



Protein Industries Canada

Global Market Forecast and Competitiveness Study for Canadian Plant-Based Proteins

Summary of Findings

September 12, 2023

EY

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Disclaimer

Ernst & Young LLP (EY) was engaged by Protein Industries Canada Inc. (PIC) to perform a refresh of the global market forecast for Canadian plant-based proteins originally completed in 2021. This study is intended to provide PIC with an updated global perspective of the demand for plant-based agri-food products to help a) quantify and characterize the economic opportunity out to 2035 and b) understand how emerging market segments are expected to perform in the coming years. In preparing this document (Report), EY relied upon unaudited data and information from PIC, Food and Agriculture Organization, Good Food Institute, as well as other third party sources (collectively, the Supporting Information). EY reserves the right to revise any analyses, observations or comments referred to in this Report, if additional Supporting Information becomes available to us subsequent to the release of this Report. EY has assumed the Supporting Information to be accurate, complete and appropriate for the purposes of the Report. EY did not audit or independently verify the accuracy or completeness of the Supporting Information. Accordingly, EY expresses no opinion or other forms of assurance in respect of the Supporting Information and does not accept any responsibility for errors or omissions, or any loss or damage as a result of any persons relying on this Report for any purpose other than that for which it has been prepared.

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Executive Summary



Executive Summary

Purpose of the Study

Ernst & Young LLP (EY) was engaged by Protein Industries Canada Inc. (PIC) to perform a refresh of the global market forecast for Canadian plant-based proteins originally completed by EY in 2021. This study provides PIC with an updated global perspective of the demand for plant-based agri-food products until 2035, as well as a view into how these products are expected to perform in emerging markets over the coming years. This report includes:

A global market forecast out to 2035:

- ▶ Quantifying and characterizing plant-based protein market segments, including three emerging market opportunities;

An assessment of Canada's future competitive position, including:

- ▶ A view into the Canadian ingredient manufacturing industry and recommendations to improve global competitiveness and support inward foreign direct investment (FDI).

Market Overview

Since the previous study completed by EY, the outlook for the plant-based protein industry remains positive.

Segment	2021 Market Size*	2035 Market Size*	CAGR
Plant-Based Meat	US\$16.5 billion	US\$139.4 billion	16.5%
Plant-Based Dairy	US\$14.4 billion	US\$51.3 billion	9.5%
Plant-Based Baking Fortification	US\$8.7 billion	US\$15.3 billion	4.1%

Recent Global Trends

Since the last report, major events such as the pandemic in 2020 and the global macroeconomic slowdown in 2022 have impacted demand and supply trends in the plant-based protein industry. This report provides an updated view of the global market, based on market trends such as:



Increased Discretionary Spending

Concerns around environmental sustainability and animal cruelty are top of mind for consumers, increasing willingness to purchase plant-based products.



Higher Preference for Healthy Foods

Consumer preferences are shifting towards healthier foods, which has led to an increase in consumption of plant-based products.



Increased Price Sensitivity

Recent inflation has led to higher price sensitivity among consumers for products lacking texture and taste parity. Future product improvements are expected to offset this trend.



Rapid Growth in Emerging Markets

Population growth, rising incomes, and lactose intolerance have promoted growth of plant-based proteins in emerging markets, such as the Asia-Pacific.



Tight Labour Market

Persistent labour market shortages have affected industries across the world, including plant-based protein.

Despite the economic uncertainty in recent years, a positive outlook is expected for the plant-based protein industry due to factors that are expected to outlast recent disruptions. These include, but are not limited to, sustained consumer demand, growth in emerging markets, and innovative product improvements.

Executive Summary

Barriers to Growth

Globally, companies in the plant-based protein industry encounter a range of barriers to growth. Product-centric challenges may be resolved in the future through technological advances and innovative product development. However, streamlined government regulation and increased access to capital are needed to fuel innovation and scale-up production. Concurrently, supply chains need to be bolstered to sustain growth and avoid market disruptions.

1

Product Parity

Parity in price, taste, texture, and nutrition is critical for consumer adoption. Current products differ to various degrees.

2

Regulatory Challenges

Lagging government regulations, such as labelling and food safety regulations, are hindering the deployment and growth of novel products.

3

Access to Capital

Innovation of new technologies and scaling of market-tested products require funding, and adequate investment is a bottleneck.

4

Variations in Consumer Adoption

While plant-based dairy demand is relatively mature, efforts are being made to grow demand for other segments.

5

Supply Disruptions

Fluctuations in the supply and prices of input crops are affecting production costs and resulting product pricing.

Industry Priorities

Companies in the plant-based protein industry are focusing on the following themes to drive the growth of their businesses:



1. Augmenting Product Offerings

Focus on research and development (R&D) and new technologies as companies make efforts to improve parity and expand product portfolios.



2. Increasing Supply Chain Resilience

Diversifying sources of input crops and protein ingredients to increase resilience to potential supply chain disruptions.



3. Expanding the Addressable Market

Increasing accessibility of products in emerging markets and establishing partnerships to improve availability at the food service and retail level.



4. Improving Business Model Sustainability

Improving operational efficiency to transition into a profitable enterprise, sustain growth, and generate investment.

Considering the present market challenges and global economic conditions, companies that are able to address consumer demands sustainably and efficiently are expected to enhance consumer adoption of their products and facilitate market growth.

Executive Summary

Canada's Competitive Positioning

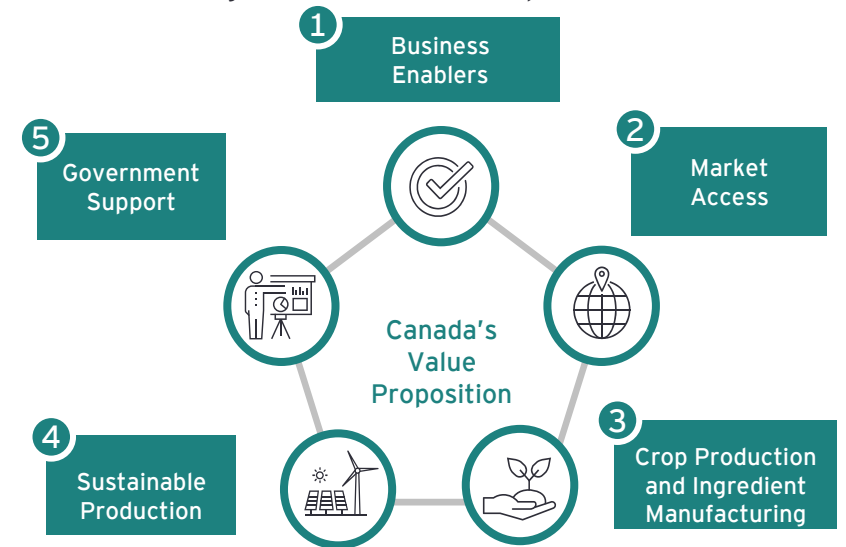
Based on an analysis of Canada's competitive position against leading jurisdictions active in the plant-based protein industry, Canada has several key challenges and opportunities to enable growth.

Themes	Competitive Advantages	Opportunities for Development
Market Size & Access	<ul style="list-style-type: none"> Established trade routes and agreements Sustainability in agricultural practices 	<ul style="list-style-type: none"> Investment in logistics infrastructure Securing supply chains
Agri-Food Ecosystem	<ul style="list-style-type: none"> Mature agricultural sector 	<ul style="list-style-type: none"> Reducing reliance on genetically modified organisms (GMOs)
Alternative Proteins	<ul style="list-style-type: none"> Established pulse fractionation capabilities Access to a wealth of input crops 	<ul style="list-style-type: none"> Capturing value-added activities Relaxation of labelling restrictions
Access to Capital	<ul style="list-style-type: none"> Strong financial sector, stable economy, and well-developed capital markets 	<ul style="list-style-type: none"> Enabling downstream capital access through tax incentives, risk capital and incubator support
Access to Skilled Labour	<ul style="list-style-type: none"> Quality academic institutions, with programs in agricultural sciences, that produce a highly educated labour force 	<ul style="list-style-type: none"> Supporting development of the manufacturing workforce Identification and investment in skill gaps
Business Costs	<ul style="list-style-type: none"> Localized sourcing eases logistics costs The combined federal-provincial statutory corporate income tax rate is one of the lowest in the G7 	<ul style="list-style-type: none"> Easing regulation and strengthening transportation infrastructure
Government Policies & Initiatives	<ul style="list-style-type: none"> Government support through initiatives targeted at the agri-food sector 	<ul style="list-style-type: none"> Enabling a supportive regulatory system
Collaboration & Coordination	<ul style="list-style-type: none"> Coordination between academic institutions, non-profits, industry, and government organizations 	<ul style="list-style-type: none"> Promoting government support Increasing regional and global collaboration

Canada's Value Proposition

Canada's value proposition in the plant-based protein industry is developed based on an analysis of Canada's strengths and unique positioning.

Figure 1: Canada's Value Proposition



- 1 A large diversified market with access to talent, financial markets, and support industries
- 2 Streamlined trade with western markets and access to emerging markets
- 3 Leading producer of protein-rich crops and infrastructure support for rapid processing
- 4 Focus on sustainability and food safety driven by a modern consumer base
- 5 Industry-specific government support to increase collaboration and investment

Executive Summary

Recommendations

Based on the key insights from the analysis, below is a set of recommendations for Canada's ingredient manufacturing industry segment:



Support Businesses in Meeting Input Needs

- ▶ Identify and link in-demand labourers to immigration and training programs
- ▶ Establish location-based incentives for manufacturers



Enable a Supportive Policy Environment

- ▶ Explore the costs and benefits associated with exemptions to front-of-package nutritional labelling, similar to those currently in place for traditional proteins
- ▶ Facilitate market entry of novel alternative protein products by championing product-specific guidelines in the food safety regulation process



Support Infrastructure Developments

- ▶ Invest in port infrastructure and technology
- ▶ Upgrade and develop agri-food processing infrastructure
- ▶ Support initiatives to improve water supply and wastewater infrastructure



Reduce Regulatory Red Tape

- ▶ Increase mobility for skilled trades across provinces
- ▶ Fast-track the regulatory inspection and shipping process for inbound equipment



Facilitate Downstream Demand

- ▶ Encourage industry for co-products
- ▶ Further international memberships and collaborations



Improve Access to Capital

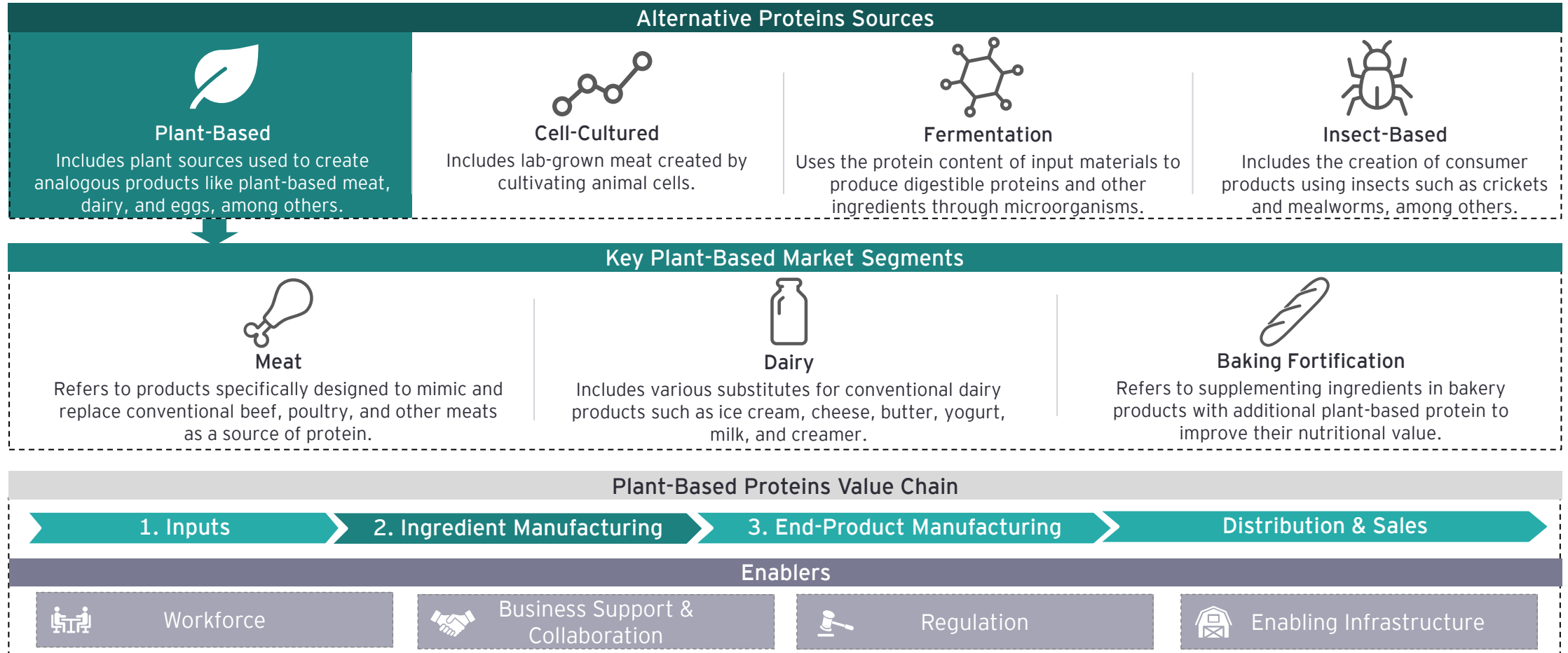
- ▶ Enable greater access to capital for the innovation pipeline to support scale-up opportunities
- ▶ Explore incentives such as new types of sector-specific investment tax credits

Overview of Findings



Overview of the Alternative Proteins Ecosystem

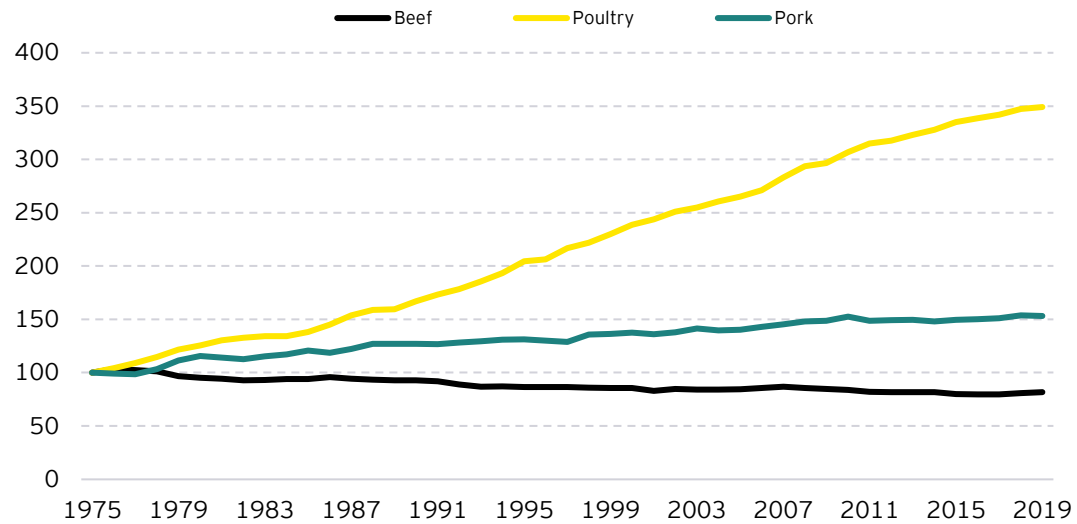
Alternative proteins include food products created with non-animal sources of protein to replace traditional animal-based sources. This assessment was conducted with a focus on plant-based protein ingredient manufacturing, and broader industry segments including plant-based meat, plant-based dairy, and plant-based baking fortification.



Recent Macroeconomic Trends

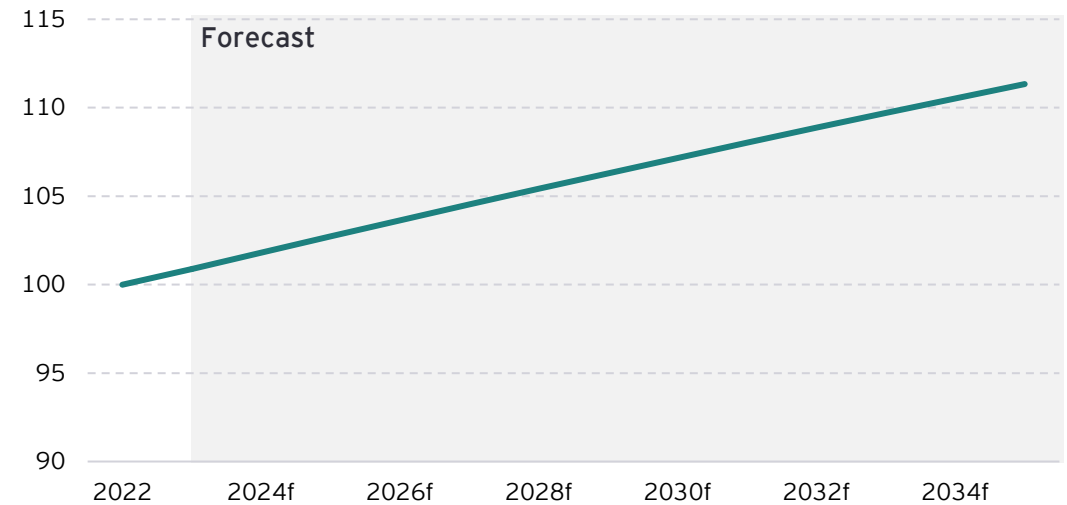
The global addressable market for plant-based proteins is increasing with shifting consumer preferences and a rising global population.

Global Change in Consumption of Meat Categories
(1975 = 100)



- ▶ While poultry consumption has more than tripled, beef consumption per capita has decreased since 1975. A similar trend is observed for milk consumption as well.
- ▶ These changes might be partly attributable to an increasingly health-conscious and eco-friendly consumer, traits that have been observed as drivers for the switch towards plant-based proteins.

Global Projected Population Growth
(2022 = 100)




- ▶ With a rising global population, plant-based proteins could offer a promising solution for a more sustainable food source.
- ▶ Bottlenecks to consumer adoption of alternative proteins are expected to reduce with increasing global income and the maturity of associated technologies.


Recent Macroeconomic Trends

In the coming years, short- to medium-term economic trends are not expected to outlast growth in the sector.


Key Global Macroeconomic Trends




Rising Costs




Low Business Confidence



Boost in Retail Sales

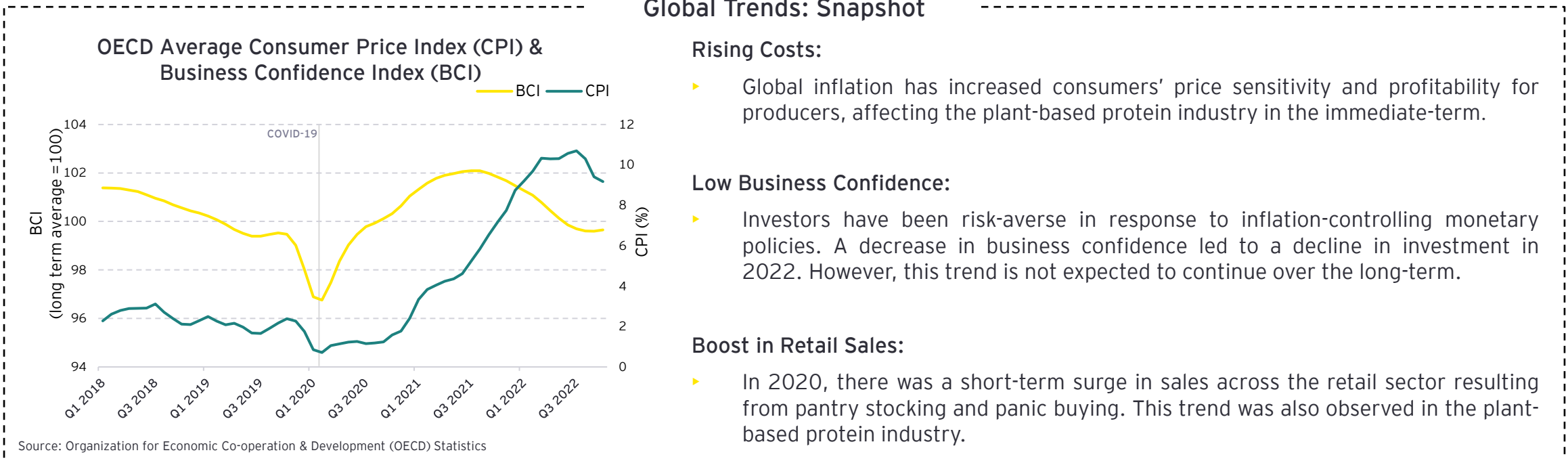


Labour Shortages



Supply Chain Disruptions

Global Trends: Snapshot



Rising Costs:

- ▶ Global inflation has increased consumers' price sensitivity and profitability for producers, affecting the plant-based protein industry in the immediate-term.

Low Business Confidence:

- ▶ Investors have been risk-averse in response to inflation-controlling monetary policies. A decrease in business confidence led to a decline in investment in 2022. However, this trend is not expected to continue over the long-term.


Boost in Retail Sales:

- ▶ In 2020, there was a short-term surge in sales across the retail sector resulting from pantry stocking and panic buying. This trend was also observed in the plant-based protein industry.


Recent Macroeconomic Trends

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Key Global Macroeconomic Trends




Rising Costs




Low Business Confidence



Boost in Retail Sales

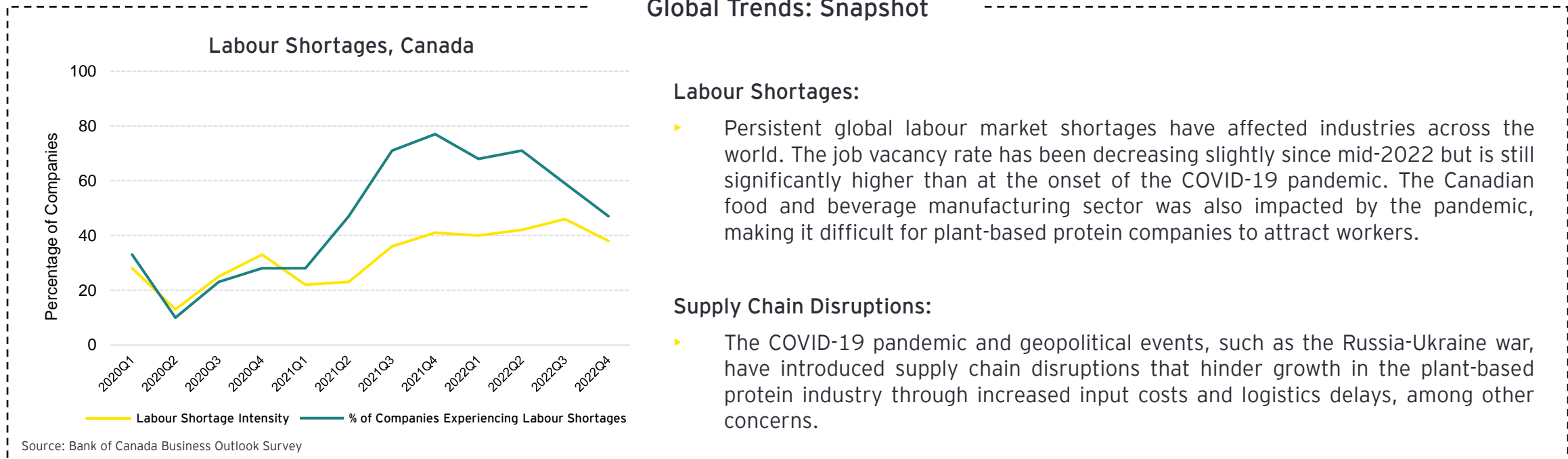


Labour Shortages



Supply Chain Disruptions

Global Trends: Snapshot



Labour Shortages:

- ▶ Persistent global labour market shortages have affected industries across the world. The job vacancy rate has been decreasing slightly since mid-2022 but is still significantly higher than at the onset of the COVID-19 pandemic. The Canadian food and beverage manufacturing sector was also impacted by the pandemic, making it difficult for plant-based protein companies to attract workers.

Supply Chain Disruptions:

- ▶ The COVID-19 pandemic and geopolitical events, such as the Russia-Ukraine war, have introduced supply chain disruptions that hinder growth in the plant-based protein industry through increased input costs and logistics delays, among other concerns.

Drivers of Consumer Adoption

Consumer adoption of plant-based proteins has been increasing due to growth in emerging markets and perceptions of sustainability, health benefits, and accessibility.

Sustainability

- ▶ Consumers are concerned about environmental sustainability and the production process of traditional proteins
- ▶ These concerns are more prevalent in younger generations

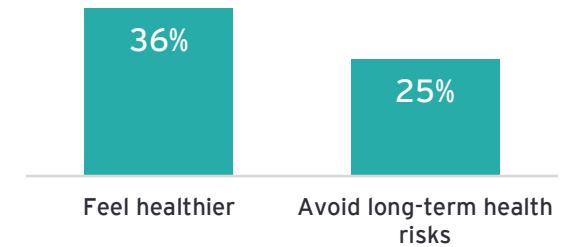


47%
of United States consumers believe plant-based alternatives to meat are better for the environment

Preference for Healthy Foods

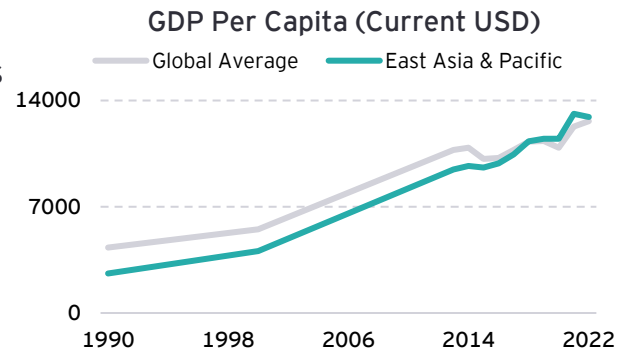
- ▶ Consumer preferences are shifting towards foods with lower saturated fats and cholesterol

Top Reasons for Consuming Plant-Based Meats (Global)



Growth in Emerging Markets

- ▶ Growth of alternative proteins in emerging markets such as Asia-Pacific
- ▶ This growth is observed due to population growth, rising incomes, and increasing instances of lactose intolerance



Accessibility

- ▶ Increased and easy access across retail and food service makes substitutions convenient for consumers

Alternative Meat Consumption Channels (US)



Barriers to Consumer Adoption

Gaps in texture, taste, and nutrition parity are the leading barriers to the adoption of plant-based proteins. At the same time, rising inflationary pressures are making consumers more sensitive to price premiums.

Price Sensitivity

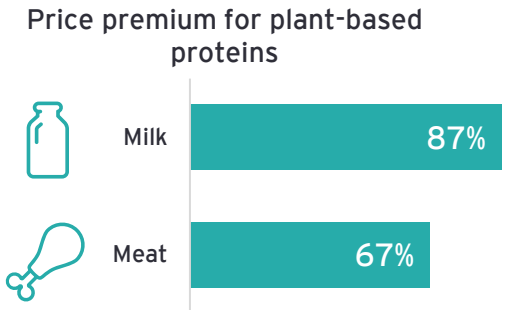
- ▶ Recent inflation has led to higher price sensitivity among consumers, hindering adoption of plant-based proteins that have not yet reached parity in price, taste, texture, or nutrition



64%
of consumers who reduced their consumption of plant-based proteins, cited price as a reason

Price Parity

- ▶ Alternatives are yet to reach price parity with conventional offerings, which hinders adoption



Taste and Texture Parity

- ▶ Technological innovations are moving plant-based products closer to taste and texture parity, however hurdles to consumer acceptance still exist



58%
of consumers who reduced their consumption of plant-based proteins, cited taste and texture as a reason

Nutrition and Product Characteristics

- ▶ Plant-based products struggle to achieve the same nutritional profile as their traditional counterparts
- ▶ Certain food products have qualities that are difficult to replicate with plant-based ingredients. Examples include the meltability of cheese and the texture of seafood



44%
of consumers wish for a wider variety of plant-based products

Observed Market Trends

Product maturity differs across the three markets - with dairy being the most established and milk the most mature product. Overall, the industry is prioritizing improving product characteristics through investments in innovative technologies and processes.

1 Plant-based Meat

- ▶ **Innovation to diversify:** While “minced” proteins like burgers and sausages close gaps in texture parity, steaks and seafood require textured proteins to mimic whole muscle strands, resulting in investments in innovation.
- ▶ **Positive Outlook:** While investment in plant-based meat companies had been steadily increasing, rising inflationary pressures in 2022 resulted in a global decrease in investment activity. Nevertheless, the long-term outlook of the segment remains positive.



2 Plant-based Dairy

- ▶ **Opportunity in food:** As opposed to traditional milk, consumption of traditional cheese and yogurt is increasing. This may indicate a potential gap in plant-based dairy food offerings.
- ▶ **Focus on nutrition:** Plant-based dairy products are being fortified with more protein, vitamins, and minerals in response to consumer demands.
- ▶ **Emerging markets:** With increasing instances of lactose intolerance, demand is expected to rise in Asia-Pacific.



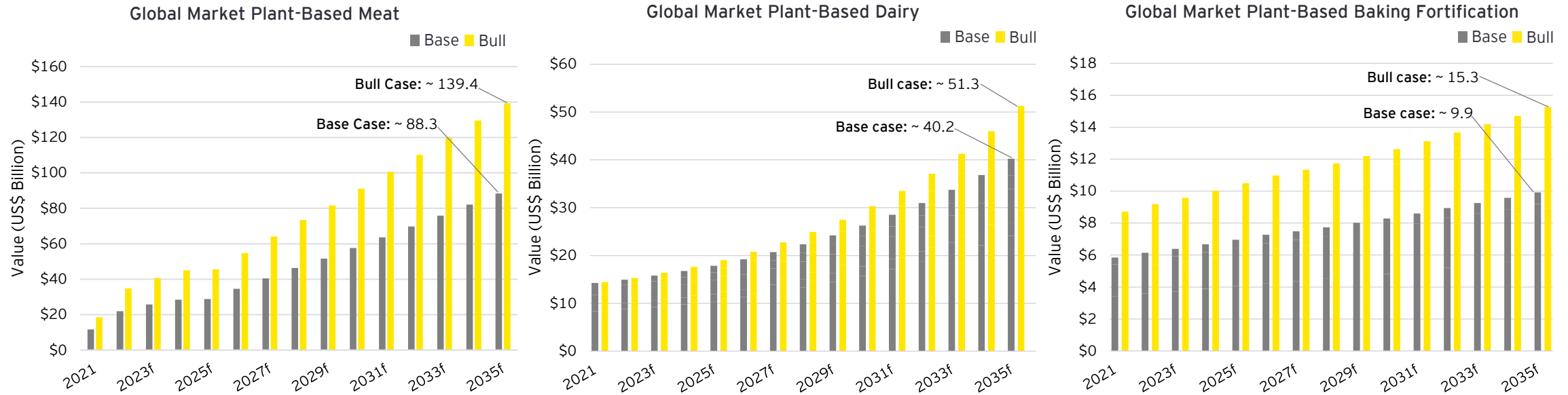
3 Plant-based Baking Fortification

- ▶ **Rising demand:** companies are responding to the increasing demand for higher-protein bakery products by prominently labelling and advertising their products' protein content.
- ▶ **Fortifying mixes:** Specialised companies are providing pre-mixed fortifying bases to both bakeries and consumers to limit detrimental effects on taste and texture.
- ▶ **Premium positioning:** Protein-fortified bakery products are being positioned as premium products with added nutrition.



Global Market Forecast: Plant-Based Proteins Market Sizing

The market outlook for plant-based proteins remains optimistic and is estimated to reach US\$ 206 billion by 2035 in the bull case.



Globally, the plant-based meat segment continues to show strong growth potential over the forecast period

- ▶ North America and Europe are anticipated to account for more than 70% of the plant-based meat market by volume and value by 2035

Plant-based dairy is currently the most mature segment, and is poised to retain its strong growth trajectory

- ▶ Asia-Pacific is estimated to be the largest market for plant-based dairy accounting for over 40% of market volume and value by 2035

Plant-based baking fortification is a nascent segment, and is estimated to reach US\$15.3 billion by 2035

- ▶ Asia-Pacific is estimated to overtake North America in market volume by 2035, though Europe is estimated to remain the largest market

Global Market Forecast: Plant-Based Proteins Demand by Source

The growing demand for plant-based proteins is expected to translate into a sizable market for raw ingredients, including soy, pea, wheat, among others.

Projected Demand for Grains and Pulses Resulting from Plant-Based Meat ('000s Tonnes), By Source

Source	Base	Bull
	2035f	2035f
Soy	18,024	28,492
Pea	10,025	15,845
Wheat	5,257	8,308
Canola	1,005	1,588
Oat	991	1,568
Lentil	1,682	2,660
Other Pulses	7,209	11,396
Other	3,888	6,147
Total	48,040	76,004

Projected Demand for Input Crops Resulting from Plant-Based Dairy ('000s Tonnes), By Source

Source	Base	Bull
	2035f	2035f
Soy	1,058	1,308
Almond	773	952
Coconut	684	842
Rice	387	484
Oat	354	447
Hemp	55	68
Others	131	164
Total	3,442	4,266

Projected Demand for Input Crops Resulting from Plant-Based Baking Fortification ('000s Tonnes), By Source

Source	Base	Bull
	2035f	2035f
Soy	533	820
Wheat	16	25
Pea	55	85
Others	12	19
Total	617	950

Under the base case and by 2035:

- ▶ Soy and pea are expected to make up more than half of the plant-based meat market
- ▶ Soy is expected to make up more than 30% of the plant-based dairy market

Over the forecast period, the market share of soy is expected to decline slightly for plant-based meat and plant-based dairy but to increase slightly for plant-based baking fortification.

- ▶ For plant-based meat, part of the market share is expected to be taken by pea and other pulses
- ▶ For plant-based dairy, part of the market share is expected to be taken by almond, coconut, and oat

The Opportunity for Canada

Below is an overview of Canada's key competitive advantages and opportunities for further development.

	Competitive Advantages	Opportunities for Development
 <p>Market Size & Access</p>	<ul style="list-style-type: none"> Established Trade Routes and Agreements Sustainability in Agricultural Practices 	<ul style="list-style-type: none"> Investment in Logistics Infrastructure Securing Supply Chains
 <p>Agri-Food Ecosystem</p>	<ul style="list-style-type: none"> Mature Agricultural Sector 	<ul style="list-style-type: none"> Reducing Reliance on GMOs
 <p>Alternative Proteins</p>	<ul style="list-style-type: none"> Established Pulse Fractionation Capabilities Access to a Wealth of Input Crops 	<ul style="list-style-type: none"> Capturing Value-Added Activities Relaxation of Labelling Restrictions
 <p>Access to Capital</p>	<ul style="list-style-type: none"> Strong Financial Sector, Stable Economy, and Well-Developed Capital Markets 	<ul style="list-style-type: none"> Enabling Downstream Capital Access Through Tax Incentives, Risk Capital, and Incubator Support

Jurisdictions Reviewed



Canada



United States



Singapore



Israel



Netherlands





China



EU

The Opportunity for Canada

Below is an overview of Canada's key competitive advantages and opportunities for further development.

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	Skilled Labour Force	<ul style="list-style-type: none"> Quality Academic Institutions, with Programs in Agricultural Sciences, that Produce a Highly Educated Labour Force 	<ul style="list-style-type: none"> Supporting Development of the Manufacturing Workforce Identification and Investment in Skill Gaps
	Business Costs	<ul style="list-style-type: none"> Localized Sourcing Eases Logistics Costs The Combined Federal-Provincial Statutory Corporate Income Tax Rate is One of the Lowest in the G7 	<ul style="list-style-type: none"> Easing Regulation and Strengthening Transportation Infrastructure
	Government Policies & Initiatives	<ul style="list-style-type: none"> Government Support Through Initiatives Targeted at the Agri-Food Sector 	<ul style="list-style-type: none"> Enabling a Supportive Regulatory System
	Collaboration & Coordination	<ul style="list-style-type: none"> Coordination Between Academic Institutions, Non-Profits, Industry, and Government Organizations 	<ul style="list-style-type: none"> Promoting Government Support of the Sector Increasing Regional and Global Collaboration

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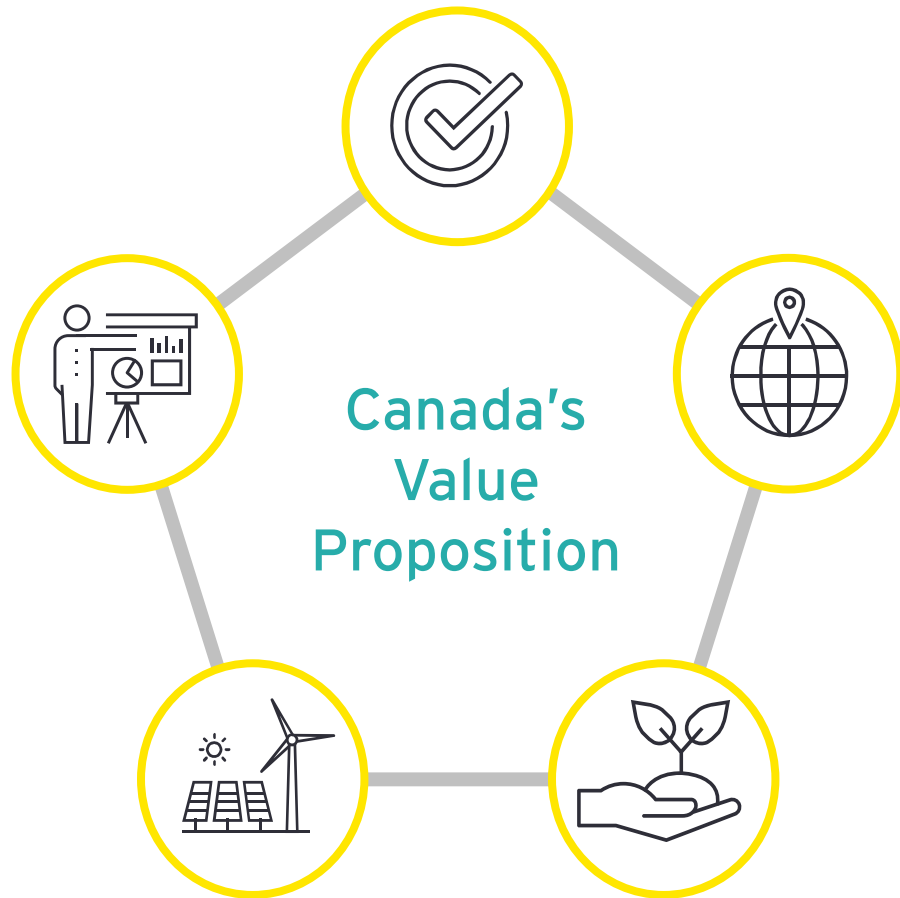
China



EU

Canada's Value Proposition

Canada's value proposition in the plant-based protein industry is developed based on research and analysis of Canada's strength and unique position in the market.



1. Business Enablers

- ▶ Acclaimed research and academic institutes
- ▶ Robust immigration policies
- ▶ Developed financial markets and diversified support industries



2. Market Access

- ▶ Close proximity to US and Mexican markets
- ▶ Preferential access to EU and UK markets
- ▶ Access to emerging markets through numerous ports



3. Crop Production and Ingredient Manufacturing

- ▶ Vast arable land endowment and leading exporter of input crops
- ▶ Infrastructure support through a logistics network with close access to agricultural inputs



4. Sustainable Production

- ▶ Use of crop rotations, crop engineering, and zero-tillage farming
- ▶ Access to a environmentally conscious consumer base
- ▶ Rigorous food health and safety standards



5. Government Support

- ▶ Sector-focused supercluster
- ▶ Proven government support and initiatives promoting academic, non-profit, and industry collaboration

Recommendations

Based on the key insights from the analysis, below is a set of recommendations for Canada's ingredient manufacturing industry segment:



Support Businesses in Meeting Input Needs

Key Actions: Identify and link in-demand labourers to immigration and training programs; Establish location-based incentives for manufacturers



Reduce Regulatory Red Tape

Key Actions: Increase mobility for skilled trades across provinces; Fast-track the regulatory inspection and shipping process for inbound equipment



Enable a Supportive Policy Environment

Key Actions: Explore the costs and benefits associated with exemptions to front-of-package nutritional labelling, similar to those that currently exist for traditional proteins; Champion alternative proteins product-specific guidelines in the food safety regulation process



Facilitate Downstream Demand

Key Actions: Encourage industry for co-products; Further international memberships and collaborations



Support Infrastructure Developments

Key Actions: Invest in port infrastructure and technology; Upgrade agri-food processing infrastructure; Improve water supply and wastewater infrastructure



Improve Access to Capital

Key Actions: Enable greater access to capital for the innovation pipeline to support scale-up opportunities; Explore incentives such as new types of sector-specific investment tax credits

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