leading authorities stress that substantially increasing production and consumption of plant proteins globally is essential.

Among this research is the well-publicised EAT-Lancet Commission, in which 37 world-leading scientists spent three years analysing the best available data to form a global 'planetary health' diet, taking into consideration environmental sustainability, human health and food security. The findings recommend a 50 percent global reduction in meat by 2050 and more than doubling of protein consumption from pulses and grains.[12]

The report underscored that Western countries such as Australia, where people eat nearly three-times the global average of meat, hold the greatest responsibility for reducing meat consumption to protect personal and planetary health.[13]

Growing awareness about the economic and societal benefits of alternative protein sources and their fundamental role in feeding the future has seen record investment in plant-based meats – the category of alternative proteins that promises the greatest immediate potential and commercial opportunity. Awareness of these foods' benefits among meat-reducing consumers – and their appeal as convenient alternatives in familiar formats – is driving increased sales, and in turn fuelling further investment and industry expansion.

To learn more about the expansive body of health, environmental and food security data driving growth in the development, supply and consumption of alternatives to conventional meat, read the sections on ***Human Health*** and ***Environmental Sustainability*** in the **Appendix**.



BBC NEWS

Plant-based diet can fight climate change - UN

By Roger Harrabin
BBC environment analyst, Geneva

8 August 2019 | Comments

Vegan burgers are now a fixture on many restaurant menus

Switching to a plant-based diet can help fight climate change, UN experts have said.

A major report on land use and climate change says the West's high consumption of meat and dairy produce is fuelling global warming.

But scientists and officials stopped short of explicitly calling on everyone to become vegan or vegetarian.

They said that more people could be fed using less land if individuals cut down on eating meat.

The document, prepared by 107 scientists for the UN's **Intergovernmental Panel on Climate Change (IPCC)**, says that if land is used more effectively, it can store more of the carbon emitted by humans.

BBC News article on IPCC report, August 2019

II. GLOBAL DEVELOPMENTS

GLOBAL DEVELOPMENTS

SECTOR EXPANSION DRIVEN BY DIVERSE FOOD INDUSTRY PLAYERS

The ever-evolving global plant-based meat sector has grown to include many of the world's largest meat and agribusiness, FMCG and grocery corporations, spurring continuous developments from all corners – especially during FY20. These companies have seized the market opportunity at hand by acquiring smaller plant-based meat start-ups or launching their own plant-based meat brands.

Beyond Meat, which helped establish the new generation of plant-based meat products back in 2012, and rival Impossible Foods, have dominated developments in the sector as its two highest profile brands. Both companies remain in the spotlight as they've continued to execute global expansion plans.

Impossible launched an e-commerce website to sell direct to consumers in the U.S. in June 2020[1]

In FY20 alone, plant-based meat brands were launched by:

MEAT GIANTS

- JBS → (Ozo)[2]
- Smithfield Foods → (Pure Farmland)[3]
- NipponHam Foods Ltd. → (NatuMeat)[4]

FAST MOVING CONSUMER GOODS (FMCG) COMPANIES

- Cargill → (private label and PlantEver)[5,6]
- Hormel Foods → (Happy Little Plants)[7]
- Kellogg's → (Incogmeato)[8]
- Nestlé → (Harvest Gourmet & Sweet Earth)[9,10]

GROCERY RETAILERS

- Kroger (U.S.) → (Simple Truth)[11]
- Sainsbury (UK) → (Plant Pioneers)[12]
- Woolworths (AU) → (Plantitude)[13]
- Coles (AU) → (Nature's Kitchen)[14]

NEW COMMITMENTS MADE IN 2020

Unilever

US$ **1.2B**

IN ANNUAL PLANT-BASED MEAT AND DAIRY PRODUCTS SALES OVER THE NEXT FIVE TO SEVEN YEARS[15]

GOAL

TESCO

300%

INCREASE IN ITS PLANT-BASED MEAT SALES BY 2025[16]

The UK's largest grocer first launched its plant-based range Wicked Kitchen in 2018.

GOAL

DRIVING CONSUMER TRIAL THROUGH NEW CHANNELS

While FY20 saw sectoral growth led by the United States and Europe, significant developments arose across other markets, particularly in the Asia Pacific (APAC). Amongst these developments are a multitude of partnerships that brought plant-based meat to the menus of fast casual and quick service restaurants, home meal-kits and convenience retailers. Plant-based meat companies are leveraging these channels for new customer acquisition through trial, while also responding to growing demand for meat alternatives in on-the-go occasions. Demand for plant-based meat has been predicted to continue rising in China and Thailand in particular, where it is forecast to increase by 200 percent over the next five years to 2025, driven by consumer values related to health, taste and sustainability.[17] Similar trends are expected across the entire APAC region, with an expected 25 percent increase in the market size for plant-based meat alternatives – to US$1.7 billion – over the next five years to 2025.[18]

In China, global coffeehouse Starbucks joined this trend, bringing menu items featuring Beyond Meat and Omnipork to its stores across the mainland.[19]

KFC, Taco Bell and Pizza Hut – all owned by Yum China – ran trials adding Beyond Meat offerings to their menus to garner feedback from Chinese consumers,[20] while KFC China and KFC Hong Kong launched plant-based nuggets made by U.S. conglomerate Cargill[21] and Alpha Foods,[22] respectively. Starfield Food and Science Technology, a Chinese plant-based meat company, debuted its product on the menus of Papa John's and five other major restaurant chains in China.[23] In September 2020, Beyond Meat signed an agreement with Jiaxing Economic & Technological Development Zone to build a manufacturing facility in China.[24]

This trend was mirrored in the U.S., as Beyond Meat products were added to the menus of Dunkin' Donuts[25] and tested at Subway.[26] Gardein products hit menus at New Zealand chains BurgerFuel and Hell Pizza,[27] while Burger King launched The Vegetarian Butcher's plant-based nuggets in Germany[28] and its burger patties as the Rebel Whopper across Europe.[29] In Australia, local company v2food debuted its plant-based burgers in Hungry Jack's (known globally as Burger King) Rebel Whopper,[30] while many other fast casual restaurants also added plant-based meat options to their menus (read more in **Australian Landscape 2020**).

KFC Hong Kong launched plant-based nuggets made by Alpha Foods and a Gardein plant-based burger in July 2020

Translation: "*Beyond Meat joins hands with Starbucks China to launch Beyond Beef in China*"
Starbucks China launched menu items featuring Beyond Beef across its mainland stores in April 2020

PRODUCT INNOVATION

Globally, evolution in the plant-based meat sector was marked by new product launches and investment in technology to advance plant protein production, both prior to and throughout the pandemic. Impossible launched its plant-based pork and breakfast sausage at Consumer Electronics Show 2020, captivating news coverage of the U.S.-based technology trade show.[31] Also in the U.S., Gardein, known previously for their legacy[32] meat alternatives, launched a new generation[33] plant-based meat, the Ultimate Vegan Burger.[34]

In China, homegrown companies catered to local tastes with Zhenmeat's launch of plant-based pork and crayfish[35] and Omnipork's launch of a plant-based luncheon meat (similar to SPAM®) and pork shoulder-style strips,[36] while Beyond Meat launched Beyond Pork meatless mince, a product developed to cater to Chinese consumers.[37] Omnipork, citing continued inflated pork prices due to African Swine Fever, saw the opportunity to expand its plant-based pork products beyond restaurant channels. The company brought its products to the shelves of 210 grocery stores across China,[38] as well as online retailer Tmall[39] and, ahead of the pandemic's halts to air travel, to Cathay Pacific flight menus.[40] In Brazil, JBS focused on the technology underpinning plant-based meat with the launch of its Incredible Lab, which will unite consumer, science, technology, and gastronomy experts to develop plant-based protein on a global scale.[41]

IMPACTS OF COVID-19

The 18 months following the launch of Food Frontier's previous State of the Industry report in 2019 included arguably the most dynamic market force in modern times – the COVID-19 pandemic. The plant-based meat sector, as with other food sectors, endured the pandemic's rapid and sweeping impacts on businesses and consumer buying habits worldwide.

> The COVID-19 pandemic created global supply chain shocks as countries moved to swiftly close borders, impacting movement of people, and to a lesser extent, goods. New demand patterns arose as restaurants were forced to close or operate at lesser capacities due to public health measures – drastically reducing demand in foodservice – while people prepared more meals at home while in lockdowns, drastically increasing demand in grocery retail.[42]

The initial consumer response of 'panic buying' saw grocery shoppers rush to purchase large quantities of shelf-stable foods including long-life milks, beans, pasta and rice,[43] reflecting a fear that food supply may become insecure. The supply chain for conventional meat was initially impacted in some markets, as the virus spread amongst workers in meat processing facilities including in Australia,[44] the U.S. and Brazil.[45] In the U.S., meat shortages resulted in an initial increase in U.S. meat prices,[46] which have since subsided. During this time, demand for plant-based meat increased in the U.S., with sales in grocery channels jumping 200 percent in the week ending April 18, compared with the same period the year prior.[47] In Australia, sales of red meat were reported to have increased by 30 percent during the nationwide lockdown.[48] Read about how Australian plant-based meat companies swiftly shifted distribution tactics in response to the stay-at-home impacts of the pandemic in **Australian Landscape 2020**.

Empty shelves at a U.S. supermarket in April 2020. Credit: PhotoEuphoria / Getty Images

COMPANIES AROUND THE WORLD RESPOND

In Asia, consumer concern over COVID-19's origins in a wet market that sold animal meat is speculated to have contributed to an increase in plant-based meat consumption. The CEO of Beyond Meat's distributor in Asia said demand for plant-based meat alternatives doubled in March and April 2020 following the start of the pandemic,[49] while other leaders of Asian plant-based meat companies also pointed to increased demand during this time.[50] While there isn't publicly available market data to demonstrate these sales increases, the combined impact of speculative consumer concerns around the safety of conventional meats, and the reality of meat processors having to temporarily close after becoming hotspots for spreading COVID-19, highlights the risks of relying so heavily on conventional methods of protein production.

In the UK, Meatless Farm and THIS both attributed the pandemic-induced shift to eating at home to a rise in their product sales, with THIS doubling its supermarket revenue during lockdowns from February to March 2020.[51] Meatless Farm leveraged newfound interest in their products to launch a provocative campaign, "Now that's a M*** F*** Burger!", targeting "former meat-eaters" who made the swap to plant-based meat during lockdowns.[52]

In the U.S., pandemic-induced shutdowns of conventional meat processing facilities led to short-term meat shortages, affecting eaters both at home and in restaurants. Sales in the plant-based meat category increased by 86 percent during this time (early March – mid-May; year-over-year), while conventional meat grew 45 percent.[53] Beyond Meat capitalised on this growing interest in plant-based meat with the launch of its "Cookout Classic" value packs, which priced its plant-based burgers at near parity with conventional meat.[54]

Beyond Meat launched a "Cookout Classic" value-pack in June 2020 to reach U.S. consumers cooking at home more during the pandemic

Advertisement for Meatless Farm's "Now that's a M*** F*** Burger!" campaign, launched to target "former meat-eaters" during the pandemic

INVESTMENT

The global protein market – comprising conventional animal proteins and alternative proteins – is valued at around US$1.5 trillion today.[55] The enormous expansion of this market required to feed a larger and increasingly affluent global population into coming decades presents vast commercial opportunities. Governments, global meat giants, venture capitalists and other powerful stakeholders have begun investing in high-growth and resource-efficient new protein industries that will be essential to meeting this challenge.

In 2020, US$1.54 billion was invested globally in plant-based meat ventures alone.[56] Success stories like Beyond Meat, whose stock price more than doubled since its public offering in May 2019 to February 2020, and Impossible Foods' raise of US$700 million across 2020,[57] signal strong investment appetite in plant-based meat ventures.[58]

$1.54B

INVESTED IN PLANT-BASED MEAT VENTURES GLOBALLY IN 2020

A late 2019 report reviewing 132 of the world's largest companies across the broader protein market found that 79 percent of food and ingredients manufacturers are advancing plant proteins through acquisitions, investments or new product launches, as are 34 percent of conventional meat and dairy companies.[59]

Several companies have invested through joint ventures or capital expenditures focused on building the supply chain for the protein isolates and concentrates used in plant-based meats, among other products:

Archer Daniels Midland (ADM), an American food processing company, and beef processor Marfrig Global Foods, established a joint venture called PlantPlus Foods following their collaboration to launch a plant-based meat product in Brazil. The venture will see Marfrig responsible for production and distribution of their jointly produced plant-based products, while ADM will supply technical expertise, product development and plant-based ingredients and flavours.[60]

Burcon NutraScience, a research and development company, established a joint venture with an unnamed investor group to create Merit Functional Foods, which will build a CA$65 million pea and canola production facility in Western Canada.[61] Production of the plant proteins used in meat alternatives and other foods is in progress following investments from the Canadian government (CA$100 million; further details on pg. 9) and ingredients supplier Bunge (CA$30 million).[62]

Maple Leaf Foods is building a US$310 million plant protein production plant in Indiana, the largest facility and investment of its kind in North America, to be completed in 2022.[63]

Cargill invested US$75 million in PURIS, a leading proprietary pulse company, to double pulse production.[64]

French ingredient company Roquette commenced production of plant proteins at its newly built CA$600 million (US$474 million) facility, currently the world's largest pea processing plant, in November 2020.[65]

MAJOR ACQUISITIONS

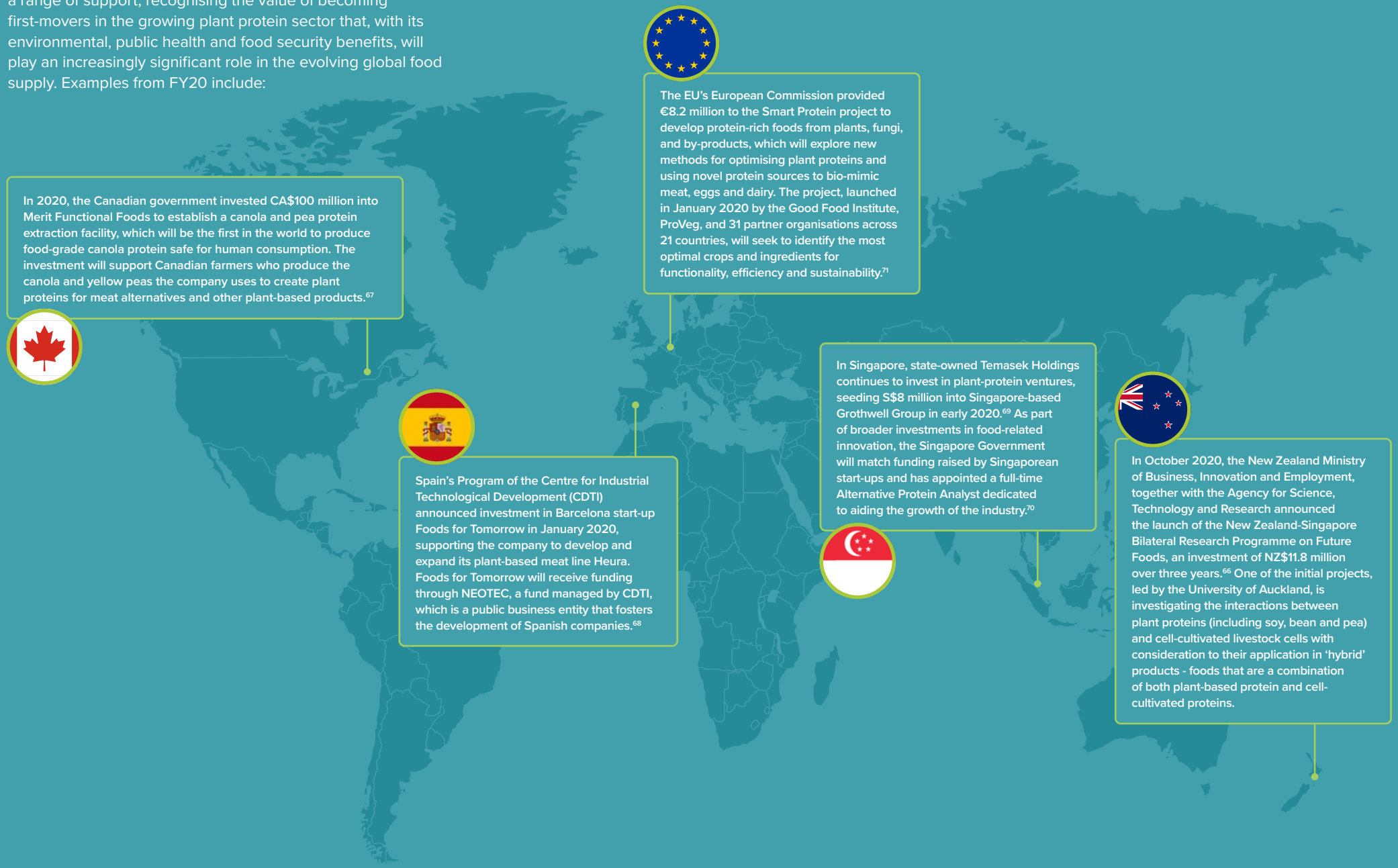
Food Frontier's 2019 report noted major acquisitions of plant-based meat brands since 2014 by FMCG companies such as Nestlé, Unilever, Monde Nissin and more. In FY20, several more acquisitions closed:

(Baicowei)	$705M DEAL Portion of deal	PEPSICO
daring.	MULTI-MILLION-DOLLAR DEAL Undisclosed	U.S. food products and services company
GREEN BUTCHER	$367M Portion of deal	pilgrim's Subsidiary of JBS
VEGAFIT	UNDISCLOSED	Dutch fish processor
FAIRDIG	UNDISCLOSED	HANEGAL Danish food company

All figures are USD

GOVERNMENT INVESTMENTS

Forward-thinking governments have continued to provide a range of support, recognising the value of becoming first-movers in the growing plant protein sector that, with its environmental, public health and food security benefits, will play an increasingly significant role in the evolving global food supply. Examples from FY20 include:



In 2020, the Canadian government invested CA$100 million into Merit Functional Foods to establish a canola and pea protein extraction facility, which will be the first in the world to produce food-grade canola protein safe for human consumption. The investment will support Canadian farmers who produce the canola and yellow peas the company uses to create plant proteins for meat alternatives and other plant-based products.[67]

The EU's European Commission provided €8.2 million to the Smart Protein project to develop protein-rich foods from plants, fungi, and by-products, which will explore new methods for optimising plant proteins and using novel protein sources to bio-mimic meat, eggs and dairy. The project, launched in January 2020 by the Good Food Institute, ProVeg, and 31 partner organisations across 21 countries, will seek to identify the most optimal crops and ingredients for functionality, efficiency and sustainability.[71]

Spain's Program of the Centre for Industrial Technological Development (CDTI) announced investment in Barcelona start-up Foods for Tomorrow in January 2020, supporting the company to develop and expand its plant-based meat line Heura. Foods for Tomorrow will receive funding through NEOTEC, a fund managed by CDTI, which is a public business entity that fosters the development of Spanish companies.[68]

In Singapore, state-owned Temasek Holdings continues to invest in plant-protein ventures, seeding S$8 million into Singapore-based Grothwell Group in early 2020.[69] As part of broader investments in food-related innovation, the Singapore Government will match funding raised by Singaporean start-ups and has appointed a full-time Alternative Protein Analyst dedicated to aiding the growth of the industry.[70]

In October 2020, the New Zealand Ministry of Business, Innovation and Employment, together with the Agency for Science, Technology and Research announced the launch of the New Zealand-Singapore Bilateral Research Programme on Future Foods, an investment of NZ$11.8 million over three years.[66] One of the initial projects, led by the University of Auckland, is investigating the interactions between plant proteins (including soy, bean and pea) and cell-cultivated livestock cells with consideration to their application in 'hybrid' products - foods that are a combination of both plant-based protein and cell-cultivated proteins.

III. AUSTRALIAN LANDSCAPE 2020

AUSTRALIAN LANDSCAPE 2020

COMMERCIAL MARKET

The enormous growth of Australia's plant-based meat sector in FY20, represented by a 46 percent increase in grocery retail sales, is a story of adaptation in the face of adversity. This rapid expansion occurred amidst an unprecedented confluence of global and domestic economic and societal upheavals resulting in complex and still unfolding outcomes.

In headline terms, the industry saw expansion in orders of magnitude, with a doubling in both manufacturing revenue and employees. The number of Australian brands in major retail and national foodservice also nearly doubled from 10 in 2018-19 to 19 in 2019-20.

DOUBLING
OF INDUSTRY REVENUE AND EMPLOYEES
FROM FY19 TO FY20

The number of products available on grocery shelves more than doubled over FY20, however retail sales, while significant, did not. This is not uncommon for new, emerging food categories, though it may also indicate consumer barriers yet to be overcome, such as price, familiarity and perception of taste.[1] This illustrates that there is still room for improvement and innovation among manufacturers. It is also reflective of the challenges retailers face in ranging and forecasting a new food category and understanding the optimum product and pricing strategy for their customers.

Rapid growth was reflected in the sector's rising value, notwithstanding substantial headwinds including Australia's first recession in three decades and systemic industry disruptions due to the pandemic. DAE analysis shows the total sales in this sector rose 32 percent to $185 million in 2019-20 from $140 million in 2018-19. Of this, the majority ($154 million or 83 percent) occurred through retail grocery outlets, an increase of 46 percent from 2018-19, with the remaining $31 million (17 percent) representing foodservice sales, which fell an estimated 10 percent, predominantly due to the pandemic.

Notably, a number of leading manufacturers of conventional meat products, including traditional butchery companies, have diversified into plant-based meat products following the identification of significant consumer demand. This demand was illustrated in 2019 research by Colmar Brunton, as featured in Food Frontier's report *Hungry For Plant-Based*.[2]

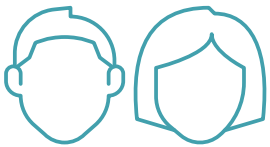
In FY20, Australia's plant-based meat sector generated:

$31M
Foodservice

$154M
Retail

$50.4M
IN MANUFACTURING VALUE-ADD

547
FULL-TIME EQUIVALENT JOBS



Economic contribution

DAE identified a 116 percent increase in direct industry economic contribution to $10.8 million from $5 million in 2018-19, and a 59 percent increase in indirect contribution to $39.6 million from $24.9 million the previous year, for a net 69 percent total economic contribution increase to $50.4 million (see **Figure 1** below).

`	2018-19	2019-20	Growth
Value added ($m) Direct contribution	5.0	10.8	116%
Value added ($m) Indirect contribution	24.9	39.6	59%
Value added ($m) Total contribution	29.9	50.4	69%
Employment (FTE) Direct contribution	104	246	137%
Employment (FTE) Indirect contribution	161	301	87%
Employment (FTE) Total contribution	265	547	106%

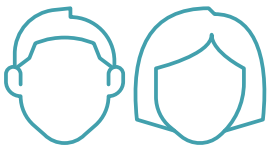
Figure 1: Economic contribution outputs for the Australian plant-based meat industry, 2018-19 and 2019-20[3]

The economic and job contributions of Australian plant-based meat businesses in FY20 are reflective of an industry in an early growth phase. The industry's rapidly increasing productive capacity, in response to rising consumer demand, is a trend mirrored globally. This growth is reflected in the Australian sector's manufacturing revenue, which nearly doubled from $35.2 million in 2018-19 to $69.9 million in 2019-20. However, the effect of the pandemic on consumers' willingness to try new products in a period of economic uncertainty, and how the plant-based meat market might have evolved in a more stable and predictable climate, may never be known.

Employment

New plant-based meat companies and greater sectoral revenue, stimulated demand for labour, creating new employment opportunities with total employment increasing 106 percent by 2019-20 to 547 from a 2018-19 figure of 265. This comprises 246 direct full-time equivalent (FTE) roles (up 137 percent), supporting 301 additional indirect FTEs, an increase of 87 percent (see **Figure 1**). This latter group relates to the sector's purchase of up-stream inputs.

137%



INCREASE IN DIRECT FULL-TIME EQUIVALENT JOBS

Interestingly, sectoral expansion can be seen in both the growth of expenditure on labour, and the reduction in average wages falling from approximately $94,000 in 2018-19 to $73,000 in 2019-20, likely reflecting the employment of more lower-paid production workers as manufacturing increases. However, average wages in FY20 in the plant-based meat sector remain substantially higher than the average Australian food manufacturing wage of $58,518.

States

DAE modelling reveals the geographic growth of plant-based meat manufacturing closely mirrors areas of traditional food manufacturing, namely urban centres in the eastern states.

New South Wales is estimated to account for 68 percent of economic contribution ($7.35 million) and workforce (167 FTE jobs), followed by Victoria enjoying 28 percent of economic contribution ($3 million and 69 FTEs), with Queensland comprising three percent ($350,000 and eight FTEs), respectively. When contrasted with the general distribution of food processing in Australia, which were reflected in DAE's 2030 Scenarios (29% in NSW, 31% in Victoria and 22% in Queensland), plant-based meat manufacturing is relatively stronger in NSW and weaker in Queensland. However, given the industry is still emerging, long term spatial patterns will likely take time to develop.

STATE-BASED CONTRIBUTION

Estimated economic contribution [as percentage and A$]
and direct full-time equivalent jobs

68% ($7.35M)
167 JOBS

NEW SOUTH WALES

28% ($3M)
69 JOBS

VICTORIA

3% ($0.35M)
8 JOBS

QUEENSLAND

<1% ($0.1M)
2 JOBS

SOUTH AUSTRALIA

<1% ($0.1M)
2 JOBS

WESTERN AUSTRALIA

<1% ($0.1M)
2 JOBS

TASMANIA

Exports

Given the Australian food and agriculture industries' ability to penetrate key, high-value export markets on the strength of Australia's reputation, exports are considered a critical measure of the plant-based meat industry's success. This opportunity has been sharpened in a world newly conscious of the potential for sudden food insecurity and the fragility of global supply chains amidst the pandemic.

Catering to the rising demand for protein from a growing and increasingly affluent global population – who are receptive to the premium, safe nature of 'Brand Australia' goods – is key to the business strategies of many new Australian plant-based product manufacturers.

Australia stands to benefit from both an increased demand for high quality raw plant protein unable to be grown in some export markets due to geography and climate, as well as new Australian-made end products like plant-based meat.

A key metric within DAE's modelling is the volume and value of the Australian plant-based meat sector's exports. Starting from near nil in 2018-19, exports grew to $2.7 million, or approximately four percent of locally made product in 2019-20, with an increase in export activity in the latter half of 2020, post the data reporting period.

The reporting period does not include significant subsequent export announcements, such as those by v2food,[4] which would increase this metric. Exports appear on-track to achieve targets laid out under any of the 2030 scenarios previously identified by DAE modelling, ranging from 10 percent of production under a conservative scenario, through to 40 percent of production under an accelerated scenario.

4%

OF PRODUCT EXPORTED IN FY20

BY 2030

BRANDS & PRODUCTS

At the close of FY20, there were more than 200 plant-based meat products available in grocery stores and foodservice outlets across Australia. As the modelling demonstrates, increased availability of these products in Australia has translated to increased sales. Australians spent $140 million on plant-based meat products across both grocery retail and foodservice channels in 2018-19 and spent $185 million in 2019-20, an increase of 32 percent. In retail, sales increased 46%.

Of the 204 plant-based meat products available in Australian grocery retailers at the close of FY20 (see **Figure 2**), 42 percent were from Australian brands.[6] The steady growth of Australian brands, and similar growth in domestic manufacturers in this time period shows the domestic industry is growing in sync with the market.

PRODUCTS FROM AUSTRALIAN BRANDS MADE UP

42%

OF CATEGORY IN FY20

Brand	Plant-based meat products stocked in major Australian retailers	Australian retailers	Manufacturing location
Alternative Kitchen	Burgers, Deli slices, Meatballs, Mince, Sausages	IGA	Canada
The Alternative Meat Co.	Burgers, Sausages	coles IGA	AU (NSW)
Amy's Kitchen	Burgers	IGA	USA
Bean Supreme	Burgers, Sausages		New Zealand
Beyond Meat	Burgers, Mince	coles IGA	USA
Coco & Lucas' Kitchen	Ready meals		AU (NSW)
Eaty	Burgers, Chunks / Strips, Sausages	coles IGA	AU (VIC)
Earth	Burgers, Fish-style, Mince, Poultry-style, Ready meals, Sausages, Snacking / Party food		AU (NSW)
Earth Grown	Meatballs, Mince, Sausages	ALDI	Brazil
Fable Food Co	Chunks / Strips, Ready meals	coles	Malaysia AU (NSW)
Field Roast	Roast	IGA	USA
The Fry Family Food Co.	Burgers, Chunks / Strips, Deli slices, Fish-style, Hot Dogs, Mince, Poultry-style, Roast, Sausages, Seafood-style, Snacking / Party food	coles IGA	South Africa
Gardein	Burgers, Chunks / Strips, Fish-style, Mince, Meatballs, Poultry-style, Seafood-style	coles IGA	Canada
Harvest Gourmet	Burgers		Czech Republic
Herb & Sons	Meatballs, Mince, Poultry-style, Sausages	coles	AU (VIC)
Linda McCartney's	Burgers, Sausages		United Kingdom
Loma Linda	Ready meals, Seafood-style	coles IGA	Thailand
Made with Plants	Bacon, Meatballs, Meatloaf, Mince, Ready meals		AU (NSW)
MEET	Burgers, Chunks / Strips, Meatballs, Mince, Poultry-style, Sausages	IGA	AU (NSW)

Figure 2: Brands sold at major national and independent Australian retailers as of December 2020 (continued on next page)

BRANDS & PRODUCTS, CONT.

Plant-based meat chilled section of a Woolworths store in Bankstown, NSW in January 2020. Credit: Aglo Retail Intelligence – www.aglo.io

Brand (cont)	Plant-based meat products stocked in major Australian retailers	Australian retailers	Manufacturing location (Country; if AU – state)
Moving Mountains	Burgers, Hot dogs	IGA, Woolworths	United Kingdom
Nature's Kitchen	Burgers, Poultry-Style, Sausages, Ready meals	Coles	AU (Multiple states)
Naturli	Mince, Poultry-Style	Coles, Woolworths	Denmark
NEXT!	Bacon, Poultry-style	Coles, IGA	Taiwan, Netherlands
NextGen2	Burgers	Woolworths	AU (VIC)
Plant Asia	Roast, Seafood-style	Woolworths	AU (NSW)
Plant Nation	Burgers, Sausages	IGA	AU (SA)
Plantein	Burgers, Poultry-style, Meatballs, Sausages	IGA, Woolworths	AU (VIC)
Plantitude	Poultry-style, Fish-style	Woolworths	AU (Multiple states)
Quorn	Burgers, Chunks / Strips, Mince, Poultry-style, Sausages, Seafood-style	Coles, IGA, Woolworths	United Kingdom
Ruffie Rustic Foods	Ready meals	Woolworths	AU (Multiple states)
Sophie's Kitchen	Seafood-style	IGA	Taiwan
Sunfed	Bacon, Poultry-style	Woolworths	New Zealand
Tofurky	Deli slices, Hot dogs, Poultry-style	Coles, IGA, Woolworths	USA
Unreal Co	Burgers, Mince, Sausages	Woolworths	AU (VIC)
v2food	Burgers, Mince	Coles, Woolworths	AU (VIC)
vEEF	Burgers, Meatballs, Mince	Woolworths	AU (QLD)
The Vegan Factor	Chunks / Strips, Poultry-style, Meatballs, Seafood-style	Woolworths	Netherlands
Vegie Delights	Bacon, Burgers, Hot dogs, Mince, Poultry-style, Sausages	Coles, IGA, Woolworths	AU (NSW), New Zealand
The Why Meat Co.	Snacking / Party food	Woolworths	AU (VIC)
Yves Veggie Cuisine	Burgers, Deli slices, Hot dogs, Mince, Sausages	IGA	Canada

Figure 2: Brands sold at major national and independent Australian retailers as of December 2020

Price Analysis

Most plant-based meat products command a price premium relative to their conventional meat equivalents, between 16 percent to 77 percent more on a dollar-per-kilogram basis. Australian plant-based meat products tend to be lower-priced than their imported counterparts: on average, $3.50 less per kilogram. This is an encouraging sign that the increase in availability of locally made products is helping reduce average price points across the category.

Product Category	Price premium for plant-based meat in comparison to conventional meat	Price premium for imported plant-based meat products in comparison to domestic products
Sausages	43%	+5%
Poultry-style – Crumbed	50%	+7%
Poultry-style – Un-crumbed	37%	+13%
Burgers	83%	+27%
Mince	36%	+39%
Ready Meals	16%	-21%
Bacon	77%	+32%
Average Total	49%	+15%

Figure 3: Price comparison of the most common categories of plant-based meat products versus their conventional meat equivalents, December 2020[7] and the price premium of imported plant-based meat products versus domestic products, December 2020[8]

+15%

IMPORTED PRODUCTS ARE MORE EXPENSIVE ON AVERAGE

FOODSERVICE

As previously reported in Food Frontier's 2019 State of The Industry report, the majority of Australian foodservice plant-based meat sales occur within Quick Service Restaurants (QSRs) and fast casual restaurants, such as Grill'd, Lord of the Fries and Hungry Jack's. Since Food Frontier's 2019 analysis, the balance of imported versus domestic products has shifted with the introduction of offerings like Hungry Jack's Rebel Whopper featuring the Australian-made v2food burger.[9]

Other prominent national QSRs and fast casual outlets launched new plant-based meat offerings in FY20, and leading into the close of 2020. From Nando's[10] to 7-Eleven[11] to Hunky Dory[12] and more, these new offerings reflect growing consumer interest in plant-based alternatives and a growing variety of products available for foodservice providers to add to their menus. In particular, foodservice providers also began offering meat-free versions of Australia's iconic meat pies and sausage rolls, with Ferguson Plarre,[13] Pie Face[14] and Four'N Twenty[15] all releasing plant-based alternatives. Plant-based meat menu items are generally priced at $0.50-$1 more than conventional meat items (with exception to some Beyond Meat substitutions); see the full price comparison in **Appendix**.

Foodservice outlet	Offering/s featuring plant-based meats	Launch details
7-Eleven	No Chicken and Lettuce Sandwich; No Beef Pie; No Sausage Roll	Launched plant-based options developed by the 7-Eleven team in June 2020 across stores nationwide
Domino's	Plant-based meat versions of pizzas: Beef & Onion, Godfather, Taco Fiesta, Loaded Burger, Fire Breather and Hawaiian	Launched plant-based beef in September 2019 and plant-based pepperoni and ham in October 2019
Ferguson Plarre Bakehouse	Plant-based versions of Aussie Pie; Sausage Roll; Wholemeal Tiddly Oggie; Wholemeal Mini Oggie	Launched July 2020 after CEO Steve Plarre made the switch to plant-based eating
Grill'd	Beyond Simply Grill'd; Beyond Garden Goodness; Beyond Chipotle; can also substitute Beyond patty in any burger on the menu	Launched Beyond patties in February 2019 to all stores across Australia, with several promotions such as Meat-Free Monday
Hunky Dory	Fishless Fish	Launched widely in February 2020 after successful trials, using Future Farms 'fish'
Hungry Jack's	Rebel Whopper	Launched in September 2019 using a v2food plant-based burger patty

Figure 4: Prominent examples of plant-based meat products on the menus at Australian foodservice outlets

FOODSERVICE, CONT.

Plant-based No Chicken and Lettuce and No Egg and Lettuce sandwiches launched in 7-Eleven's 700 stores nationwide in June 2020

Ad for Mad Mex's Spicy Vegan Chicken range featuring Simplot's 100% NOT Chicken

Foodservice outlet	Product/s featuring plant-based meats	Launch details
Huxtaburger	Alternative Meatburger (Plant-based beef); Megan (Plant-based beef); Chad (Plant-based chick'n); can also substitute The Alternative Meat Co. patty in any burger on the menu	Launched in June 2019 using plant-based burger patty from The Alternative Meat Co.; Launched a chicken alternative in November 2020
Lord of the Fries	Entire range is plant-based	Has used in-house plant-based meat patties since store's inception; the first QSR outlet in Australia to offer Beyond Meat patties (from February 2019)
Mad Mex	Poco Diablo Vegan Chicken (filling option)	Launched July 2019, using Simplot's 100% NOT Chicken
Nando's	The Great Pretender	Launched nationwide in October 2020
Pie Face	Vegan Mexi Pie; Vegan Spag Bol Pie; Vegan Cheeseburger Pie; Plant-Based Sausage Roll	Launched in February 2020 using Simplot's 100% NOT Beef
Ribs & Burgers	Fable Mushroom-Burger; Beyond Old School Burger	Launched Beyond options in March 2019 and Fable in June 2020

Figure 4: Prominent examples of plant-based meat products on the menus at Australian foodservice outlets

HUNGRY JACK'S ICONIC WHOPPER GOES PLANT-BASED, COURTESY OF V2FOOD

The Rebel Whopper, launched by Hungry Jack's in October 2019, was the first plant-based meat alternative on the menu at a major QSR in Australia. Available at 400 Hungry Jack's nationwide, the meat-free version of the restaurant's iconic Whopper burger features a plant-based patty created by Australian start-up v2food.

v2food was born from a partnership between Australia's national science agency, CSIRO; Main Sequence Ventures, an investment fund backed by CSIRO and the Australian Government; and Australian fast-food executive, Jack Cowin of Competitive Foods Australia (the parent company of Burger King's Australian franchise, Hungry Jack's). CSIRO provided flavour science expertise and technical skill to v2food in a collaboration to create a product that would achieve a sensory experience akin to conventional meat, using plants. The challenge was to create a plant-based burger patty that would appeal to meat eaters by mimicking the "flame grilled" flavour and juiciness associated with Hungry Jack's beef Whopper. The collaboration was deemed a success with Cowin's blind taste test.

> "I couldn't tell the difference between real beef and the Rebel Whopper. And I've eaten more beef burgers than anyone in Australia." – Jack Cowin, CEO, Competitive Foods Australia

Taste was central to marketing the launch of the Rebel Whopper, which carried a tagline of "100% Whopper, 0% Beef". In the first-ever TV ad in Australia promoting a plant-based meat, Hungry Jack's spruiked the burger as having a meat-like taste, communicating confidence that consumers who tried the Rebel Whopper would find it similar to conventional beef.

v2food's initial launch of its product in Hungry Jack's provided the opportunity to reach a wide range of Australian consumers, many of whom may not have yet tried plant-based meat products or may not proactively seek them out in a supermarket. It was important to price the Rebel Whopper the same as the standard Whopper, to make it an attractive option for consumers seeking a plant-based alternative and an entry point into plant-based foods for flexitarian customers. The launch and pricing strategy worked: an overwhelmingly positive social media response from flexitarians eager to try the plant-based burger – as well as vegetarians grateful for another plant-based option – mirrored Hungry Jack's in-store sales success. This success was recognised by investors, with v2food securing $35 million in funding in November 2019.

Following the debut at Hungry Jack's, v2food launched partnerships to feature its plant-based mince and burgers on takeaway restaurant menus for World Meat-Free Week with local delivery service Deliveroo[16] and in Marley Spoon home meal-kits.[17]

These partnerships, in combination with being featured on Hungry Jack's menu, served to build brand awareness ahead of the company's grocery launch of its plant-based burger and plant-based mince in grocery stores nationwide, including Drake's, Coles and Woolworths. The company's tracking of consumer sentiment in response to its retail launch reflected consistent recognition of v2food as 'the company that made the Rebel Whopper', indicating consumers' positive initial impression of the Hungry Jack's offering has translated to early enthusiasm for the brand and its retail products. These indications of loyalty and recognition demonstrate a foodservice-first launch can be a winning strategy for plant-based meat companies launching new products targeted at flexitarians. Such consumers can be positively influenced by a low-barrier trial opportunity, which may lead to increased interest in trying plant-based meats at home.

First-ever Australian TV ad promoting plant-based meat

RESPONSE TO COVID-19

The lockdowns and business restrictions spurred by the COVID-19 pandemic most prominently impacted Australia's foodservices sector, which experienced an estimated 10.4 percent decrease in sales in FY20.[18] Some emerging Australian plant-based meat companies adjusted to temporary closures of foodservice outlets by pivoting to launch their products in grocery channels.[20]

To serve consumers cooking at home more often, Fenn Foods, which relied primarily on foodservice channels to sell its plant-based burgers, quickly changed gears to placed greater focus on its own products already in grocery retail channels, sold under the brand name vEEF.[20] Fable Food Co, producer of a plant-based 'braised beef,' had partnered with Chef Heston Blumenthal to place its product on Michelin-starred restaurant menus (learn more about this partnership in **Meet the Industry**).

With the closure of fine dining early in the pandemic, Fable transitioned to direct-to-consumer distribution a few years ahead of plan. The company partnered with local restaurants to create ready meals for home delivery, ahead of launching its core product in Woolworths in June 2020.[21]

Flave, a new category entrant whose future plans to be a global plant-based casual restaurant chain were temporarily waylaid, transitioned to a meal delivery service.[22]

Australia's initial increase in grocery retail demand was shortly offset by a prolonged reduction in consumer spending, as consumers rapidly increased their savings in anticipation of a recession.[23] Retail food sales fell by 17.4 percent between March and April 2020.[24] Retailers suggested this trend was particularly pronounced for plant-based meat, with consumers less likely to substitute conventional meat for plant-based alternatives in the six months following the outbreak of COVID-19. This behaviour was potentially driven by the price premium on plant-based meat and lower willingness among consumers to experiment.[25]

While no similar research has been conducted in Australia, a global study shows 33 percent of consumers will prioritise their health after the pandemic crisis,[26] which may lend to future growth of plant-based meat sales.

Consumers line-up at a Victorian Woolworths store during the pandemic. Credit: Wade Manchin / Getty Images

New meal delivery service featuring plant-based meats launched by Flave during the pandemic

CONSUMER TRENDS

Increasing consumer awareness about the health and sustainability implications of their diets, along with an increasing desire for convenience, are significant factors in the rising demand for meat alternatives in Western countries including Australia.[27, 28]

To meet this demand, evolution in the meat alternatives category has primarily been driven by a new generation of plant-based meats. These products aim to achieve a hyper-realistic sensory experience akin to conventional meat – from preparation to appearance, texture and flavour. With greater sensory comparability to conventional meat than many legacy plant-based meat products, as well as increasingly widespread availability,[29] new generation plant-based meats have found a market in flexitarians and meat-reducers who still seek familiarity and convenience.

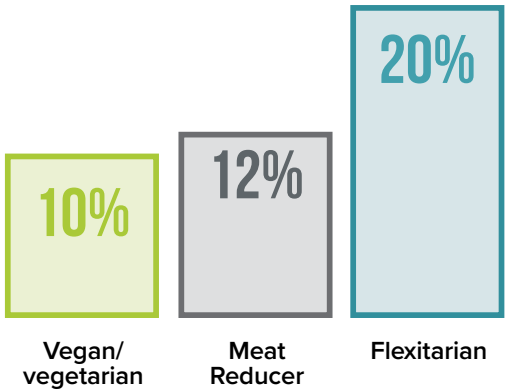
Health is a key motivator driving increased interest in plant-based eating as more Australians seek to reduce their meat consumption.

In Food Frontier's 2019 consumer research conducted by leading market research firm Colmar Brunton, health was named as the number one reason Aussies chose to eat less meat.[30] Many Australians are reducing their meat consumption, or eating none at all – represented by the 42 percent of Aussies who qualified themselves as Flexitarians, Meat-Reducers or Vegetarians/Vegans.[31]

It's possible that the many well-publicised studies warning about the health impacts of high meat consumption are resonating. These include reports from leading global health organisations like the World Health Organization,[33] EAT-Lancet Commission,[34] World Cancer Research Fund[35] and Harvard T.H. Chan School of Public Health.[36]

42%

OF AUSSIES ARE EATING LESS MEAT OR NONE AT ALL[32]



NUTRITION ANALYSIS

For consumers seeking to reduce their meat consumption but who still want the familiarity and convenience of conventional meat products, research shows plant-based meats can be a healthier swap. A 2020 report by Food Frontier and Australian Accredited Practising Dietitian Teri Lichtenstein analysed the nutrition of 95 plant-based meats across the most common product categories available in the Australian and New Zealand markets, and compared each category to its conventional meat equivalent (see **Figure 5**). The study found that plant-based meats are nutritionally superior or comparable to conventional meat equivalents, noting plant-based meats across most categories have, on average:

✓ higher Health Star Ratings

✓ lower or comparable kilojoules and sodium

✓ higher or comparable protein

✓ lower fat and saturated fat

✓ and the presence of health-promoting fibre.[37]

The study also demonstrated that plant-based meats do not present the same individual and public health risks of conventional meat, related to foodborne illness, zoonosis, antimicrobial resistance and links to diseases like type 2 diabetes, cardiovascular disease and cancer, as explored in the **The Case for Protein Diversification: Human Health** (see **Appendix**).

Red meat-style plant-based meats compared to conventional red meat equivalents (per 100g) on average

Nutrient	Sausages	Burgers	Mince	Bacon
Energy (kilojoules)	✓	✓	=	✓
Protein (g)	✓	=	✗	✓
Fat, total (g)	✓	✓	✓	✓
Saturated Fat (g)	✓	✓	✓	✓
Carbohydrate (g)	n/a	n/a	n/a	n/a
Sugars (g)	n/a	n/a	n/a	n/a
Dietary Fibre* (g)	✓	✓	✓	✓
Sodium (mg)	✓	✓	✗	✓
Health Star Rating	✓	✓	=	✓

* Dietary Fibre: Calculated based on products that list fibre nutrient value

White meat-style plant-based meats compared to conventional white meat equivalents (per 100g) on average

Nutrient	Poultry – Crumbed	Poultry – Uncrumbed
Energy (kilojoules)	✓	=
Protein (g)	=	=
Fat, total (g)	✓	✓
Saturated Fat (g)	✓	✓
Carbohydrate (g)	n/a	n/a
Sugars (g)	n/a	n/a
Dietary Fibre* (g)	✓	✓
Sodium (mg)	✓	=
Health Star Rating	✓	✓

* Dietary Fibre: Calculated based on products that list fibre nutrient value

✓ Plant-based average is better

= Average is comparable within 10%

✗ Plant-based average is worse

Figure 5: Nutrition analysis of plant-based meats versus conventional meat equivalents

MEET THE INDUSTRY

Commercial engagement in the plant-based meat sector is increasingly diverse, with the Australian industry growing from 10 to 19 brands in FY20. From conventional meat producers introducing plant-based meats to their portfolios, to high-profile chefs developing retail products or featuring meat made from plants on their menus, to one of the nation's largest grocery retailers introducing its own branded product – here are stories demonstrating the promise of this growing industry.

10 → 19

FY19 FY20

AUSTRALIAN PLANT-BASED MEAT BRANDS

Conventional meat producers diversify to capitalise on consumer demand

From JBS to Smithfield Foods, Cargill to Tyson, and many more, conventional meat producers around the globe have diversified their protein production to include plant-based meat offerings and investments in plant proteins. Australian meat companies are also recognising the opportunity at hand and moving to capitalise on plant-based meat.

This includes South Australia-based Slape & Sons, a family-owned and-operated business that has produced sausages and burgers for three generations. In 2018, influenced by third-generation family members, Slape & Sons decided to diversify their offering with a protein alternative for the flexitarian market. The company partnered with plant-based meat producer Hungry Planet to create the brand Plant Nation, launching plant-based sausages and burgers in retail, wholesale and foodservice partners across Australia in 2019.

Plant Nation, by SA meat-producer Slape & Sons

Another meat business investing in plant-based offerings is Norfolk Foods, established in 2009 by a meat industry veteran with more than four decades of experience. The aim of the company was to build value into traditional meat commodity products and create new options for customers. Following an international study tour and review of research suggesting meat consumption was declining, the company established Rogue Foods in September 2019 as Australia's first dedicated plant-based manufacturer with the capability to extrude (a form of processing) the proteins used in its products.

Norfolk Foods' team brought its expertise in processing conventional animal meat (including using ingredient extrusion technologies) to support the Rogue team to understand and solve the technical challenges of creating plant-based meats in similar formats. In Rogue Foods' continued journey toward consistently improving the quality and value of their products, the company is exploring using Australian grown and processed plant proteins, optimising its factories' extrusion capability, and establishing collaborative long-term partnerships across the supply chain. These innovative strategies serve the company's ambition to "help families provide nutritious, delicious and ethical options for their centre of plate protein options."

Herb & Sons, by Rogue Foods, a company established by Norfolk Foods

Plant-based meat elevated to culinary status as chefs get involved

The challenge of developing meatless alternatives that impress the most avid meat-lovers has attracted talented Australian chefs, while forward-thinking restauranteurs are seeking out these products to serve clientele wanting new culinary experiences, or foods that have a lighter impact.

These chefs and restauranteurs are elevating plant-based meat from an occasional alternative to a more common and credible culinary offering.

Notably, one of Fable Food Co's founders, Jim Fuller, is a chef-turned-mushroom farmer whose expertise in foraging and cooking mushrooms lent to the development of the company's plant-based 'braised beef'. The product is made primarily of shiitake mushrooms, selected to replicate a slow-cooked style meat with its deep, rich umami and tenacious fibres that make for a convincing meat alternative.

Fable Food Co team with chef Heston Blumenthal

The Fable team was inspired to develop plant-based meat products to improve agricultural sustainability, reduce human dependence on industrial animal agriculture and improve the health and nutrition of the food Aussies eat. Even without culinary elevation as a primary part of their mission, Fable sought to create a nutritious product with great taste and texture, and the result caught the eye of iconic restaurateur Heston Blumenthal. In December 2019, Fable partnered with Blumenthal to launch Fable products at Dinner by Heston Blumenthal in Crown Towers Melbourne, with the 'braised beef' subsequently joining the menus at Blumenthal's Heathrow café and Michelin-starred restaurant in the UK during 2020.

International chef and CEO of Fenn Foods, Alejandro Cancino

Former Australian Chef of the Year Alejandro Cancino was also inspired to fill what he saw as a gap in the market for a chef-crafted plant-based meat that was both delicious and sustainable. Cancino brought his 17 years-experience working as a chef in restaurants around the world – from France, Spain, UK, Mexico, Denmark and Japan to Australia – to found Fenn Foods, producer of plant-based meat brand vEEF. Targeting a flexitarian customer who cares about sustainability but "most importantly, loves good food," Cancino developed vEEF's signature Smoky BBQ Plant-based Burger and launched it in retail stores across Australia and Singapore in 2020. vEEF plans to add plant-based meatballs and chicken-style burgers to its portfolio in the future. Fenn Foods also firmly established its environmental credentials with the launch of a first-of-its-kind carbon neutral plant-based mince at the end of 2020.[39] This will be the first in a range of carbon neutral products, and the company has announced it will open an innovation centre focused on delivering more plant-based products.

IV. AUSTRALIAN LANDSCAPE 2030

AUSTRALIAN LANDSCAPE 2030

The plant-based meat sector in Australia has experienced impressive growth in one year of measurement, especially considering the broader economic disruption that occurred in the final months of that period. This growth illuminates the industry's path ahead to 2030.

In 2019, DAE modelled three potential scenarios for the plant-based meat sector to 2030: conservative, moderate and accelerated. These provide a framework for tracking the sector's progress each time we measure the market. These three scenarios were:

Scenario 1: Conscious consumers' choice, in which the Australian plant-based meat sector grows conservatively between 2020 and 2030. Australians, would, on average consume 2.4kg of plant-based meat products each year,[2] most of which would be imported. But conventional meat would remain the primary choice for most consumers.

Scenario 2: Popular and accessible alternative, where the Australian plant-based meat sector maintains strong growth. In this scenario, with an increase in consumers identifying as 'flexitarian', per capita consumption would rise to 6.1kg of plant-based meat per year.[3] Most of this demand would be met by domestic manufacturing.

Scenario 3: Mass-market commodity, which was modelled such that the popularity of the plant-based meat category accelerates rapidly through to 2030. A decline in conventional meat consumption would reflect more consumers eating meat alternatives as a dietary staple, with the average Australian consuming 15.5kg of plant-based meat.

	2018-2019	2019-2020		2030	
	Previous Modelling	Current Market	Scenario 1 (Conservative)	Scenario 2 (Moderate)	Scenario 3 (Accelerated)
Direct Value-add ($)	$5.0M	$10.8M	$184M	$528M	$1.3B
Indirect Value-add ($)	$24.9M	$39.6M	$214M	$614M	$1.6B
Total Value-add ($)	**$29.9M**	**$50.4M**	**$398M**	**$1.1B**	**$2.9B**
Direct Employment (FTE)	104	246	698	2,004	5,105
Indirect Employment (FTE)	161	301	1,402	4,023	10,251
Total Employment (FTE)	**265**	**547**	**2,100**	**6,026**	**15,356**
Australian Consumer Expenditure ($)	**$140M**	**$185M**	**$1.4B**	**$2.9B**	**$4.6B**
Value of Australian Exports ($)	n/a	$2.7M	$47M	$338M	$1.376B

Figure 6: Key findings: Updated economic modelling of Australia's plant-based meat sector

As the new FY20 sector modelling reflects only one year since these scenarios were outlined, it is not yet possible to confidently predict the size of the sector by 2030. The unprecedented impacts of COVID-19 on purchasing decisions in the first half of 2020 make it especially difficult to evaluate the sector's growth trajectory, with the extent of these impacts on the emerging industry yet unknown. However, some general trends in FY20 can be observed:

- Manufacturing sector revenue growth was double the annual growth rate required to achieve the most ambitious $3.5 billion per year metric as in Scenario 3 – reflecting an early-stage industry rapidly scaling up.
- Growth in exports and local production was broadly consistent with achieving Scenario 3 levels.
- Notwithstanding the significant impact of COVID-19 on the foodservice sector, the growth in consumer expenditure, if replicated annually, will achieve the Scenario 2 sales metric of $2.9 billion. Logical extrapolation of this trend, in a more benign retail environment, would indicate consumer expenditure exceeding Scenario 2 levels.

While the various measures of growth demonstrated for FY20 are remarkable, the size of Australia's plant-based meat sector in 2030 will ultimately be determined by the sustainability of this growth trajectory. DAE's 2030 scenarios considered a range of factors, including proportion of the population consuming plant-based products, population growth, wholesale and retail price of plant-based meat and export volume and value. It is common for fast-growing categories to level off as market size increases, with a smooth tapering of growth over time being rare, and 'lumpy' or uneven growth more typical. Growth rates can plateau or even fall, before accelerating again, with changes in technology, consumer preferences, new products, pricing and marketing for example, all influencing major shifts in sales.

International comparisons may provide some clues. While Australia achieved a 32 percent growth in consumer expenditure from FY19 to FY20, it is expected that this will gradually decrease over time, although the growth potential in foodservice remains unrealised, particularly given the regression in sales during the pandemic.

The more mature UK plant-based meat sector, for example, with sales of $1.44 billion in 2019, had an average growth rate of seven percent in each of the last five years. However, leading UK retailer Tesco announced in September an almost 50 percent growth in demand for plant-based meat over the previous year, and consequently announced a target of increasing the category's sales by 300 percent over five years to 2025.[4] This demonstrates the sector's growth potential when leading market players actively pursue category growth.

It is consequently not yet possible to predict the growth trajectory for plant-based meat in Australia and the point at which this will plateau, although given current growth rates, planned investments in the sector and the room for future growth, it is likely to be some time away.

Food Frontier's 2019 report detailing DAE's modelling highlighted several key metrics against which to measure Australia's progress. These metrics included: consumer expenditure (i.e. the size of the market at a retail level – both grocery and foodservice for all plant-based meat products, domestic and imported); percentage of plant-based meat share of total meat consumption; full-time equivalent jobs (both direct and indirect), and; value of local production exported. Several of these are detailed in **Figure 7**.

A ready meal from Tesco's Plant Chef line featuring plant-based meat ingredients, launched in September 2019

Australia remains on-track, with the FY20 figures, to achieve any of the 2030 scenarios previously identified. The annual percentage growth from the baseline (FY19) required to achieve these scenarios is detailed in **Figure 7**.

Variable	Scenario 1: Conscious consumers' choice	Scenario 2: Popular and accessible alternative	Scenario 3: Mass-market commodity	Actual growth from 2018-19 to 2019-20
Consumer expenditure	23%	32%	38%	32%[5]
Value of imports	24%	30%	22%	NA
Manufacturing sector revenue	21%	45%	48%	98%
Volume of local production	25%	42%	64%	70%
Volume of local production exported	38%	71%	107%	100%
Value of local production exported	33%	62%	87%	133%
Direct full-time equivalent jobs	11%	23%	35%	137%

Figure 7: Required annual growth rates to reach 2030 Scenario levels[6]

Production of plant-based 'tenders' at Proform's facility in NSW

V. THE PATH FORWARD

THE PATH FORWARD

The Australian plant-based meat industry has grown exponentially in just one year, signalling that the opportunities the sector presents are already at our doorstep. The time is ripe for significant research, policy and commercial investments, and greater collaboration among stakeholders across the supply chain – from agriculture to food processing to retail.

Food Frontier has identified a range of opportunities that will allow Australia to capitalise on its potential, and leverage its unique intellectual, infrastructure and natural assets to lead in the global plant-based meat sector. Collectively, these sector-wide interventions can ensure a robust, competitive and value-adding domestic industry that contributes to employment, economic growth and efficient use of agricultural resources. While the growth of Australia's plant-based meat industry over FY20 indicates strong early progress towards DAE's scenarios modelled to 2030, these recommendations consider the anticipated trajectory of a still new and emerging industry, and the actions required to realise its potential.

GOVERNMENTS & REGULATORS

Federal Governments

The federal government launched its Ag2030 programme in October 2020, supporting the industry-led plan to build a $100 billion food and fibre sector by 2030. This is an ambitious goal that requires major investment in sectors that value-add agricultural products – of which plant-based meat is a prime example.

While the federal government has been slow to prioritise investment in R&D specific to the development of the plant-based meat sector, there are now clear opportunities to support sector-specific collaborative research mechanisms, such as a Cooperative Research Centre focused on primary inputs for the sector; the funding of a national alternative proteins research initiative through the CSIRO; the quantification of international demand for Australian-grown plant proteins, and; investment of funds from Rural Research and Development Corporations (RDCs) like the Grains RDC, Agrifutures and Hort Innovation into relevant research streams that can support the development of intellectual property to establish Australia as a global centre for alternative proteins.

The federal government's positive engagement with the sector would align with myriad objectives including the diversification of supply chains; increased onshore primary product value-adding; and investment in rural and regional areas to foster economic growth and job creation.

State Government

The increasing emergence of plant-based meat manufacturing at a time when state governments are eager to incentivise infrastructure investment, presents a significant yet time-limited window to establish industry manufacturing hubs in their jurisdictions.

DAE research indicates that plant-based meat manufacturing is arising in traditional food manufacturing strongholds, notably major urban centres on the east coast, with New South Wales host to an estimated 67 percent of direct sectoral jobs, and Victoria host to 28 percent. With the sector in an early stage of development, and significant capital investment required in coming years, states can judiciously invest in key areas such as manufacturing and ingredient processing to capture domestic production and employment market share.

State governments may benefit from undertaking an analysis of the sector's potential economic value-add and employment contributions, through specific plant-based sectoral roadmaps. These roadmaps would reveal the most effective tax and incentive mechanisms to increase investment, partnerships and supply chain integration across the sector.

Regulators

Regulators hold a critical role in facilitating a level playing field for plant-based meat products in the marketplace. This includes ensuring new emerging industries are supported to fulfil their potential, and protected from anti-competitive attempts to restrict market innovation, such as on key matters like product labelling and proposals to introduce unnecessary regulation.

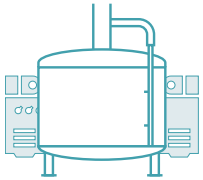
As new, high-value sectors such as alternative proteins emerge, all regulators play important roles that require impartial, evidence-based processes and outcomes, particularly in the face of significant pressure from vested interests and their political allies.

FARMERS & FARMING BODIES

Australia's farming sector has faced significant collective challenges over the last year through labour shortages, external freight capacity and trade barriers. There are, however, positive stories for the farm sector, including rising demand for plant protein ingredients among growing industries like plant-based meat, which DAE projects to produce 169,000 tonnes of end product by 2030 under a moderate growth scenario.

The recent exponential growth seen in Australia's plant-based meat sector, which doubled in manufacturing sales revenue during FY20, is an encouraging sign for farmers producing crops like legumes – key inputs for plant-based meats. Australian farmers stand to benefit from selling these crops into the industry's value-added domestic supply chain, generating more profit at the farmgate and sidestepping volatile global commodity markets. Additionally, booming demand for high-quality protein isolates internationally, including for plant-based meat, offers another market for Australian-grown plant proteins.

Plant-based meat will contribute to the Australian government's Ag2030 plan supporting the agriculture sector's $100 billion target, though not without sector-wide collaboration and investment in plant protein processing capacity to open up the supply chain to Australian farmers. Participation by leading farmer representative groups and state farming organisations in collaborative mechanisms focused on new protein industries, such as the Future of Protein Forum, and proactive policy leadership, such as that by NSW Farmers, offer an encouraging start. These collaborations demonstrate the agriculture sector's ability to take a proactive and united approach to new emerging industries, recognising the value they bring to Australian farmers.



INGREDIENT PROCESSING

The value to the Australian farming sector of value-adding crops like pulses and legumes as ingredients for products like plant-based meat – instead of farmers selling their produce into volatile commodity markets – is becoming more widely recognised.

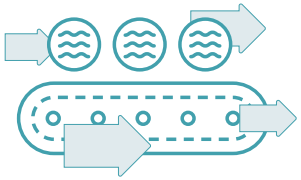
The benefits of public trust in 'Brand Australia' enjoyed by Australia's food and agriculture industries are highly appealing to both the domestic plant-based meat industry and international businesses, particularly with the potential to supply Asian plant-based meat manufacturers with Australian-grown plant protein isolates. Manufacturers are also interested in Australia's potential to produce higher quality, better performing protein isolates using the latest innovations in plant breeding and processing techniques.

Significant investment in local plant protein processing infrastructure is required to cater to this demand. The EAT Group's investment in establishing a protein fractionation facility in Victoria in 2020 brought new, yet limited capacity to Australia.

There remains significant scope for greater investment in fractionation infrastructure considering the plant-based meat industry, as per DAE's moderate growth scenario, is projected to produce 169,000 tonnes of end product by 2030.

From 2018-19 to 2019-20, the volume of plant-based meat manufactured in Australia increased 70 percent, with leading companies indicating their desire to use more Australian ingredients in their products. This demand for plant protein ingredients is growing among other food categories too, from baked goods to sports nutrition products and more, demonstrating significant need for local plant protein processing.

At least one state government in Australia is actively scoping the need for further investments in such processing facilities to generate jobs and support Australian agriculture, while more private businesses are also exploring the opportunity, signalling key developments ahead in 2021 and beyond.



PLANT-BASED MEAT MANUFACTURERS

The expansion of plant-based meat products on grocery shelves nationwide has been rapid, with nine new Australian brands launching in FY20 while existing brands extended their product ranges to offer plant-based bacon, schnitzels, ready meals and more. Australian consumers benefitted, with many more meal occasions and recipes now possible.

With consumers' growing interest and trial, as demonstrated in FY20's nearly 50 percent increase in grocery sales of plant-based meats, they are likely to become more discerning about both the quality and value of products on offer.

Studies have found Australian consumers are some of the most price-sensitive grocery shoppers in the world,[1] suggesting that plant-based meats will need to reach a closer price-point with equivalent conventional meats to become a competitive alternative.

Our 2020 price-point analysis shows that on average, plant-based meat products are currently 49 percent more expensive than their conventional meat counterparts, though some individual brands have already reached price parity. Yet as the still small and emerging sector continues to grow, it stands to benefit from realising economies of scale in production and distribution, areas the conventional meat sector benefits from with its significantly larger size and scale.

Increasing exports will be key to the Australian plant-based meat sector's path towards economies of scale. Several companies, such as v2food and Fenn Foods, have begun exporting their locally made products to countries such as Singapore, Japan and the Philippines,[2,3] catering to demand amongst growing Asian populations. Food Frontier will produce resources in 2021 to accelerate Australian plant-based meat manufacturers' export ambitions, helping the industry achieve the production volume increases necessary to drive down unit product manufacturing costs.

Recent investments by Australian plant-based meat companies in manufacturing facilities and equipment to improve the quality and the value of their products are important and necessary.[4] Yet to compete with international imported products, more companies need to evaluate if their current facilities are fit for the future. As consumer expectations of product price and performance increase, companies that continue to innovate and invest in R&D to reach optimum quality and value will win market share.

Understanding consumer purchasing behaviours, how they use the widely growing range of plant-based meat products, and their expectations around price and performance will be key for brand owners in the coming year. As the category grows and Australian consumers experiment more frequently with these products, opportunity exists for plant-based meat companies to make certain Aussies' needs are understood and catered for. Companies must also ensure any barriers such as consumer uncertainty around preparation techniques, poor performance in taste or texture, or products not fulfilling nutritional needs, are overcome through product development, innovation and marketing.

RETAILERS & FOODSERVICE

All retailers – whether major national, smaller regional or independents – increased their plant-based meat product ranges in FY20. Many of the major quick service and fast casual restaurant chains also added plant-based meat options to their menus, an early investment rendered unrealised as restaurants closed due to the COVID-19 pandemic.

The 32 percent combined increase in consumer expenditure on plant-based meat products across the grocery retail and foodservice sectors is encouraging, but it does not tally with the more than doubling of products available in the marketplace. Notwithstanding the unusual circumstances in the foodservice sector due to the pandemic, this disparity suggests that in retail, too high a proportion of plant-based meats are not being purchased by consumers before their use-by dates and therefore are going to waste.

Retailers' strategy to stock plant-based meats in the chilled case alongside their conventional meat counterparts has been successful in spurring greater experimentation and trial, while customers benefit from added convenience. Yet this strategy must be balanced with consideration to the limitations of chilled products, which have a comparatively shorter shelf life than plant-based meat products sold frozen. Products stocked in the freezer aisle have the advantage of less in-store waste, but their in-store positioning is less likely to motivate customer trial. Frozen products also, often unjustifiably, can be associated with a lower perception of freshness and comparability of quality, functionality and performance against chilled foods. Considering the ethical, environmental and commercial impacts of in-store food waste, this is a pressing issue for both retailers and their manufacturing partners to address, though also quite common in emerging food categories.

Innovation in product formulation or processing and packaging technologies to extend the shelf life of plant-based meat products will always be encouraged by retailers. Yet retailers can address the commercial challenges of in-store waste in a new emerging product category such as plant-based meat through greater consideration to the maturity of the market in their category planning and forecasting.

If plant-based meat products are treated as just another SKU in a conventional meat category when forecasting sales and waste and setting margin expectations, it will be difficult for consumer sales' volumes to increase at a rate that enables manufacturers to achieve price parity with conventional meat. This also slows manufacturers' continued investment in innovation to improve product quality.

This approach to margin and waste targets in the early days of a new emerging product category has been adopted in other countries like the UK. As such, the UK plant-based meat market is now reaching a tipping point and maturity level where significant investment, growth and scale is enabling retailers to announce bold, ambitious and yet achievable sales targets for plant-based foods.[5] A strategic and longer-term approach will be vital to win a reputation amongst consumers as the destination shop for these products.

Reaching market maturity, where short-term compromises are no longer needed, could also be accelerated by connecting plant-based meat companies with large conventional meat processors to leverage the similar production equipment and facilities, and more importantly, the chilled supply chains and associated distribution infrastructure. With significant and longstanding relationships across the supply chain, major retailers are uniquely positioned to encourage and facilitate this collaboration.

Beyond these foundational approaches to enhance efficiencies on the supply side, retailers must also consider how to foster demand through greater consumer engagement. Retailers can broaden consumer education on this emerging category and overcome barriers to purchase, trial, or repeat purchase through simple communications tactics, using marketing channels such as in-store product sampling or recipes in their in-house food magazines. Independent consumer research, or research conducted in collaboration with manufacturers and brands, will inform these tactics.

Bonus Chapter:

VI. CELLULAR AGRICULTURE

CELLULAR AGRICULTURE

While plant-based meat is commanding widespread attention as the most immediate commercial opportunity in alternative proteins, momentum is also growing in the emerging cellular agriculture sector. Around the world, entrepreneurs, scientists and chefs are harnessing the power of cell biology to cultivate meat, seafood, dairy, eggs and other products from animal cells, without the need to farm animals.[1]

Cellular agriculture is the technology that enables companies to grow food from animal cells through a process that mimics the biological growth within an animal. Depending on the process and technology used, the foods are either "cultivated" or "products of fermentation"[2] and are identical to conventional animal products at the cellular level. Foods produced using cellular agriculture – like cultivated meat and milk – provide the nutritious and familiar protein sources consumers are seeking,[3] and also require fewer environmental resources than conventionally farmed animal products.[4]

There are more than 80 cellular agriculture companies globally,[5] the majority (65 percent) of which are developing cultivated meats including beef, poultry, pork and seafood.

Others are using acellular technologies to produce different animal products like cheese, milk, ice cream and eggs, or are companies producing business-to-business (B2B) inputs, such as animal fats, functional scaffolds for cultivated meat, or affordable, serum-free culture media. Almost one-third of cellular agriculture companies are in North America, with the Netherlands, UK, Israel, Singapore and Australia also home to multiple companies.[6]

As the cellular agriculture industry moves towards commercialisation, many companies have unveiled prototypes and offered samples for taste-testing in advance of their commercial launch. At the close of 2020 came a world-first approval by the Singaporean Government for the commercial sale of cultivated meat.

For all companies in the sector, achieving production at scale while continuing to reduce costs remains a fundamental focus on the path to commercialisation.

Find key terms related to cellular agriculture in the **Glossary** in the **Appendix**.

GLOBAL DEVELOPMENTS

As technology advances, developments in cellular agriculture continue to gather pace, with a series of world-firsts occurring at the close of 2020. In November, Israeli company SuperMeat opened a concept restaurant where diners could taste-test (but not pay for) dishes made from cultivated chicken grown onsite.[7] In December, the Singaporean Government announced it would be the first jurisdiction worldwide to allow the sale of cultivated meat, providing approval to cellular agriculture company Eat Just Inc. The company's cultivated chicken was first served to diners at Singapore's 1880 restaurant in the final days of 2020.

Israel-based Aleph Farms has also continued to advance the frontiers of cultivated meat. In October 2019, the company successfully grew cultivated meat at the International Space Station, in partnership with Russian company 3D Bioprinting Solutions.[8] In February 2020, Aleph Farms announced the launch of its visitor centre in Tel Aviv to promote transparency and trust in the cultivated meat industry,[9] and in April 2020, its plans to eliminate greenhouse gas emissions from its meat production by 2025 and to reach same net-zero emissions across its supply chain by 2030.[10]

In the UK, cultivated meat company Higher Steaks produced the world's first samples of cultivated bacon strips and pork belly in July 2020.[11] The pork belly product contains 50 percent cultivated cells and the bacon product contains 70 percent cultivated cells, with a mixture of plant-based proteins, fats and starches also incorporated. CEO Benjamina Bollag explained that hybrid products will help introduce consumers to the concept of cellular agriculture, as well as enable companies to offer more affordable products, ahead of commercial-scale production.

The same month, KFC announced a partnership with 3D Bioprinting Solutions to produce cell-cultivated and 3D printed chicken nuggets in Russia.[12] This marked the first major fast-food chain to make an announcement of its plans to produce and sell cultivated meat.

The process of cultivating meat from cells: gathering a small sample of cells from an animal; proliferating the cells in a bioreactor to grow fat and muscle tissue; a finished meat product. Credit: New Harvest

GLOBAL INVESTMENT

Despite the unprecedented economic uncertainties spurred by COVID-19, strong investment in the cellular agriculture sector continued to build momentum from 2019 into 2020 with growing interest in safe, secure and sustainable food systems.

TOTAL GLOBAL INVESTMENT IN CELLULAR AGRICULTURE COMPANIES FROM JULY 2019 – DECEMBER 2020:

Prominent investments and funding rounds from 2019-20 around the globe included:

Wild Type, a San Francisco-based company developing cultivated sushi-grade salmon, raised US$12.5 million in Series A funding.[13]

Israel cultivated meat company Future Meat Technologies raised US$14 million in a Series A round, with participating investors including Monde Nissin and Tyson Foods' venture capital arm, Tyson Ventures.[14]

Dutch cultivated meat company Meatable raised US$10 million, $3 million of which came from the EU's European Commission through its Eurostars Programme. CEO Krijn de Nood said this demonstrated the EU viewing cultivated meat as a credible aid to combating climate change.[15]

Californian cultivated meat company Memphis Meats raised US$161 million. Notable investors included Bill Gates, Richard Branson, and meat giants Cargill and Tyson Foods.[16]

Cultivated seafood company Blue Nalu raised US$20 million in a Series A round to help fund a pilot production facility in San Diego, ahead of a planned commercial launch in late 2021.[17]

The Singaporean Government allocated a further US$106 million to fund projects in the new Singapore Food Story R&D program, which includes a strong focus on cultivated meat and microbial protein production[18] and aligns with the country's aim to produce 30 percent of its own food by 2030.[19]

Californian acellular fermentation company Perfect Day raised US$300 million, the largest amount to date by any cellular agriculture company. Perfect Day uses fermentation to produce animal-free whey and casein, which can be used in dairy-style products such as ice cream, butter and cheese.[20]

Israeli 3D printed cultivated meat company MeaTech purchased cultivated fat company Peace of Meat for US$17.5 million.[21] MeaTech expects the cultivated fat technology to offer R&D synergy with its cultivated meat production for a more sustainable approach, after successfully 3D-printing a cultivated beef fat structure.

The Dutch company behind the world's first cell-cultivated burger, Mosa Meat, raised US$55 million.[22] Since 2013, the company has reduced its cost of production from €250,000 for its initial prototype to around €9 per burger, demonstrating the evolving potential of scaling cultivated meat production.

Singaporean cultivated seafood company Shiok Meats raised US$12.6 million to support three years of R&D and the building of the company's first production plant.[23] New shareholders include Seeds Capital - the investment arm of Enterprise Singapore - and several venture capital funds.

Australian cultivated meat company Vow raised A$7.7 million from investors including billionaire couple Mike and Annie Cannon-Brookes,[24] bringing the total funds raised by the two-year-old company to A$9 million.

AUSTRALIA'S ECOSYSTEM

The Australian cellular agriculture industry is gathering momentum, more than doubling in size with four new companies founded in 2020.

Companies in the local sector are focused on elements across the production chain, from developing materials such as scaffolding, cell culture media, and fats and oils derived from fermentation, to creating end products like cultivated meat and acellular dairy products.

Amongst several key developments in 2020, Sydney company Vow showcased some of the first cultivated meat products to be made in Australia in collaboration with celebrity chef Neil Perry of Rockpool Group. The proof-of-concept demonstration marked a milestone in the company's journey towards commercialisation.[25]

Despite this progress, a lack of local funding opportunities and adequate R&D infrastructure has placed the Australian sector at risk of losing homegrown companies and talent to more mature overseas food technology hubs such as Singapore, Israel, the Netherlands and the United States.

Company	Location	Product	Founders	Focus	Key milestones
cass materials	Perth	Scaffolds for cultivated meat	Dr Gary Cass	Working to produce an affordable, edible, high fibre scaffold to grow cultivated meat, using bacteria nanocellulose (BNC) also known as nata de coco	Founded in 2020; completed Australian accelerator Startmate's 12-week program; In process of securing funding for next stage of development
change FOODS	Melbourne (HQ in San Francisco)	Acellular dairy (cheese)	David Bucca	Using bio-engineering and acellular microbial fermentation to create dairy products that are lactose and hormone-free, and don't require the farming of animals	Founded in 2019; has held two funding rounds; set up U.S. headquarters in May 2020; developed its first microbial dairy compounds in June 2020. Raised US$875,000 in seed funding; hired a CMO formerly a Danone plant-based dairy brand manager
Heuros	Brisbane	Ingredients for cultivated meat	Dr Nick Beaumont	Developing growth factors, medium and other technology for growing mammal and bird muscle cells for cultivated meat production, with technology that does not use genetic engineering, animal products such as serum, recombinant growth factors, pluripotent stem cells, steroids or antibiotics	Founded in 2018; has received funding from Blackbird Ventures
MAGIC VALLEY	Melbourne	Cultivated meat (farmed animals)	Paul Bevan	Creating cultivated meat from traditionally farmed animals, with an initial focus on lamb	Founded in 2020
Me& FOOD TECH	Melbourne	Infant nutrition from human breast milk	Esha Saxena & Dr Luis Malaver-Ortega	Focusing on producing human breast milk including the nutritional value and its immunological and developmental benefits to deliver a complete infant milk formulation	Founded in 2020
Nourish Ingredients	Brisbane	Animal-free fats and oils produced by fermentation	Dr James Petrie & Dr Ben Leita	Building tailored animal-free fats to be healthier, more sustainable and offer the same taste and mouthfeel as animal fats, unlike plant fats like coconut and palm	Founded in 2020
Vow	Sydney	Cultivated meat (farmed and undomesticated animals)	Tim Noakesmith & George Peppou	Creating a library of animal cells from domesticated and undomesticated animals; Vow proposes that the most delicious meats may lie outside traditionally domesticated animals and instead are creating "a new category of food that is not just replicating existing meat options today, but also offering a new culinary experience"[26]	Founded in 2019; became the first company to create cultivated meat from an undomesticated animal (kangaroo); in 2020 showcased five additional prototypes. Raised nearly A$8M in seed funding in 2020 taking total raised capital to over A$9M

Figure 8: Australia's cellular agriculture companies, as of December 2020

ACADEMIC RESEARCH

Researchers across Australia and New Zealand are exploring a broad range of topics surrounding cellular agriculture including consumer attitudes and awareness, food sensory science, production methods, scalability and the social and environmental impacts of cellular agriculture. Current academic research projects include:

Socio-environmental impacts of scaling production: The Government of Western Australian has funded three PhD students to intern at Perth company Cass Materials to research the socio-environmental impacts of scaling production of scaffolds.[31]

Life-cycle-analysis of cultivated meat: Dr Natalie Doran-Browne at University of Melbourne is collaborating with CSIRO, Australia's national science agency, to assess and quantify sustainability aspects of various cultivated meat production systems. Outcomes from this project will inform industry best practice to drive sustainability.[27]

Consumer and chefs' attitudes toward cultivated meat: Researchers at the University of Melbourne will explore chefs and consumers' insights on cultivated meat and motivators for purchase decision.[28]

Food safety, food security and human health: University of NSW professor Johannes le Coutre is building a research group to explore the possibilities of cellular agriculture to address dilemmas around food safety, food security and human health.[29] The group is specifically investigating bioreactor design, tissue culture growth and food and sensory science, and has also collaborated with Australian company Vow.[30]

Interactions between plant-based proteins (soy, bean and pea) and cultivated livestock cells: The New Zealand-Singapore Bilateral Research Programme on Future Foods, led by the University of Auckland, is investigating these interactions to consider how they can be applied to the development of 'hybrid' products - foods which are a combination of both plant-based protein and cultivated proteins.[32]

VII. ABOUT FOOD FRONTIER

ABOUT FOOD FRONTIER

Food Frontier is the independent think tank and expert advisor on alternative proteins in Australia and New Zealand. Funded by grants and donations, our work is creating a safer, more sustainable and diversified protein supply.

Global economic, environmental and public health authorities continue to urge for greater consumption of protein from plant sources and reduced reliance on industrial systems of livestock farming and fishing. Alternative proteins, like plant-based meat and meat cultivated from cells, are a critical part of this solution.

Food Frontier illuminates the economic, environmental and public health benefits of alternative proteins and enables leaders to understand and pursue the opportunities they present. As an educator and facilitator at the centre of Australia and New Zealand's alternative proteins ecosystem, we engage businesses, innovators and policymakers – from start-ups to grocery giants, farming bodies to regulators – through reports, conversations and events.

FOOD FRONTIER

REPORT REVIEW

Sections of this report pertaining to DAE modelling were reviewed by:

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IMAGES

7-Eleven
Aglo Retail Intelligence
BBC News
Beyond Meat & Starbucks China
Channel 9 News
eatJUST
Fable Food Co.
Flave
Getty Images
Herb & Sons
Hungry Jack's
Impossible Foods
KFC Hong Kong
Mad Mex Fresh Mexican
Meatless Farm
New Harvest
Proform
Slape & Sons (Plant Nation)
Tesco
The Fry Family Food Co. (incl cover image)
vEEF by Fenn Foods
v2food

VIII. APPENDIX

APPENDIX

EXECUTIVE SUMMARY: GLOSSARY OF TERMS

Alternative proteins: Alternatives to conventional animal products that are either entirely plant-based, such as traditional meat alternatives and plant-based meats, or grown from animal cells using cellular agriculture technology.

Plant-based meats: Products that are made from combinations of plant proteins, oils, spices, seasonings and other plant derivatives, including starches and common food additives. Generally, these products use plant proteins (most often in the form of protein isolates, concentrates and flours) or mycoprotein (protein derived from fungi – see **Fermentation** as follows) as a base to achieve a more meat-like appearance and texture than traditional meat alternatives based on whole grains, legumes, nuts or vegetables – though some plant-based meats do contain these. Broadly, there are two groupings of plant-based meats:

- **Legacy products** helped establish the category in the 1980s and are primarily marketed to people who follow a meat-free lifestyle, often appearing in a dedicated vegetarian/vegan section of the grocery store.
- **New generation products** began to appear in Western markets from 2015 and aim to achieve a hyper-realistic sensory experience akin to conventional meat – from preparation to appearance, texture and flavour. As such, they are typically marketed to flexitarians and meat-reducers who are seeking familiar taste and functionality.
- **Fermentation:** Fermentation-based products, such as mycoproteins, are derived from certain varieties of fungi and produced with the use of fermenters similar to those found in a brewery. The fungi are grown in a nutrient solution in the fermenters, and the final product is heated, seasoned, steam cooked, chilled and shaped into the final meat-like texture.

Traditional meat alternatives: Products mostly composed of whole ingredients like whole grains, vegetables and legumes. As such, these products are not designed to closely replicate meat and are often marketed to vegetarians and vegans. This category includes **traditional alternatives**, foods long considered to be meat alternatives and made primarily of one ingredient, like tofu, tempeh and falafel, as well as **whole ingredient combinations** like a lentil burger. **Wholefood mimics** also fall into this category, and consist of fruits, vegetables or fungi prepared to mimic meat, like, 'pulled pork' jackfruit. These foods are used in meals as meat alternatives due to their meat-like appearance, texture and/or their ability to absorb flavours.

Note: Traditional meat alternatives are not plant-based meats and thus this subcategory of meat alternatives has not been included in the data underpinning the economic analysis for this report.

Plant proteins: Protein isolates, concentrates or flours derived from legumes, pulses, wheat and other plants via an extraction process. These protein ingredients make up a primary portion of plant-based meat products and are also used in other food products such as baked goods or sold direct to consumers as a stand-alone ingredient.

Cellular agriculture products: Meat, dairy, and other animal products that are identical to the components of conventional animal products (fat, muscle) at the cellular level, but created by mimicking the biological processes that traditionally occur within an animal. Cellular agriculture products are not yet available in commercial markets in Australia and thus not represented in the data underpinning this report.

- **Cultivated meat/seafood:** Animal meat/seafood created through cellular agriculture.
- **Cell culture medium/media (plural):** A nutrient rich solution used to support the growth of cells.
- **Cell scaffold:** A physical structure on which cultivated meat cells attach and are grown to form complex 3D structures, which imparts the texture and shape of the finished product.
- **Acellular:** A category of cellular agriculture that involves growing and harvesting a product that the cell cultures make, not the actual cells themselves. In acellular production, a variety of different proteins and fats can be grown without using animals, but instead by using cells or microbes (like yeast or bacteria). These proteins and fats can be harvested to create products like egg whites and dairy milk.

Conventional meat / seafood: Flesh from a whole mammal, bird or fish, including shellfish or other sea animal.

Diet Definitions:

- **Plant-based:** A diet type or food entirely comprised of plants, free from any animal products. This diet type is also referred to as Vegan.
- **Meat-Eater:** A diet type describing a person who eats conventional meats at the same or greater level than during the last 12 months.
- **Meat-Reducer:** A diet type describing a person who eats less meat in the last 12 months.
- **Flexitarian:** A diet type describing a person who eats primarily plant foods, though occasionally eats conventional animal meats, a maximum of four times a week; includes pescatarians.

INTRODUCTION: THE CASE FOR PROTEIN DIVERSIFICATION: HUMAN HEALTH

Global health authorities have demonstrated consistent and wide agreement that many countries should reduce consumption of meat[1,2,3] and increase consumption of fruits, vegetables, legumes and whole grains to reduce chronic diseases, public health risks and promote good overall health.[4]

It is also widely recognised that animal products can contribute to a healthy diet when consumed in moderation, especially in developing countries where food resources may be more limited.[5,6,7] Yet in nations where meat is consumed beyond the amount recommended by dietary guidelines, predominantly in the West, detrimental human health impacts have been observed. A major body of evidence spanning decades has consistently demonstrated the relationship between high consumption of red meat, particularly processed meat, and increased incidence of and mortality from[8,9] colorectal cancer,[10,11,12,13] cardiovascular disease[14,15,16] and type 2 diabetes mellitus.[17,18,19] These diseases are among the leading causes of death in Australia,[20,21] where in 2020, the average adult ate nearly double the amount of red meat recommended by dietary guidelines.[22,23]

This research led authorities like the Australian Heart Foundation to revise their dietary guidelines in 2019 to recommend that Australians get most of their protein from plant-based sources, as well as fish and seafood, rather than poultry and red meat. For the first time, the Heart Foundation recommended a specific limit on red meat consumption: no more than three lean serves (totaling 350 grams) of unprocessed beef, pork, lamb or veal a week.[24] In Canada, revisions to national health policy influenced the 2019 Canadian Dietary Guidelines[25] to strongly emphasise higher consumption of plants and moderation of animal products, as do the 2015 Swedish Dietary Guidelines.[26]

To enable the population-wide dietary changes needed to meet these guidelines, consumers require alternatives to conventional meat that are convenient, familiar and accessible. Offering consumers alternatives to their current dietary choices that suit their existing eating patterns can be a successful strategy, as studies have found that incremental dietary changes are often better implemented and adhered to long term.[27,28] There is positive evidence that replacing animal protein (of all types) with plant protein reduces all-cause mortality and the risk of developing cardiovascular disease.[29,30,31] Plant-based meats offer one form of plant protein that is both accessible and can serve as a healthier choice for those seeking to reduce their meat consumption. On average, across most categories, plant-based meats available in the Australian and New Zealand markets are nutritionally superior or comparable to similarly processed conventional meat products, as found in 2020 study by Food Frontier, *Plant-Based Meat: A Healthier Choice?*[32]

Other public health issues tied to conventional meat production, including the rise of antibiotic resistance and zoonotic disease, remain a significant threat with continued heavy reliance on systems of industrial animal agriculture, while plant-based meat production does not present these same risks.[33]

Average consumption of red meat by Australian adults in 2020, according to data from Organisation for Economic Co-operation and Development

INTRODUCTION: THE CASE FOR PROTEIN DIVERSIFICATION: ENVIRONMENTAL SUSTAINABILITY

A major 2019 report from the IPCC exploring land use and climate change concluded that the West's high consumption of meat and dairy products is contributing to global warming,[34] with animal agriculture now one of the largest greenhouse gas (GHG) emitters.[35] In contrast, the report found that plant-based diets, which require fewer environmental resources, can help fight climate change.[36]

An array of studies from other leading institutions have echoed these findings. A meta-analysis by the University of Oxford and the Life Cycle Assessment Research Group using data from 570 studies covering 38,700 farms in 119 countries, including Australia, found that most plant-based foods produce 10-50 times fewer emissions than animal products (see **Figure 9**).[37] Johns Hopkins University research found that choosing plant-based meals two-thirds of the time can cut a person's food-related emissions by nearly 60 percent.[38]

In Australia, ruminants (cows, sheep and goats) are responsible for 73 percent of emissions from agriculture, a sector that represents 13 percent of the country's total emissions according to Australia's former Department of Environment and Energy (DEE).[39] However, these figures could be far greater, as the DEE's calculation fails to include emissions from several components of the livestock production supply chain, including land cleared for grazing. A Beyond Zero report using data from CSIRO, the University of Sydney and aerial photography, shows when land clearing is included, animal agriculture accounts for 33 percent, or one-third, of Australia's overall emissions.[40]

As livestock industries and policymakers in Australia try to achieve progress towards reducing emissions from animal agriculture, public and private investment in increasing production and consumption of less resource-intensive protein options will be equally crucial.

Individually, Australians might consider how their dietary choices can lessen their environmental footprint. Academics from Melbourne, Deakin and the Australian National Universities examined the impacts of a variety of diets on land degradation, food security and sustainability in Australia. Their study demonstrated that a plant-based diet has the most potential to reduce the resources required to feed the population while also mitigating associated GHG emissions.[41] From an economic perspective, plant-based diets were also shown to help Australia maintain export capability, and these factors combined would reduce Australia's vulnerability to anticipated disruptions in the global food supply. Importantly, researchers noted that the current 'average' Australian diet is "environmentally unsustainable, unhealthy and costly".[42]

As climate change intensifies globally, agricultural losses will increase due to more frequent extreme weather events.[43] Simultaneously, ever-increasing agricultural production will eventually reach planetary boundaries as the resources necessary to grow food, like land and water, are depleted. Considering the outsized impact of animal protein production, increasing production of plant proteins in its place would result in a net increase in calories available to humans[44] and decrease in GHG emissions.[45] More efficient use of agricultural resources, including redirecting crops used for livestock feed to human consumption, will be essential to feeding populations within planetary boundaries.

Further, some varieties of pulses and legumes (including those used to produce plant-based meats) can be bred to resist drought, offering new ways to future-proof agricultural systems from the impacts of climate change.[46] Such innovations have already attracted large investments from the likes of Cargill,[47] as well as the Australian government, which invested in a joint venture with India's government to develop chickpeas that are tolerant to the stress of drought and increasing soil salinity.[48]

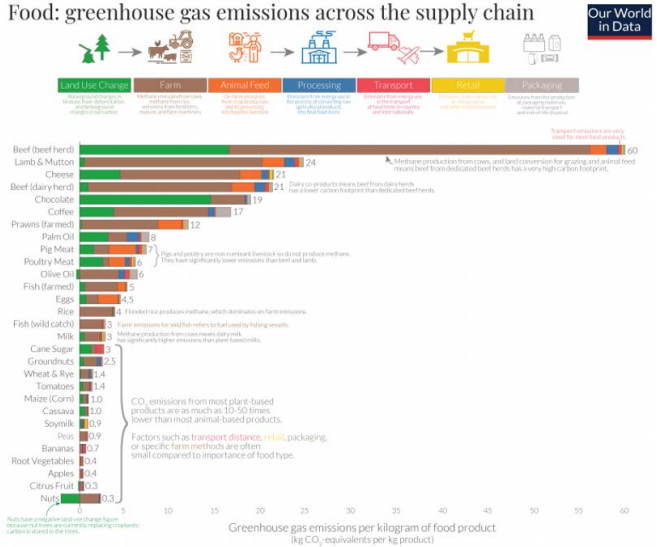

Figure 9: Data source: Poore and Nemecek (2018). Reducing food's environmental impacts through producers and consumers. *Science*.[49]

AUSTRALIAN LANDSCAPE 2020: FOODSERVICE PRICE COMPARISON

Price comparison of prominent examples of plant-based meat products on the menus at Australian foodservice outlets, with data gathered by Food Frontier in late 2020

Foodservice outlet	Price of plant-based meat product	Price of equivalent conventional meat product
7-Eleven	No Beef Pie: $4	Meat Pie: $3.5
	No Sausage Roll: $4	Sausage Roll: $3.50
Domino's	Meat-free Godfather: $14.20	Godfather: $13.40
	Plant-based Taco Fiesta: $14.20	Taco Fiesta: $7.95
Ferguson Plarre	Plant-Based Aussie Pie: $5.95	Beef Pie: $5.50
	Plant-Based Sausage Roll: $5.50	Sausage Roll: $5.20
	Plant-Based Wholemeal Tiddly Oggie: $5.95	Tiddly Oggie: $5.60
	Plant-Based Wholemeal Mini Oggie: $2.20	Mini Oggie: $2.20
Grill'd	Beyond patty can be added to any burger: $3	
	Beyond Simply Grill'd: $13.90	Simply Grill'd: $10.90
	Beyond Garden Goodness: $15.90	Garden Goodness: $13.50
	Beyond Chipotle: $15.50	(no Chipotle equivalent)
Hunky Dory	Varies by meal choice	
	Standalone, Fishless Fish: $12	Flake: $8.50 Barramundi: $12
Hungry Jack's	Rebel Whopper: $8.65	Whopper: $8.65
Huxtaburger	Substitute an Alternative Meat Co. patty: $4.50; Chik'n patty: $3.50	
	The Alternative: $18; Megan: $15	Kevin (grass-fed beef) $13.40
	Chad: $14	Henry (fried chicken): $12.50
Lord of the Fries	Examples of plant-based offerings: Big Original Burger $10.10; Big Chick'n Burger $10.10; Premium Original Burger (contains Beyond Beef patty) $14.10 Substitute a Beyond Meat patty on any burger: $3.95	No conventional meat served
Mad Mex	Poco Diablo Vegan Chicken Burrito: $12.90	Chicken Burrito: $11.90
Nando's	Great Pretender Protein can be added to any burger, wrap or salad: $1.00 Classic Burger with Great Pretender: $9.95	Classic Peri-Peri Burger: $8.95
Pie Face	Sausage Plant Roll: $5.00	Beef Sausage Roll $5.00
	Vegan Classic Mince Pie: $7.00; Vegan Thai Green Chicken Curry Pie: $7.00	Classic Mince Pie: $7.00; Chicken Mushroom Pie: $7.00
Ribs & Burgers	Fable Mushroom Burger: $14.90	No equivalent
	Beyond Old School Cheeseburger: $15.90	Old School Cheeseburger: $11.90

END NOTES

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