



Ministry of Foreign Affairs

Market Study: Opportunities for the Netherlands in the Canadian Plant Protein Sector

Commissioned by the Netherlands Enterprise Agency

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Market Study: Opportunities for the Netherlands in the Canadian Plant Protein Sector

Prepared For

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The Netherlands and RVO

Prepared By

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Project Overview

Background

The Embassy of the Netherlands along with the Consulate Generals of the Netherlands in Canada have collaborated with the Dutch Agricultural Team in Canada to identify specific opportunities for the Dutch plant protein sector in the Prairie Provinces of Alberta, Saskatchewan, and Manitoba.

The Netherlands and Canada continue to work together to address food security while reducing the global footprint by emphasizing on sustainability. The Netherlands is well-known for its agricultural innovation, high-quality value-added products, and strong supply chain. The Netherlands is also a crucial European distribution hub.

The productive and innovative Dutch agricultural sector makes the Netherlands a key player in the global agriculture sector. Meanwhile, Canada has 28 million hectares of arable land and is the world's largest pulse exporter and canola producer, making it a plant protein powerhouse. Canada's agricultural capabilities is supplemented by world-leading plant science and research. This market study will explore opportunities for collaboration between the two countries.

The Plant Protein Sector

Recent changes in dietary preferences and concerns regarding sustainability has propelled the plant protein industry into the mainstream. The global industry is expected to be valued at \$40 billion by 2025, driven by consumer demand, as well as COVID-19. The pandemic has resulted in meat plant closures, revealing vulnerabilities in the meat protein supply chain, and further accelerating the focus on environmental awareness.

The development process aimed at ensuring optimal taste, texture, flavour, functionality, and quality for consumers is both complex and dynamic. However, these complexities provide opportunities for researchers, ingredient companies, and process technology companies to further develop the product.

The plant protein sector must look ahead, beyond the current challenges associated with supply issues and ensure that stakeholders are well-positioned for a new supply situation with new protein products. Currently, the main challenge is managing the value chain and developing strategic relationships between suppliers and users. The continued success of the plant protein sector is dependent on the sector's ability to have an operational, tactical, and strategic approach to the products for the long-term.

Complementary Collaboration

The complementary strengths exhibited by Canada and the Netherlands will allow for a strategic, mutually beneficial relationship. Both Canada and the Netherlands boast strong R&D capabilities and both countries are striving for self-sufficiency in their plant protein sectors. For its part, the Netherlands aims to work together with Canada to fill the gap between demand and supply and exploit the full value of plant protein.

Although the Dutch supply chain is strong, the absolute number of acres in the Netherlands is a limiting factor. This issue can be addressed through a collaboration between Canada and the Netherlands, benefitting both countries' agricultural sectors.

The Canadian Protein Strategy

The Canadian plant protein sector is transitioning from being a commodity producer to an ingredient supplier. Protein Industries Canada (PIC), an industry led organization with funds from both industry and the Government of Canada, is seeking partners with knowledge, expertise or technology in the plant protein sector on certain crops to promote the plant protein sector. In 2018, the Canadian government announced over \$150 million in funding to support the Protein Industries Canada Supercluster. The funds were aimed at helping the industry with technology development throughout the whole value chain with the goal of making Canada a world leader in the growing market for plant-based proteins.

PIC is currently exploring collaboration with partners in industry and research across the entire supply chain of the plant protein sector. PIC is committed to sustainability initiatives including circular agriculture with whole plant utilization including side streams. This goal towards sustainable development and value-added can be facilitated through a partnership with industry leaders and research partners from the Netherlands. This partnership would both allow Canada to realize the potential of its value-added agriculture sector and provide Dutch companies with financial opportunities.

The Dutch Protein Strategy

The Dutch government is in the process of finalizing its National Protein Strategy. The Netherlands is increasingly focusing on plant protein quality rather than quantity by placing greater emphasis on the sustainability of the protein. The Netherlands is undertaking an innovative and strategic approach to grow alternative plant crops for product development that satisfies the growing demand of meat-alternatives. This approach complements the circular agricultural approach in which the whole crop is used, minimizing waste. To help facilitate this approach of knowledge development, international collaboration in supplying and processing novel ingredients, co-product development, co-product application between Canada and the Netherlands is critical.

Project Objectives

The purpose of this report is to identify opportunities for Dutch companies in the Canadian plant protein sector and explore how future collaboration between industry players in both countries can be most productive. The intent is to develop an analysis of specific opportunities in the plant protein sector for Dutch research, industry, and government. Ultimately, this market study will provide a clear insight on the sector's features and opportunities. This information will facilitate the ability of the two countries to leverage their strengths in a strategic way.

In a plant protein partnership both countries have something to offer, the Netherlands could contribute to the Canadian market with precision protein and product development/application as well as access to the European market. Canada could contribute to the Dutch market because of the availability of high-quality ingredients (feedstock) and expertise. Throughout the development of this partnership, both countries could complement each other in developing technological plant protein innovations and advance R&D efforts in the plant protein sector.

The following questions were used to help guide the direction of this market study. Select questions are answered at the start of each chapter in this report.

Question 1: Provide a short overview of the Canadian strategy in the field of plant proteins, both on a federal level as well as on provincial level in the Prairie Provinces. Highlight the role of organizations such as Protein Industries Canada (PIC) and other important organizations representing the plant protein sector. Please indicate what the financial opportunities are in Canada for international plant protein collaboration.

Question 2: Who are the main players in research and industry in the field of plant proteins in the Canadian Prairie Provinces? Please describe the value chain in terms of resources (traders), ingredient processors, equipment manufacturers and distribution (B2B/B2C). Please note that the focus is not on consumer products/ end products. Please give an overview of the most innovative players in the plant protein sector with a focus on Canadian organizations who already have experience in international business, or organizations with ambitions to expand to Europe. If possible, please add a contact person in the organizations. Please highlight areas with strong growth for example in pulses or pea protein. Please highlight the international strategies (if available) and identify on which countries/subsectors/ parts of the food chain these strategies focus.

Question 3: Who are the main players - (applied) research, industry/SME and innovation hubs - in the Netherlands? Which subsector of the plant protein sector in the Netherlands has the most potential for collaboration with Canada? Please give an overview of the most innovative players in the plant protein sector.

Question 4: What could be the added value of the Netherlands to the Canadian industry such as access to market, co-product development, specific knowledge on processing?

Question 5: What could be the added value of the Canadian industry to the industry of the Netherlands such as high-quality ingredients, new products, co-development of products?

Question 6: How can the supply and demand of the Netherlands and Canada be matched for complementary collaboration? Which part of the plant protein chain has the most potential for both countries in the upcoming five years? Are there any specific niche or subsectors that have the most potential for collaboration?

Executive Summary

The Canadian Plant Protein Sector

The objective of this report is to identify opportunities for Dutch companies, research partners and innovation clusters and to be updated about the Canadian plant protein sector and highlight where future collaboration could be most productive. The report gives the reader insight on the plant protein sector's features and opportunities in Canada.

This report provides an overview of plant protein strategies from the national perspective of Canada as whole, but this report also focuses on the strategies of the three prominent Western Canadian Prairie Provinces of Alberta, Saskatchewan, and Manitoba. This region is where pulse production in Canada is concentrated and where most of the business and research opportunities for collaboration in the plant protein sector can be found.

The Federal Government of Canada announced Protein Supercluster funding contributions in 2018, which is targeted at contributing to the overarching goal of reaching CAD\$75 billion in agri-food exports through a combination of factors including *"increasing innovation and seizing value-added opportunities"* (Government of Canada). This ambition set the stage for immense growth in the agri-food sector in Western Canada. The Federal Government recognizes that innovation in plant proteins is the path forward to expand the value of prairie crop production, and various incentives are in place to attract innovators to the Prairie Provinces.

The plant protein industry is rapidly growing in Western Canada due to the combination of the following factors:

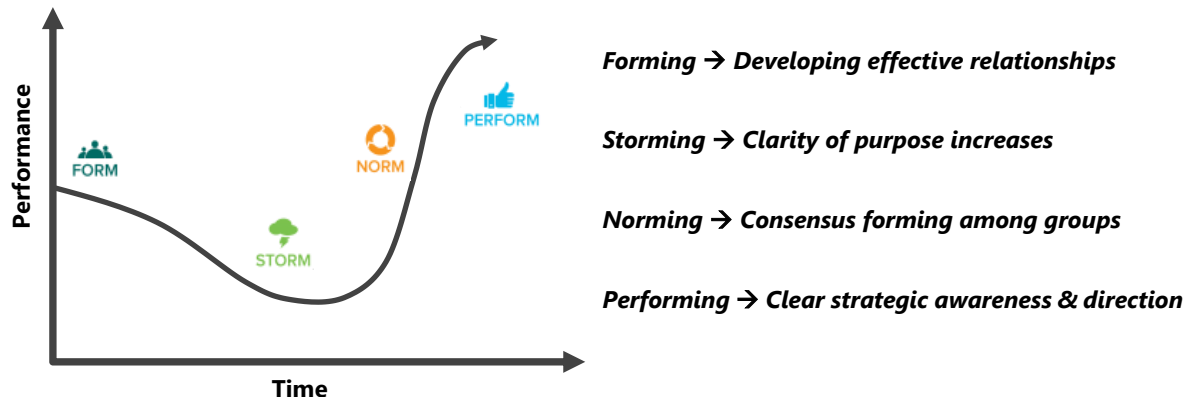
- Infrastructure, in the form of strong rail and transportation distribution hubs;
- Strong commodity crop production and high levels of experience/expertise in growing diverse pulse varieties;
- Favourable governmental policy setting for plant protein industry innovation and growth;
- Environment that encourages international companies to establish connections.

Furthermore, the Western region of Canada is open for investment, there is an abundance of raw commodity production in the prairie provinces, and the trade agreement between Canada and the European Union lowers thresholds of doing business abroad. These factors make Western Canada a preferable location for collaboration with international partners from the Netherlands.

As a method for describing the transitional growth of the plant protein sector in Western Canada, this report refers to Bruce Tuckman's development model, which outlines four phases of developmental growth: form, storm, norm, and perform.¹ The Canadian protein sector is still working through the forming stage, where relationships are being developed and paths forward identified (Figure 1). Since the Protein Supercluster funding announcements back in 2017-2018, these relationships have been forming between Canadian and international companies in the plant protein space. However, the clarity of purpose and direction forward for this industry is still in its developmental stage. This report provides insights in opportunities for collaboration of the Canadian plant protein industry with Dutch partners in the future.

¹ Bruce Truckman (1965) originally developed the commonly used model of group development to be applied to helping small working groups achieve high-performance in a rapid pace. However, the concept of transitioning through the phases is an effective way to describe the phases of development of Canada's protein industry.

Figure 1: Stages of Development



Source: Mission Capital, year?

The opportunities for the plant protein sector in Canada at this time are focused on ingredient and food production. There are specific opportunities for collaboration in plant protein fractionation in the prairie provinces because these processes have not (yet) been fully integrated. This includes innovative approaches to increasing the sustainability of production methods and diversifying the commodities being processed beyond yellow peas. Innovation in food production revolves around starch applications, production of flexitarian products, and in developing food products beyond meatless patties (e.g., plant-based dairy). There are also opportunities for collaboration with food production expertise from Food Valley in the Netherlands. Canada can take lessons learned from the Netherlands with regards to trained food scientists capable of effectively contributing to this sector.

Plant Protein Strategies

As a Dutch company, technology provider or representative from a Dutch research and innovation cluster it is very important to understand the overarching plant protein strategy and the differences on the national versus the provincial level. Plant protein research and innovation dollars in Canada are being channeled through the Protein Supercluster (PIC), the National Research Council (NRC), and various other initiatives designed to promote value-added processing in Canada. This report explains how national programs offer many opportunities for collaboration, but it is important to emphasize that the provincial programs should be given equal attention when it comes to seeking potential investment and collaboration opportunities as described below.

Plant protein strategies at the provincial levels are similar to the federal strategy as they focus on motivating further value-added processing and food manufacturing. While the federal strategy is broader reaching, the provincial strategies are more detailed in the types of plant protein innovation they target: (1) *improve plant processing techniques for more favorable product traits*, and (2) *incentivize processors to establish facilities in their region*.

More specifically, each province is seeking to develop commercial-ready lentil and pea protein isolate production processes for improved flavour profiles. This research priority from the provinces results from the negative taste attributes associated with commonly used plant-based proteins like yellow pea isolate. Consultation with stakeholders knowledgeable about policy direction at the provincial level outline how the provinces are investing in research to improve product traits, which they believe will help the protein industry further develop in Western Canada.

Discussion with the provincial food innovation and research centres suggests that the provinces recognize that this research is needed to supply higher quality inputs to plant protein processors, and ultimately feed into secondary food production for consumers. The provinces want their provincial ingredient producers to be working with inputs that allow them to develop ingredients that are able to supply niche varieties with favourable protein, starch, and fiber levels and accompanying attributes. The research towards improved product traits is currently taking place in each of the provincially owned food research development centres. Dutch expertise at this level of ingredient production would likely find opportunity to work with this emerging sector.

Consultation with investment attraction units of the provincial governments and other stakeholders suggest that the second overarching and connected plant protein strategy is to promote economic growth in the province by attracting value-added processing. At the most basic level the provinces and the federal government are seeking to attract more fractionation investments, but there is also a drive to push for more value-added food processing. The provinces want to capitalize on their position as global leaders in pulse production and incentivize further value-added processing. This work has been ongoing over the past five years and there are opportunities for both investment and for applying improved technologies to this space. The consultation process for this report revealed that the fractionation industry in Western Canada is in need of innovation with regards to processes. This could provide an incredible opportunity for Dutch innovation e.g., application of cutting-edge membrane extraction processes to pulses like yellow peas, lentils and chickpeas.

Canada and the Netherlands have different funding mechanisms to stimulate Research and Development, mostly with a national focus. While a number of different funding programs is available for international research or demonstration projects, these programs are often complex, not well known and need a long term commitment from participants. There is a need for Dutch and Canadian government to give an in-depth overview of available funding in the plant protein sector and to promote this in the sector.

Plant Protein Opportunities

Based on the background research and the extensive consultation process with plant protein stakeholders in Canada and the Netherlands, this report outlines the main opportunities for Dutch collaboration on plant protein. The opportunities have been separated into: (1) ingredient production, and (2) food production.

Ingredient Production

First and foremost, there are opportunities for collaboration, investment, and technology development in ingredient production techniques and capacity in all three prairie provinces. While this opportunity could take the form of a foreign direct investment by an international partner, it could also take the form of collaboration on research and development, advisory services on how to apply new processing techniques not yet commonly adopted in Western Canada, or selling advanced processing equipment, among other opportunities. Dutch companies could leverage advanced technology or collaborate with research and development taking place in the Netherlands and transplant these techniques to Western Canada. The key point to emphasize is that any collaboration should ensure that it is targeting producing niche ingredients or adopting new and innovative technologies. The objective would be to position themselves at a competitive advantage over some of the larger producers in this space that are reportedly using outdated technology.

A selection of the specific examples from this report include:

- Wet and Dry Fractionation Processes: There are specific opportunities for collaboration in both wet and dry fractionation in the prairie provinces. For example, adopting cutting edge membrane extraction techniques (common to the dairy industry) for wet fractionation of yellow peas, lentils, and chickpeas could create competitive advantages in this space. For dry fractionation, finding cost effecting techniques to pull more

protein out of starch flour would improve the viability of this industry. This is particularly true for the semi-arid regions of the prairies where a costly wet fractionation investment is either too capital intensive or requires too much water to be viable in the region. While the large wet fractionation investments in Western Canada (e.g. Roquette) have received the majority of the media attention, consultation with experts suggest that the “untapped” opportunity may be in dry fractionation on a much smaller scale.

- **Sustainable Production Techniques:** Collaborating to improve the sustainability of fractionation offers clear benefits: (1) more sustainable methods could potentially reduce production costs, and (2) more sustainably produced fractions would link well with the growing consumer demand for sustainable sourcing. The sustainability trend in Canada will only become more important in the future. For example, a developer of a water recycling technology that could be applied to wet fractionation may allow these investments to be made in more regions in the prairie provinces. Consultation with stakeholders at the provincial government level suggest that they are constantly being approached by regional economic zones (e.g. Battle River Alliance for Economic Development) that have ample raw commodity but other limiting factors (e.g. water) to supply a processing facility. These regions have investment incentives in place to attract processing, but the technology (or awareness of technology) is not present to allow these investments to go forward.
- **Diversification of Crop Inputs:** At the moment yellow peas are the current driver of the fractionation industry in Western Canada. However, as more fractionation capacity is built there will be a growing need to diversify outputs to stay competitive. The agronomic conditions in the drier regions of the prairies are equally or more favorably suited to growing lentils and chickpeas, indicating an opportunity to invest in processing these ingredients. Refined techniques for processing pulses are still being developed and this could provide an opportunity for Dutch expertise to collaborate with that plant protein space in Western Canada.

Food Production

There are also opportunities for investment and collaboration on food production technologies. Plant based food production is trending towards incorporating ingredients with improved flavor profiles and the use of fewer additives in their products, i.e. clean labels and gentle processing techniques. This links well with the Dutch Wageningen University's research focused on clean labels and gentle processing techniques. There are two main areas of collaboration with most opportunities:

- **Product Innovation:** With the Netherlands as a leading global food manufacturer, there is considerable opportunity for Dutch collaboration on product innovation in Canada. Particularly in finding innovative uses for starch, production of flexitarian products, and in developing food products beyond meatless patties (e.g., plant-based dairy). Consultation with experts in the food industry in the Netherlands suggest that the market for meatless patties (e.g., vegan burgers) will become saturated in the next five years. The emerging opportunities will be in seafood and dairy alternatives. The Netherlands is leading the way in this research and there is opportunity to collaborate in this area of the plant protein space. Consultation with those knowledgeable about Canada's food entrepreneur capacity indicate that Canada lags other nations like the United States and the Netherlands in producing expertise in this space.
- **Technology:** Various Canadian research centers are working on developing prototypes for plant-based meats using extrusion technologies. However, Canada has not historically emphasized research at this stage of the food supply chain. Instead, they have focused primarily on improving agronomic characteristics of plant production (e.g. crop “standability”, disease resistance, and improved yields). Transplanting Dutch expertise in the application of production techniques from Foodvalley in the Netherlands has potential. Canada could learn from the lessons learned in the Netherlands regarding trained food scientists capable of effectively contributing to this sector. The opportunity could take the form of providing consulting expertise, collaborating on research, or selling equipment. For example, the consultation process revealed

that many research institutions across Canada are receiving budgets to purchase equipment and develop new techniques to process food, but feedback suggests that there is a knowledge gap that needs attention going forward.

Conclusion

This report reveals the opportunities in the plant protein sector, but also specific recommendations to follow up with stakeholders regarding some of the points raised throughout the report. To summarize the overarching direction this industry is going in the next years, Western Canada will see more refined processes in the fractionation industry, that produce higher quality protein and starch through both wet and dry fractionation methods. The ingredient processing techniques will become increasingly more sustainable, and the diversity of crops being processed will move beyond peas.

When considering collaboration opportunities with the emerging plant-protein industry in Western Canada understand that the main opportunity for increasing ingredient production capacitating and technology and focusing on innovation new food production techniques.

Various processing techniques are reportedly coming down the pipeline and could potentially be applied to ingredient production in the prairies. The production techniques used by those entering this space must allow them to either produce niche products or produce fractionations at a higher quality than the larger players in the market at this time if they hope to compete. An advantage to investing in some of these smaller ingredient producers is that they are more able to shift production lines to create custom compositions. Consultations with the plant protein industry? The government? suggest that there is an “untapped” opportunity in dry fractionation in the drier regions of Western Canada. More processing capacity could provide a steady supply of ingredients for food processing in the Netherlands, offer an opportunity for consulting services on advanced processing techniques, or the direct sale of equipment to processors in the prairies.

A part of this push in the prairies to attract more ingredient production includes investment in research and innovation to improve ingredient compositions. Canadian companies are working with Universities and the provincial food development centres to produce ingredients for use in a variety of industries. One particular emphasis is on improving the flavour profiles of fractionation from yellow peas, which make up the bulk of pulses being processed in Western Canada. There is potential for this to link up well with Wageningen University’s research focused on clean labels and gentle processing techniques. The opportunity could also be motivated by seeking alternatives for soybean fractionations, which currently make up the bulk of the input for plant-based foods in the Netherlands. At an overarching strategic level, an argument could be made for the Netherlands to invest in increasing ingredient production in the prairies as a strategic policy to diversify away from relying on a few exporters of soybean fractionations. This could offer an opportunity for mutual gain for both Canada and the Netherlands.

There is also an opportunity for Dutch participation in Western Canada’s plant protein industry in food production. The Netherlands has entrepreneurs devising new products from a variety of protein-rich plant sources ranging from soy, peas, pulses, and so forth, predominantly in the area of meat analogues. This is the type of innovation needed in Western Canada. While there are funds being channelled into the food development centres and there is momentum behind this push, Canada remains behind the Netherlands in this area of expertise.

Finally, while Canada is coming into its third year following the Protein Supercluster announcements by the Federal Government, the relationships are still in their forming stage of development. There is a momentum in this industry right now and there is opportunity for Dutch collaborators to establish connections at this early stage and benefit as the sector continues to develop.

Recommendations

The recommendations outlined in this report build off the focus areas identified in detail in the [Target Growth Areas in Western Canada – Plant Protein](#) section. A detailed overview of the recommendations can be found in the [Recommendations](#) section at the end of this report. The following bullet points are the target areas identified:

- *Ingredient Production for Mutual Gain;*
- *Improve Fractionation Processing Methods;*
- *Prioritize Sustainable Production Methods and Research;*
- *Leverage Dutch Expertise in Applied Food Production Technology;*
- *Opportunity for Entrepreneurs in Food Product Innovation;*
- *Advisory Services Needed for Incorporating Plant-Based Ingredients.*

1. Introduction: The Canadian Plant Protein Sector

The objective of this market study is to identify the opportunities for Dutch companies, research partners and innovation clusters to become involved in the Canadian plant protein sector and highlight where future collaboration could be most productive. The intent is to provide the reader with a clear insight into the plant protein sector’s features and opportunities in Canada.

To understand why the Government of Canada is investing millions of dollars into plant protein innovation, and why companies are clustering in the prairies to capitalize on the emerging opportunities, it is important to understand it’s history. It is key to understand how Western Canada as a region traditionally growing cereal crops is now transitioning a dynamic plant protein innovation region. This will help to provides context around investments like the near complete CAD\$600 million dollar pea fractionation plant in the small town of Portage la Prairie, Manitoba. In short, the focus of this shift is on strategic, economic, and sustainable growth.

Canadian Prairie Provinces in Western Canada

The focus of this growth is in three Canadian prairie provinces of Alberta, Saskatchewan, and Manitoba in Western Canada. To put the size of this region into perspective, the province of Saskatchewan alone is 650,000 km², which makes it larger than the land surface masses of Germany, the Netherlands, and Great Britain combined. The prairie provinces have the agronomic conditions including well-drained, clay loam soils, which are ideal for growing plant protein such as peas, lentils, chickpeas and faba beans (Figure 2). Furthermore, the prairie provinces have skilled and experienced agricultural producers that have been growing consistent high quality pulse crops since the early 1990’s.

Figure 2: Canadian Pulse Growing Regions



Source: Pulse Canada

Pulse production

The Prairie Provinces are a major pulse production centre. Canadian pulse producers planted 3.9 million hectares of pulses in 2020 and are now producing in the range of 8.0-8.5 million metric tonnes on an annual basis. Saskatchewan and Alberta are the main producers. Manitoba has some production, but their growing conditions are also suited to corn and soybean, which are often favoured by producers over peas. Over the past five years Saskatchewan and Alberta have accounted for 95% of Canada's pea production, which reached 4.6 million metric tonnes in 2020. Green lentils are the second most grown pulse crop in the prairies. Canada accounts for nearly 40% of global lentil production (FAO), which is like saying the province of Saskatchewan accounts for close to this level of global lentil production, as the province accounts for 90% of Canadian production. This year Canada is predicted to export 5.5 million metric tonnes of lentils and peas (Statistics Canada).

Opportunities

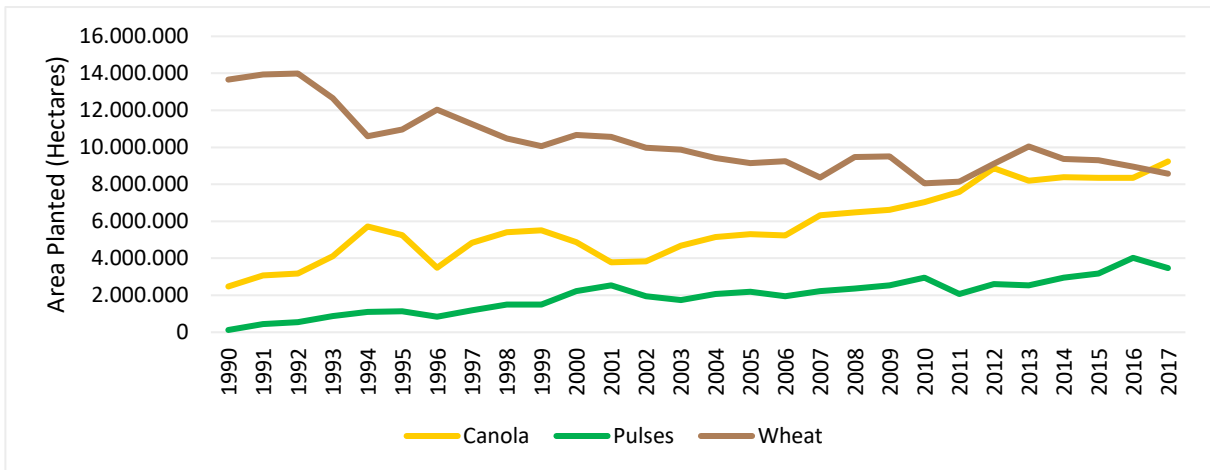
The focus of this opportunity revolves around the fact that this industry is still in its early forming days. This industry will soon enter the "storming" phase of growth (as described in Figure 1 on page 9), suggesting that now is the time for business partners to become involved with this sector. There is momentum and a window of opportunity for Dutch companies to develop strategies with Canadian partners as (national/international) strategies are currently being formed/developed.

For example, the Dutch expertise in secondary food processing is valuable to the Canadian sector to increase the quality of protein ingredients. Furthermore, the supply of plant protein ingredients from Canada to the Netherlands for partner food processors located in the Netherlands could help both countries develop their R&D in food product development. This could offer Dutch food manufacturers the opportunity to source consistent input of crops, or potentially expand production by establishing new operation lines that would allow them to grow into the North American market. Feedback from consultations at the provincial level indicate that the prairie provinces are primed for investment, there is abundant supply of a diverse variety of pulse crops in the region, and the trade agreement between Canada and the European Union all make it a preferable/favourable location for collaboration with international partners in the Netherlands.

History of the Canadian agricultural sector

In addition to a firm understanding of the growing prominence of pulses in this region, it is also important to provide more background on the pace with which agricultural production has changed in the Western provinces of Canada. Production of pulses has steadily grown since the early 1990's, which has helped to set the stage for the innovation in plant proteins seen today. It is important to understand that until early 1990, the prairie provinces focused primarily on the production of cereal crops like wheat (Figure 3). Canadian research and development were geared towards improving agronomics (standability, disease resistance, days to harvest, improving yields, etc.) and more generalized crop attributes (e.g. high protein level and high oil content) rather than value added processing. Up to the mid-1980's, Canadian associated agricultural policy, driven by Agriculture and Agri-Food Canada (AAFC), managed agricultural supply as a form of income stabilization (risk management) in the grain sector through controlling supply and providing transportation subsidies. Shifts in government policy, reduction in transportation subsidies, and changing global markets for wheat set a new path in motion in Western Canada: producers began to seek new crops to grow in the prairies.

Figure 3: Area Planted to Wheat, Canola and Pulses (1990-2018)



Note: "Pulses" includes peas, lentils, and chickpeas

Source: Statistics Canada, 2018

The first major shift in Canada came with canola. It is well known that Canada is a global leader in canola production and export. By the 1980's, as agricultural policy was shifting in Canada, researchers began to produce rapeseed genetics with low erucic acid content which has allowed the crop to become Canola ("Can" from Canada and "OLA" meaning "Oil, low acid"), which is now a dominant player in the global oilseed market. While canola is still the crop that farmers focus on to generate the highest returns on their operation, disease problems associated with monocropping and other factors continue to lead them to plant alternative crops in their rotations. Since the early 1990's there has been a steady increase in peas, lentils, and chickpeas in the three prairie provinces. Canada is now uniquely placed to sustainably rotate cereal crops, oilseed crops and pulse crops in a 3-year rotation in a tight geography. These three prairie provinces in Canada, with incredible agricultural potential, are now a global leader in pulse exports.

A Focus on Commodity Crops and Export

The current Canadian agricultural sector is still focused on commodity crop production and export. The Canadian plant protein sector is transitioning from being a commodity producer to an ingredient supplier. Protein Industries Canada (PIC), an industry led organization with funds from both industry and the Government of Canada, is seeking partners with knowledge, expertise, or technology in the plant protein sector on certain crops to promote the plant protein sector. In 2018, the Canadian government announced over \$150 million in funding to support the Protein Industries Canada Supercluster. The funds were aimed at helping the industry with technology development throughout the whole value chain with the goal of making Canada a world leader in the growing market for plant-based proteins.

PIC is currently exploring collaboration with partners in industry and research across the entire supply chain of the plant protein sector. PIC is committed to sustainability initiatives including circular agriculture with whole plant utilization including side streams. This goal towards sustainable development and value-added can be facilitated through a partnership with industry leaders and research partners from the Netherlands. This partnership would both allow Canada to realize the potential of its value-added agriculture sector and provide Dutch companies with financial opportunities.

Canadian agricultural research continues to be a global leader in agronomy focused on increasing crop yields and improving the sustainability of production using methods like no-till seeding. Grain handlers and producers have

both invested heavily in storage capacity both at the main collection points and on farm. The two Class 1 rail lines have also improved logistics networks and “Transportation Hubs” with transloading facilities have been built to get the commodities to export terminals on the west coast and at various terminals along the Great Lakes in both Canada and in the United States (Figure 4). While this investment into logistics and storage will help Canada capitalize on the increasing crop production coming out of the prairies, it has also helped to prepare for the growth in secondary processing. Even though the prairie provinces remain very focused on commodity production and export, it is important to emphasize that the business setting in Canada has important factors in place to thrive the plant protein sector collaboration between the Dutch and Canadians because of the following:

- Large surface of arable land and favourable growing conditions;
- Experience growing a variety of pulse crops (e.g. peas, lentils, chickpeas);
- Abundance of crop production (90% are pulses are exported);
- Stimulating provincial and federal plant protein policies;
- Large grain handlers for storing and distributing crops;
- Infrastructure for distribution to export terminals,

Figure 4: Grain Supply Chain



Source: CP Rail

Policy makers at the federal and provincial levels understand that Canada has already cemented its position as a global leader of agricultural commodity exports. The Canadian government is now seeking to increase the value of agri-food exports to \$75 billion annually by 2025, partially by adding value to commodities before exporting. Understanding this overarching policy direction is key if Dutch companies hope to collaborate with Canadian industry to work with some of the funding set aside for this purpose. In short, *a subsidiary investment with a coalition including Canadian partners for the purpose of secondary processing in Canada is a prerequisite for funding*. While this report will outline other opportunities for collaboration on research and development, those investors seeking to access funding will need to put some “skin in the game” and invest in innovation in Canada. In other words, Dutch companies that are looking to benefit from PIC funding will need to make real co-investments into the Canadian market to access funds in return.

This report emphasizes the opportunities currently available for Dutch companies and potential for increase collaboration in future. The opportunities identified in the report show that this industry is still in its early days and there is considerable opportunity to become involved at this stage in development. There is opportunity right now for Dutch companies to establish connections at this early stage and benefit as the sector continues to develop.

Dutch expertise in secondary processing could be leveraged to increase the quality and improve the supply of plant protein ingredients for partner food processors located in the Netherlands. The prairie provinces are primed for growth in the plant-based protein sector, there is abundant supply in the region, and the trade agreement between Canada and the European Union all make it an ideal location for collaboration with international partners in the Netherlands.

2. Canada: Current Protein Strategies

Question 1

Provide a short overview of the Canadian strategy in the field of plant proteins, both on a federal level as well as on provincial level in the Prairie Provinces. Highlight the role of organizations such as Protein Industries Canada (PIC) and other important organizations representing the plant protein sector. Please indicate what the financial opportunities are in Canada for international plant protein collaboration.

2.1 Overview

This chapter provides an overview of the current plant protein strategies in Canada, both on a federal level as well as on a provincial level in the Prairie Provinces. In Canada, the distribution of legislative powers are separated into two orders of government: the federal government and provincial governments ([Government of Canada](#)). The provinces have jurisdiction over natural resources and share legislative authority over agriculture with the federal government. Besides the split in authority between the feds and provinces, it is important to grasp the geographic scope of policy in Canada. For example, the distance from Alberta's capital city (Edmonton) to the national capital city (Ottawa) is roughly 3,000 km, or approximately the distance from Rotterdam to Cairo. The point is that Canadian national policy often has to fit a broad lens. In general, the federal plant protein strategy and the provincial plant protein strategies are going in the same direction. However, there is more detail outlined in the provincial strategies and this report will provide further context on their focuses.

2.2 National Plant Protein Strategy

The federal government in Canada has introduced a number of programs/clusters to promote the expanding plant protein sector in Canada. Canadian policy makers at the federal levels are seeking to increase the value of agri-food exports to \$75 billion annually by 2025 by adding value in Canada before exporting and shifting into becoming an ingredient provider

The push to generate sustainable economic growth in the agricultural sector is part of the five-year federal-provincial-territorial initiative known as the [Canadian Agricultural Partnership \(CAP\)](#). The program is broken down into five themes: (1) Environmental Sustainability and Climate Change; (2) Products, Market Growth and Diversification; (3) Science and Research; (4) Risk Management; and (5) Public Trust. Under this overarching 5-year agricultural plan, the federal government is promoting market diversification strategies aimed at Canada becoming more self reliant. Through their pulse strategy, Canada aims to diversify markets for pulse exports, target investment in food manufacturers and large-scale volume foodservice operators, increase their focus on pet food, feed, and aquaculture markets, and use 25% of pulses produced in Canada for domestic milling by 2025.

The approach to meeting the targeted market diversification goals is being channeled through various initiatives. The key national initiatives regarding plant protein strategy include: The information below does not need to be in a separate text box and can be added in text.

[Protein Industries Canada](#): In early 2018, the federal government announced the PIC Supercluster, pledging up to \$153 million, matched dollar for dollar by the private sector. The prairie-based initiative is comprised of businesses, post-secondary institutions and non-profits collaborating to make Canada a world leader in the

expanding plant-based protein market. The primary objective of this supercluster is to transition Canada from being a commodity exporter to an ingredient provider while creating over 4,500 jobs and adding over \$4.5 billion to Canada's GDP over the span of a decade.

Agri-Innovate Program: This program provides repayable contributions for projects that aim to accelerate the commercialization, adoption and/or demonstration of innovative products, technologies, processes, or services that increase agri-sector competitiveness and sustainability. The government of Canada recently announced financing to the tune of \$100 million for the new Merit Functional Foods facility in Winnipeg. The financing was provided through a number of federal departments including Agriculture and Agri-Food Canada (Agri Innovate Program), Farm Credit Canada, Export Development Canada, and the PIC funding initiative described above.

CAPTURE project: The CAPTURE project was established in April of 2019 to prepare emerging scientists to work in the plant-based protein sector. The program is led by Dr. Mike Nickerson, a professor at the University of Saskatchewan in collaboration with the Saskatchewan Ministry of Agriculture Strategic Research Program chair in protein quality and utilization, the CAPTURE Project is an interdisciplinary project whose objectives include:

- Improving the quality of protein feed stocks;
- Developing innovative dry and wet fractionation processes;
- Improving the techno-functional properties of plant proteins;
- Developing value-added applications, and
- Examining supply chain and market development opportunities for plant protein ingredients.

Of the \$3.8 million allocated to the CAPTURE project, the Natural Sciences and Engineering Research Council (NSERC) provided a grant of \$1.65 million dollars. The remaining funds came from the University of Saskatchewan, University of Alberta, and University of Manitoba, in the form of research grants and scholarships. The \$1.65 million in funding is part of a larger \$29.6 million investment being made by the Natural Sciences and Engineering Research Council of Canada's (NSERC) Collaborative Research and Training Experience (CREATE) program.² The Collaborative Research and Training Experience (CREATE) Program supports the training and mentoring of teams of highly qualified students and postdoctoral fellows from Canada and abroad through the development of innovative training programs, including programs aimed at the plant protein sector.

NRC/IRAP: NRC is Canada's largest federal research and development organization. The NRC partners with Canadian industry to take research impacts from the lab to the marketplace, where people can experience the benefits. IRAP is the funding program within NRC that is designed to accelerate the research and development projects of Canadian innovators. Businesses who are developing and implementing process improvements are the primary targets to receive research funding contributions through IRAP, however, large-scale technology adoption projects that lead to new capabilities are also considered.

In general, the federal plant protein strategy is in line with the three prairie provinces: Alberta, Saskatchewan and Manitoba. All federal and provincial strategies focus on support from the federal government, and generally have the same overarching goal of increasing value-added agri-food processing. They differ in approaches, which is explained in the table below. It should be emphasized that the provinces should also be focused on when seeking potential investment and collaboration opportunities with their specific expertise, specific budgets from their provincial government.

²<https://www.cbc.ca/news/canada/saskatoon/plant-meat-1.5213049>

2.3 Provincial Plant Protein Strategies

2.3.1 Alberta Plant Protein Strategy

Interest for Dutch Companies in Alberta	
<p>Alberta is the second largest pulse producer in Canada and a key producer of yellow peas, which are the main driver of the plant protein processing industry in Canada. In general terms, Alberta appears to be slightly behind the other two prairie provinces with regard to establishing secondary processing facilities. This was a general theme mentioned throughout the interviews with stakeholders in Canada. In this way, there is now a push from the government to establish more processing, which may offer opportunity for Dutch companies interested in entering the market.</p>	
Strengths	Weaknesses
<ul style="list-style-type: none"> ➔ <i>Solid research and finance experience (ATB, AFSC)</i> ➔ <i>Lowest corporate tax rate of the three prairie provinces</i> 	<ul style="list-style-type: none"> ➔ <i>Lacks fractionation plants</i> ➔ <i>Potential budget deficits driven by poor performance of oil and gas</i>
Context on Alberta's Plant Protein Strategy	Focus research on improving product traits for the food processing sector
	<p>A central pillar of Alberta's plant protein strategy is working towards improved product traits. This report provides an overview in the introduction of the historical focus in Canada on research and development geared towards improving agronomics (standability, disease resistance, days to harvest, improving yields, etc.) and more generalized crop attributes (e.g. high protein level and high oil content). This is now beginning to change, especially in Alberta. Alberta is shifting their research and development funding towards developing improved product characteristics, which are needed by plant protein processors, and ultimately consumers. This means meeting the need for niche varieties, certain protein/starch/fiber levels. Policy makers understand that this shift is necessary if value-added processing is going to be increased in the province.</p> <p>In a similar field, the University of Alberta is also working toward the goal of developing biopolymers with specific interesting in food proteins and polysaccharides from plant resources. The Faculty of Agriculture, Life & Environmental Science at University of Alberta is involved in plant-based protein innovation and application. The strategic partnership focuses on developing animal nutrition innovation and includes Trouw Nutrition and Wageningen University in the Netherlands. This partnership is currently being used to exchange researchers and promote innovation. While this partnership does not rely on any of the large funding initiatives recently announced, it is a good example of collaboration in the plant protein space and a research centre in Alberta with this focus in mind.</p>
	Support research through key programs and research centres
	<p>The province is supporting research by channelling funds through the provincially owned food development centre and through the Results Driven Agriculture Research (RDAR) program.</p> <p>At the research institution level, Alberta is also channelling funds into the Results Driven Agriculture Research (RDAR) program. Consultations with the provincial government suggest that RDAR is considering recruiting a "very short list" of individuals with expertise in plant proteins and "setting them up" in Alberta. One area where this research could focus is on valorization. Valorization, through isolation of proteins from the leaves of sugar beets (grown</p>

in Southern Alberta), is currently taking place in Alberta. Collaboration between researchers in the Canadian prairies and Dutch researchers from the Netherlands (e.g. food scientists from Wageningen, Food Valley) could yield positive results with respect to innovation and product commercialization because, research on processing techniques can be used to tailor plant protein functionality. This can be in the form of improving purity/solubility such that it can be incorporated in various types of products.

Through funds given by the federal government the provincially owned Food Processing Development Centre located in Leduc, Alberta, is receiving \$2.6 million for equipment that will help companies develop new plant-based foods and products in the province. The center supports the growth and commercialization of food, beverage, and ingredient companies. From a broader perspective, loans for food processing companies can be acquired through the Agricultural Financial Services Corporation (AFSC), based in Lacombe, Alberta. This group has been known to offer various loans through its Agribusiness Loan and Rural Business Loan programs for agribusinesses through its lending program. AFSC has been known to provide its services to unique investments (e.g. hemp decortication plants) that failed to secure loans from conventional banks. ATB Financial, based in Edmonton, Alberta, also offers financial services tailored for agribusinesses.

Example of Innovation in Alberta

A specific example of innovation taking place in the province of Alberta is with the company Botaneco. Botaneco received the first co-investment from Protein Industries Canada (PIC) which was \$4 million from PIC matched with an additional \$4 million from industry. The company uses its patented, water-based and sustainable method of separating oil bodies, protein concentrates and isolates from oilseeds (i.e. canola, safflower, hempseed). The company has two operating facilities in Calgary, as well as a U.S. personal care sales office in New Jersey, USA. Botaneco's goal is to create healthier and more affordable food, feed, and personal care products. Recent trial results validated Botaneco's Canola protein concentrate as a highly effective aquaculture feed protein ingredient that. Botaneco's push for whole crop utilization is well-aligned with the Netherlands' national protein strategy with respect to the circular agricultural approach where waste is minimized. While this initiative has received PIC funding, consultation with Botaneco suggests that conversations around collaboration were taking place well before the PIC funding announcement back in 2017, In other words the funding itself did not spark the collaboration but it helped to support it once those connections were already established. Botaneco recognized the "valuable talent" in the Netherlands (Wageningen University) and approached them to come to Western Canada to collaborate on research. Botaneco's connection with Wageningen University could be regarded as a case study and a successful example of Dutch and Canadian collaboration in plant protein

2.3.2 Saskatchewan Plant Protein Strategy

Interest for Dutch Companies in Saskatchewan	
<p>Saskatchewan is the largest pulse producer in Canada and the largest pulse exporter globally. The Government of Saskatchewan is looking to increase the number of processors in the province and there are opportunities for Dutch companies to become involved. Saskatchewan is seeking to develop commercial-ready lentil and pea protein isolate production process for improved flavour profiles, therefore, Dutch companies with expertise in this field would find opportunity to collaborate with the growing industry.</p>	
Strengths	Weaknesses
<ul style="list-style-type: none"> ➔ Saskatchewan has strong research capabilities ➔ Province is the largest pulse producer in Canada 	<ul style="list-style-type: none"> ➔ Historically lacked the same financial base as Alberta/Manitoba for investment
Context on Saskatchewan's Plant Protein Strategy	Increase processing within the province
	<p>Saskatchewan is the largest pulse producer in Canada and accounts for nearly 40% of global lentil exports. The government of Saskatchewan has published a 2030 strategy, with one of the goals being to process half of all pulse crops grown in Saskatchewan. Some wonder the feasibility of this objective, but it conveys the emphasis and priority of the on value-added processing by Saskatchewan. One strategy towards accomplishing this objective is their drive to promote networking and participation in plant protein conferences such as the Virtual Protein Summit, organized by the Dutch company Bridge2Food, which connects retailers, foods service professionals, food manufacturers, ingredient suppliers, and other service providers such as packaging, marketing, and brand agencies. For example, in June 2020, Saskatchewan partnered with Bridge2Food to host a virtual event to highlight and discuss opportunities in Saskatchewan in value-added agriculture, and to help promote economic growth in the province by attracting investment and increasing trade.</p>
	Commercialization of new processing techniques
<p>Saskatchewan supports the commercialization of new plant protein processing techniques. This is understandable given that they are the main producers of the raw commodities. Specifically, they are seeking to develop commercial-ready lentil and pea protein isolate production process for improved flavour profiles. The flavour profiles of pea isolate are not desirable in their current form, and the increasing push from food companies for "clean labels" suggests that processes to improve isolates flavour profiles, and thereby reducing the number of additives included in plant-based foods, would be a desirable result for the industry. There is a push to develop a commercial-ready process for manufacturing a bland tasting pea and lentil protein isolate, by spray drying, with functional properties that enable the protein to compete against other plant protein ingredients on the market and to be incorporated effectively into food products. The project is funded by the Saskatchewan Agricultural Development Fund and the Saskatchewan Pulse Growers. This specific focus is driven by the Saskatchewan Agricultural Development Fund (ADF) and Saskatchewan Pulse Growers (SPG). The first products to be launched under his stewardship are Xanflax (a clean label, gluten free substitute for Xanthan gum) and SesaFlax (a roasted flax seed that tastes like Sesame seeds).</p>	
Example of Innovation in Saskatchewan	
<p>One of the key players in plant proteins in the province is AGT Foods and Ingredients. AGT Foods is the largest pulse exporter in Canada and had a reported Gross Profit of \$125 million in 2018 (AGT Foods). AGT exports to world</p>	

markets focusing on India, Turkey, the United States and Europe. Traditionally AGT facilities are specialized in cleaning, calibration, peeling, splitting and colour sorting of pulses. They opened their first fractionation facility in North Dakota in the United States in 2013, where they use Saskatchewan-grown pulses (lentils, peas and beans). AGT is now positioning itself to being supplying ingredients to companies like Beyond Meat and Maple Leaf Foods (which owns LightLife). They recently entered a partnership with Ulivit, a Saskatoon-based start-up focusing on plant-based food manufacturing, where it will supply [Ulivit](#) with ingredients for its products. The \$11.3-million partnership was established through PIC funding. In addition, they have established a partnership with Lucent's technology, an agreement that will allow for whole-seed utilization by converting the hulls of lentil and pea seeds produced by AGT into fertilizer, minimizing waste in the value-added processing stream and expanding the market plant protein co-products. Again, this partnership emphasizes AGT's commitment to a circular economy, which is in line with the Netherlands' protein strategy.

2.3.4 Manitoba Plant Protein Strategy

Interest for Dutch Companies in Manitoba

The provincial government of Manitoba recently unveiled a protein strategy aimed at increasing collaboration between plant-based and animal-based protein producers. Manitoba has the most concentrated production of hogs in the prairies and has major processing facilities for companies like Maple Leaf Foods. (one of Canada's largest meat processors, Maple Leaf Foods reported CAD\$3.9 billion in sales in 2019 ([Maple Leaf](#))). Maple Leaf is reportedly diversifying their offering to prepare for strong demand for plant proteins by consumers. This drive meshes with the desire from some consumers to consume a flexitarian diet, where they do not cut meat consumption completely, rather they seek to reduce consumption or eat foods that had plant-based additives. The strategy includes signing a cross-border agreement so Manitoba researchers and companies can collaborate with industry partners in other provinces and states to explore and develop new uses for proteins.

Strengths	Weaknesses
<ul style="list-style-type: none"> ➔ Hosts world's largest pea protein facility (Roquette) ➔ Favourable government support infrastructure 	<ul style="list-style-type: none"> ➔ Less provincial pulse production ➔ Smaller research profile than other provinces

Context on Manitoba's Plant Protein Strategy	Attract plant protein processing facilities
	Another key insight is the disproportionate number of processing facilities being set up in Manitoba relative to the production in the province. While some of these facilities will benefit from access to soybean production and other crops that are grown in the province, the majority of the pulse crops are grown in Saskatchewan and Alberta. One of the explanatory factors is Manitoba being an early promotor of their willingness to offer financial support for plant protein companies. Manitoba also has ample water resources and favourably priced hydro-electric power rates.
	Support technology development
	A recent announcement of financial support from the provincial government and the federal government is the \$2.5 million investment to support technology development and utilization in Merit Functional Foods' new plant protein production facility in Winnipeg. Burcon NutraScience , a protein extraction technology developer, established Merit Functional Foods , which now produces proteins to be used as commercial ingredients. Merit and Burcon have recently entered into an agreement with Nestlé, with the aim of supplying protein derived from peas and canola that will be incorporated in Nestlé's food and beverage products. Using

	Burcon's state of the art technology, Merit will produce plant protein ingredients with specific applications for food and beverage products.
Example of Innovation in Manitoba	
<p><i>The largest plant protein processing investment in Manitoba is Roquette, which aims to be the largest fractionation plant in the world, is currently in the final stages in Portage la Prairie. During stakeholder consultations, one interviewee noted that the Premier of Manitoba himself was directly involved in efforts to attract Roquette's investment. The Manitoba government provided tax increment financing (TIF) to the tune of CAD\$6.8 million to assist in covering site development costs for the new facility. As a sign of further support, at the start of 2020 the province allocated over CAD\$60 million in funds for wastewater infrastructure upgrades in Portage la Prairie, which is home to a numerous other agribusiness along with Roquette. The province recognizes that this type of infrastructure is crucial for food processing facilities and that it will likely drive future investments.</i></p>	

2.4 The Plant Protein Strategy of the Netherlands

Interest for Dutch Companies in the Netherlands	
<p>The Netherlands presents an opportunity for Canadian companies to set up in a region that can act as the gateway to Europe. The Netherlands has strong supply chains, strong research and development infrastructure and considerable expertise in food processing.</p>	
Strengths	Weaknesses
<ul style="list-style-type: none"> ➔ Experience in market development, financing and facilitating partnerships ➔ Strong R&D Capabilities (Wageningen University, Food Valley, etc.) 	<ul style="list-style-type: none"> ➔ Limited acres of raw commodities as feedstock ➔ Limited resources/ processing infrastructure ➔ Different fragments of the supply chain the development of plant protein products complex
Context on Dutch Plant Protein Strategy	<p style="background-color: #008000; color: white; padding: 2px;">Circular Economy</p> <p>The Dutch circular economy emphasizes the requirement for the transformation of various production supply chains. With a focus on the food supply chain, agriculture, the environment, trade, green growth, and innovation.</p> <p>The Netherlands seeks to add value by taking an integrated approach to the transition by establishing a framework an integrated approach. The approach focuses on three requirements:</p> <ol style="list-style-type: none"> 1. In a circular economy, natural resources must be effectively used and managed. Such resources include soil, water, and biodiversity. These resources are essential to be able to produce renewable resources. 2. Reducing food waste and a focus on more vegetable protein and less animal protein is another emphasis in the Dutch circular economy. Also important is a reduced use of natural resources and less environmental pressure. 3. It is important to make optimum use of residue streams, such as tomato stalks, beet pulp and stale bread. In this way, as little biomass as possible will be lost.

	These three requirements demand action to be able to bring about the transition to a circular food system.
	Plant Protein Food Production
	There are considerable companies and research institution in the Netherlands focused on plant-based protein, including international companies like Beyond Meat , but also domestic companies like the Vegetarian Butcher. Start-ups are also emerging that specialize in the production of alternative dairy products and alternative seafood products. The Netherlands is leading in this area.
	Example of Innovation in the Netherlands
	<i>One example of an innovative Dutch Company in plant proteins is "Those Vegan Cowboys". The founders of the Vegetarian Butcher are now working to develop plant-based dairy products. While the two founders sold the Vegetarian Butcher to Unilever in 2018, they are now working on innovation into alternative milk and other dairy products. Our consultations with stakeholders in the Netherlands indicated that the next steps for plant proteins will move beyond meatless patties. The two new trends that will emerge will be alternative dairy products and alternative seafood products. The Netherlands has the food scientists and established food companies capable of leading this type of innovation.</i>

2.5 Recommended Approach to Outreach

There are various approaches that can be taken to connect with the industry in Western Canada. The approach adopted depends on whether the interested party is a company, a consultant, an investor, a research institution, or various other potential interested parties. The above information will have provided an overview of the direction policy priorities, and the following is intended to tell readers who to reach out to for further information.

First and foremost, there are various experts operating in this space that are well connected to the protein initiatives and would be the ideal source for making the necessary connections. A selection of these contacts can be found in the [Appendix](#). Many of these individuals already work with both Canadian and international companies and they would be well suited to facilitating the right connections.

2.5.1 Business to Business (B2B) Connections

For those applicants from the private sector seeking to conduct their own outreach regarding potential investment opportunities, it is recommended that they reach out first to the provincial investment attraction branches of the ministries in Alberta, Saskatchewan, and Manitoba. Connecting directly to the Canadian provinces and the specific branch of the provincial ministry that is charged with attracting investment to the plant proteins sector is the most effective method to get insight into immediate opportunities. The staff working in these units are well-aware of the sector and have connections with the emerging plant protein space in their respective provinces.

One advantage to reaching out to staff within the Canadian Ministries first is that they have less interest in influencing the direction the larger plant protein industry takes. In other words, unlike some of the other funding initiatives and potentially the food development centres, the provincial investment attraction branches are simply aiming to connect investors for emerging opportunities. In this way, they are not trying to 'guide' the direction of the plant protein sector and have less interest in fitting investors into their priorities for the industry. Similarly, it is

recommended touching base with the regional economic development organizations in each province. Please see the information per province below.

Alberta		
Alberta Agriculture and Forestry	Ileana Costiuc	Ileana.Costiuc@gov.ab.ca
Edmonton Global	Mustafa Sahin	msahin@edmontonglobal.ca
Saskatchewan		
Saskatchewan Ministry of Agriculture	Justin Redekop	justin.redekop@gov.sk.ca
Invest in Canada	Jordan Gaw	jordan.gaw@invcanada.ca
Manitoba		
Manitoba Protein Advantage	General Enquiries	mbproteinadvantage@gov.mb.ca

While it is recommended establishing contact with the larger national Protein Supercluster initiatives because of their broader reach and access to funding, it is additionally suggested to connect directly to the provincial investment attraction units as well. Contacting them directly as a first step to get a perspective on current opportunities may give Dutch investors an overview without having to navigate the various layers of politics involved with some of the other initiatives. As a starting point, the following are contacts for the provincial investment attraction branches.

2.5.2 Government to Government (G2G) Connections

For government-to-government connections this report recommends reaching out to the Industrial Research Assistance Program (IRAP) within Canada’s National Research Council (NRC), the Investment Attraction Branch within AAFC, and Protein Industries Canada (PIC). These groups are key organizations to reach out to as they have a broad perspective on opportunities and are well connected with the funding opportunities. Protein Industries Canada (PIC) in particular has access to national funding and a good oversight of potential opportunities coming down the pipeline. They should be contacted to discuss potential opportunities going forward. PIC has access to upwards of CAD\$153 million in funding to match with private sector contributions and the contact below is a good starting point for Dutch companies seeking opportunities to team up with Canadian companies. The following contact would be a good place to start.

Industrial Research Assistance Program (IRAP)		
Industrial Technology Advisor	Tamara Kononoff	Tamara.Kononoff@nrc-cnrc.gc.ca
Investment Attraction and Innovation Branch (AAFC)		
Senior Investment Officer	Denis Bégin	denis.begin2@canada.ca
Protein Industries Canada (PIC)		
Program Specialist	Diane Harmes	diane@proteinsupercluster.ca

2.5.4 Applied and Fundamental R&D Connections

Finally, the last key piece of the puzzle are connections focused on applied and fundamental research and development. This is primarily targeted at those private contract research centres (e.g. NIZO and TOP B.V.) and leading academic research institution such as Wageningen. The primary contacts in Canada are going to be the food industry development centres within each province. These offer similar services as the Green East Centre in the Netherlands. These food development centres not only have a good perspective on the state of industry in their respective provinces, but they also have strong connections to the research institutions (colleges and universities) in each province. Therefore, they would be an ideal place to begin inquiries for those from Dutch research

institutions seeking to collaborate on research and development going forward. The food development centres often have university representatives on their board of directors and can help to facilitate connections to specific research departments within the universities in Western Canada. The approach to take would be to review the provincial plant protein strategies outlined earlier in this report and approach the contacts below with specific requests to become involved in those research priorities.

Organizations reaching out for international R&D funding have to be aware that Canada and the Netherlands have different support and funding mechanisms, mostly with a national focus. The funding mechanisms for international collaboration can be complex, in some cases a formal partnership or even a local office is needed to benefit.

Some examples of funding mechanisms are:

“[DHI Subsidie regeling](#)”: is a program for Dutch companies planning to demonstrate a new technology in Canada, this can be through a demonstration project or can be used when setting up a feasibility study.

-the Scientific Research and Experimental Development Tax Incentive program in Canada ([SR&ED](#)) is one of the most commonly used flexible programs. This program also offers opportunities for international collaboration, eg a funding mechanism to attract foreign students and researchers for specific projects.

-[Horizon Europe](#): (the follow up program of Horizon 2020) Canada is international partner in this European R&D program, this program is aimed at projects with partners from multiple countries, through an international competitive process. In 2018 Canada has launched [the New Frontiers in Research fund](#), with the goal to simplify the process for Canadian partners to join the European funding programs.

Results Drive Agriculture Research (Alberta)		
Director of RDAR	Dr. Stan Blade	blade@ualberta.ca
Saskatchewan Food Industry Development Centre		
President	Daniel Prefontaine	dprefontaine@foodcentre.sk.ca
Manitoba Food Development Centre (FDC)		
Chief Operating Officer	Robin Young	FDInfo@gov.mb.ca

2.6 Findings

This section of the report has provided detail on the plant protein strategies in place at the federal and provincial levels. The federal government in Canada has introduced several programs through which they seek to increase the value of agri-food exports. At the provincial levels, each of the three prairie provinces has a similar objective: *Increase value added processing in their province*. While each region is looking to achieve this goal through slightly different approaches, the goal of increasing processing is the intended end game.

The potential opportunity for overlap with plant protein strategies in the Netherlands revolve around establishing those relationships that will allow these intermediate plant protein ingredients to be used as inputs in the Netherlands to achieve their own objectives of developing further plant protein agri-food products. Specific examples of these products are outlined in detail during the latter half of this report.

The key opportunities are expected to be found in:

- Collaboration on **ingredient production** in the prairies with a focus on processing fractionations and researching improved product characteristics, which are needed by plant protein processors, and ultimately consumers. This means meeting the need for niche varieties, certain protein/starch/fiber levels.
- Collaboration on **food processing** in the prairies. This could take the form of commercialization of new production techniques, which are currently being tested in each province’s food research development centre.

3. The Plant Protein Sector in Canada: Main Players in research and industry

Question 2

Who are the main players in research and industry in the field of plant proteins in the Canadian Prairie Provinces? Describe the value chain in terms of resources (traders), ingredient processors, equipment manufacturers and distribution (B2B/B2C). Give an overview of the most innovative players in the plant protein sector with a focus on Canadian organizations who already have experience in international business, or organizations with ambitions to expand to Europe. Highlight areas with strong growth in pulses or pea protein. Highlight the international strategies and identify on which countries/subsectors/ parts of the food chain these strategies focus.

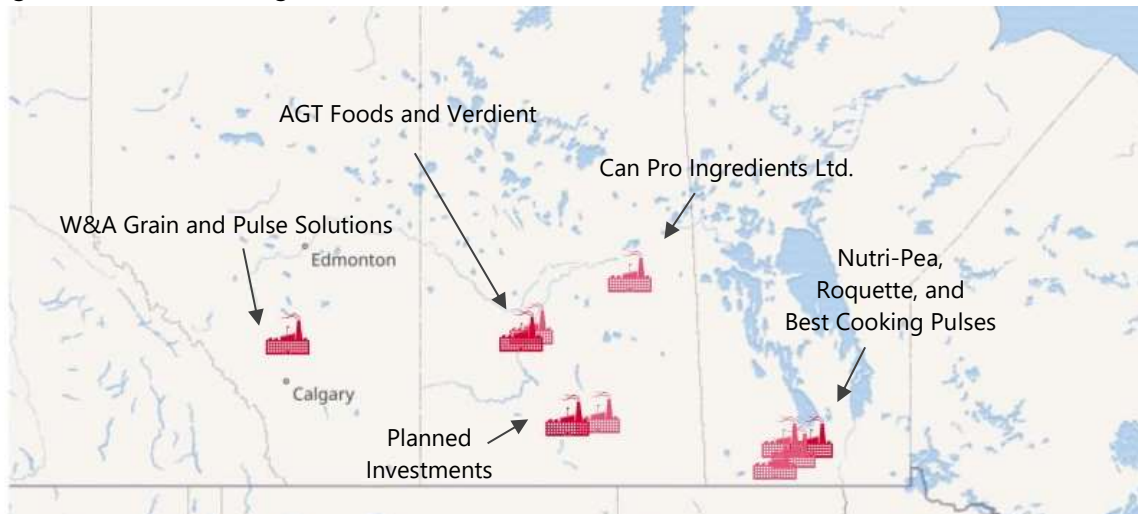
3.1 Industry Overview - Canada

The plant protein value chain in Canada consists of several innovative start-ups as well as established companies focused on primary production, food manufacturing, ingredient production, ingredient manufacturing, technology innovation, and research and development focused on plant genetics.

Regarding handling primary production, the large grain handlers such as Cargill, Richardson's, Parrish and Heimbecker and Viterra are very well established as grain aggregators across the prairies. There is little opportunity to enter this stage of the value chain. However, specialty millers and plant protein ingredient manufacturers are continuing to enter the market by contracting directly with producers. In our opinion, while this market is increasingly becoming competitive there is still opportunity for new players to establish themselves. Companies looking to contract growers directly for specialty plant protein production (e.g. yellow peas and lentils) must provide incentives to ensure supply and convince farmers to sign the contract. A good example is the Roquette facility in Manitoba, which at the time of writing this report is offering producers a CAD\$1.00/bu premium on the market price for yellow peas to ensure supply for their pea fractionation plant in Portage la Prairie.

Plant protein ingredient producers and food manufacturers are spread across the prairies (Figure 5). Some of the key players producing ingredients (primarily fractionations) include Merit Functional Foods, Roquette, Botaneco, AGT Foods, and Verdient Foods. Regarding food manufacturing, some of the larger names in this value chain include Avena Foods, Big Mountain Foods, Daiya Foods, Ulivit, Maple Leaf Foods and The Very Good Food Company. Their focuses range from specialty millers that supply the food and pet food sectors to being major players in the global consumer goods market like Maple Leaf Foods, which has recently acquired Seattle-based Field Roast Grain Meat Co. for USD\$120 million and took over Massachusetts-based LightLife Foods for USD\$140-million. All the companies described here are well-established in this sector and are competitors for any Dutch companies looking to establish themselves in this market. While this space is clearly competitive, in our opinion there is still opportunity for other players to enter the market if they position themselves well and bring an innovative process that will allow them to differentiate themselves in the market.

Figure 5: Pulse Processing Plants in the Prairies



Source: Produced by Serecon with the use of the Canada West Foundation map

Over the past few years, the plant proteins industry in Western Canada has continued to develop and there have been some key partnerships signed to produce plant protein ingredients and develop the industry further. To provide the reader further context on this industry, we provide the following list of some key partnerships:

Key Plant Protein Partnerships:

- The [Mera Food Group](#) (processing), Mera Developments Inc. (technology and innovation) and [Benson Farm](#) (primary production) have established a partnership on development of new plant-based products from crops grown in Western Canada.
- [Verdient Foods](#) (fractionation) and O.M.D. Food Products (food manufacturer) have teamed up to conduct research on pulse functionality in high-value ingredients and they are opening new markets of pulse-based proteins.
- [AGT Foods](#) (fractionation and milling) and Ulivit (food manufacturer) are now collaborating to convert pea, lentil and faba bean protein concentrate into high moisture meat analogue, Texturized Pulse Protein (TPP), tempeh, tofu, pasta and non-dairy analogues.
- Merit Functional Foods (fractionation), [Pitura Seeds](#) (primary production), and [Winning Combination](#) (nutraceutical manufacturer, part of TCW nutrition) are working to process pea protein into a range of new plant-based protein products. Merit Functional Foods (fractionation) has also team up with Burcon (equipment manufacturer), and Nestlé (food manufacturer) to produce high-quality plant proteins that will be used in Nestlé products including dairy alternatives.

3.1.1 Main Players in Research and Industry in Canada

Primary Production		
SeedNet	SeedNet is a group consisting of 14 independent seed growers based in southern Alberta with experience in growing, processing, and selling seed.	Lethbridge, AB
Rowland Farms	Rowland Farms is a family-owned agri-business specialized in growing and processing various organic grains, pulses and oilseeds for human and livestock consumption. Rowland farms has facilities in Taber, Barnwell, Vauxhall and Grassy Lake.	Taber, AB
Food Manufacturers		
Avena Foods	Avena Foods Limited is a specialty miller that supplies food, pet food and nutraceutical manufacturers with sustainably grown and milled purity protocol oat and functional gluten-free pulse ingredients. Their plant protein ingredients are used in food products in Europe.	Regina, SK
Big Mountain Foods	Big Mountain Foods is family-owned and focuses on product innovation. Products are sold fresh and can be found in national major retailers in the United States and Canada. The company has recently undergone extensive rebranding reducing the amount of plastic in their packaging by 40 per cent and the amount of cardboard by 25 per cent. Big Mountain Foods is currently expanding. By 2022, the company plans to run a zero-waste facility. Due to the rapid growth, BMF is expanding into a 70,000 sq. ft. facility to scale up its production capacity by 2021 and compete with other global plant-based brands.	Vancouver, BC
Daiya Foods*	Daiya Foods is an major player in innovative plant-based foods, their products are all free from dairy, gluten, soy as well as other common allergens. Daiya Foods was one of the first Canadian companies to produce plant-based cheese and has since evolved as an innovator of products in a variety of categories including pizza, frozen desserts, mac and cheese, burritos, and salad dressings among others. Daiya's markets its plant-based foods in over 25,000 grocery stores in the United States. Daiya's products are also available in Canada, the United Kingdom, Australia, Mexico, and Hong Kong.	Vancouver, BC
Ulivit	Ulivit is a Saskatoon-based start-up that uses Canadian pulse proteins to produce plant-based foods with a low carbon footprint.	Saskatoon, SK
Maple Leaf Foods	Maple Leaf Foods is a well-established Canadian meat processor that has recently transitioned to being a "consumer protein company". As part of this transition, Maple Leaf has recently spent US\$120 million to buy Seattle-based Field Roast Grain Meat Co. and took over Massachusetts-based LightLife Foods in a \$140-million deal. Maple Leaf Foods is currently developing a burger that will compete with the Beyond Meat burger. The company is planning to build North America's largest plant-based protein food processing facility in Shelbyville, Indiana to meet the growing demand.	Mississauga, ON
The Very Good Food Company	The Very Good Food Company is an emerging plant-based technology company focused on developing, producing, and distributing plant-based food alternatives	Victoria, BC
Ingredient Manufacturers		
Merit Functional Foods	Merit Functional Foods produces high quality protein ingredients and blends with a focus on improving purity, taste, and solubility. Merit is building a state-of-the-art production facility in Winnipeg, where it will produce various pea and canola protein ingredients with enhanced functional and nutritional values.	Winnipeg, MB
Botaneco	Botaneco's focus is on commercializing an innovative oilseed processing technology platform that isolates highly functional natural ingredients from oilseeds for the food, feed, and personal care markets.	Calgary, AB

AGT Foods	AGT Food and Ingredients Inc. (AGT) is a Saskatchewan-based processor of value-added pulses and food ingredients for export and domestic market. AGT produces food ingredients such as pulse flours, proteins, starches and fibres as well as pulse-based food products such as texturized pulse proteins used as meat substitutes and pulse-based pasta; and supplies retail packaged and canned foods to retail and food service sectors. AGT has offices and processing facilities across the globe, including the Netherlands.	Regina, SK
Verdient Foods	Verdient Foods was acquired by Ingredion (U.S. based). It will operate using a state-of-the-art, food grade, pulse crop processing facility. Production volumes are expected to exceed over 160,000 metric tons. Verdient is developing additional product lines and products in conjunction with research being conducted at the Saskatchewan Food Industry Development Centre.	Vanscoy, SK
Novozymes BioAg Ltd	Novozymes offers biological solutions to produce affordable, plant-based products with enhanced taste and texture. The office in Saskatoon is part of Danish multinational Novozymes	Saskatoon, SK
Technology Provider		
Burcon NutraScience Corporation	Burcon is a global technology leader in the development of plant-based proteins. The company has over 270 issued patents in addition to 260 additional patent applications, developed over a twenty-year period. Burcon has expanded an impressive portfolio of composition, application, and process patents covering new plant-based proteins derived from pea, canola, soy, hemp, and sunflower seed, among others. In 2019, Merit Functional Foods Corporation was established in a joint venture between Burcon and three veteran food industry executives. Merit will produce, under license, Burcon's novel pea and canola protein ingredients.	Vancouver, BC
The Very Good Food Company Inc.	The Very Good Food Company Inc. is a plant-based technology company that designs, develops, produces, distributes and sells a wide range of plant protein products including meat alternatives.	Victoria, BC
Sightline Innovation Inc.	Sightline Innovation is a leading Canadian AI and Data Trust company, providing tools for customers to generate and control value from data. The company's AI and data trust tools are currently being used to optimize current plant breeding processes. Sightline Innovation was founded in 2011 and has offices in Canada, the UK, and the US.	Toronto, ON
Farmer's Edge	Farmer's Edge is global leader in digital agriculture that is currently developing a new platform that will increase on-farm efficiencies and expand plant-protein market opportunities	Winnipeg, MB
Sure Growth Solutions	Sure Growth Solutions provides farmers with proper tools, knowledge and production practices to achieve high yields. The company has recently entered into a partnership aimed at developing new artificial intelligence spraying technology.	Langenburg, SK
Buhler	Buhler Industries offers industrial-scale, complete solutions for processing alternative proteins into high quality meat or fish alternatives. The solutions are aimed at optimizing the texture, shape, colour, and flavor of the products according to the needs of consumers.	Winnipeg, MB
Plant Genetics / R&D		
DL Seeds	DL Seeds is a prairie-based plant breeding company currently developing market class genetics in both hybrid canola and pulses for distribution partners and their farmer customers.	Morden, MB
Corteva Agriscience	Corteva offers integrated and expanded seed and crop-protection solutions that combine genetics, chemistry, and precision agriculture to support farmers in maximizing productivity.	Calgary, AB

Lucent Biosciences	Lucent BioSciences manufactures fertilizer that helps increase crop yields, while also supporting soil and human health. Lucent has recently entered into a partnership with AGT Foods and Protein Industries Canada. The partnership is focused on whole-seed utilization and consists of Lucent converting the hulls of lentil and pea seeds produced by AGT into fertilizer.	Coquitlam, BC
University of Alberta	University of Alberta (UofA) Researchers are working closely with industry to study plant proteins. U of A researchers in the Faculty of Agricultural, Life and Environmental Sciences (ALES) are exploring the possibility of using canola protein for human consumption, as well as determining how plant proteins can replicate the functions and structure of meat proteins, and ways to use plants for packaging material and industrial filters	Edmonton, AB
University of Manitoba	The University of Manitoba (UofM) has a number of breeding programs aimed at improving the quality of protein crops. The objectives of such programs are to understand the factors that impact the content, quality and functionality of pulse and canola protein sources to support crop germplasm development. The UofM also has a sustainable protein crop production program aimed at exploring best management practices for soybean and pulse cropping systems through agronomic research, extension and training that enhance agronomy, profitability and sustainability for farmers across the prairies.	Winnipeg, MB
University of Saskatchewan	In 2020, the University of Saskatchewan (U of S) received funding to be used for improving disease resistance in pulse crops, developing novel methods of extracting protein from pulses to be used as beverage industry additives, replacing animal products, and developing new meat alternatives through pulse fermentation.	Saskatoon, SK
Leduc Food Processing Development Centre	This government-owned facility hosts specialized equipment and teams of scientists, engineers and technicians dedicated to helping small- and medium-sized entrepreneurs with R&D as well as navigating the logistics of interprovincial exports. The center has recently purchased a \$4 million fractionation suite for plant proteins, the first of its kind in Alberta.	Leduc, AB
Saskatchewan Food Industry Development Centre Inc. (Food Centre) Pilot Plant	The Saskatchewan Food Industry Development Centre Inc. (Food Centre) is a non-profit organization dedicated to helping food processors add value to their products. The Food Centre's line of expertise consists of: food and process development, interim processing, extrusion technology, skills development, food safety education and training, quality assurance, technology transfer and path-finding. The Centre's federal processing facility is Saskatchewan's only commercial incubation centre for food processing. In recent years, the Food Centre has worked with local and international clients in the development of meat analogues and protein filtration. The Food Centre is a global leader in capitalizing on the potential of plant-based protein through new product development, ingredient validation and extrusion technology. This new technology has the potential of transforming a wide range of crops into innovative food products (i.e. snack foods, cereals, pet foods, meat substitutes and bio-products).	Saskatoon, SK
The Richardson Centre for Functional Foods and Nutraceuticals	The Richardson Centre for Functional Foods and Nutraceuticals (RCFFN) is dedicated to functional food and nutraceutical research, supporting the development of an economically feasible, sustainable, and functional food industry. The Centre is part of the university of Manitoba.	Winnipeg, MB

3.2 Findings

The plant protein value chain in Canada consists of several innovative start-ups as well as established companies focused on primary production, food manufacturing, ingredient production, ingredient manufacturing, technology innovation, and research and development focused on plant genetics. The main players have been provided in the tables in the previous section. While the tables provide an overview of many innovative players in the plant protein sector in Canada, there are three that stand out: Botaneco, AGT Foods and Ingredients, and Merit Functional Foods.

Botaneco is using a patented, water-based and sustainable method of separating oil bodies, protein concentrates and isolates from oilseeds. Botaneco is working closely with researchers out of Wageningen University. AGT Foods and Ingredients grew from a business operated out of the owner's basement in 2007 to one of the largest suppliers of value-added pulses, staple foods and food ingredients globally. AGT has also established an agreement that will allow for whole-seed utilization by converting the hulls of lentil and pea seeds produced by AGT into fertilizer, minimizing waste in the value-added processing stream and expanding the market plant protein co-products. Merit Functional Foods produces proteins to be used as commercial ingredients. They have recently constructed a 94,000-square-foot facility in Winnipeg for this purpose. These three companies are closely involved with Canada's Protein Supercluster and are leading the way for plant-based protein research and innovation.

Key areas of plant-based research that provide considerable opportunities for meaningful industry innovation across the value chain include sourcing, isolation and functionalization, formulation, processing, and distribution. Sourcing plant proteins and handling primary production is already a crowded market with Canadian and international companies like Cargill, Richardson's, Parrish and Heimbecker, and Viterra, among many other well known grain handlers in this space. These are very well established as grain aggregators across the prairies, and it is a competitive industry to break into. The opportunity lies beyond the next stage of the value chain. Isolation and fractionation, ingredient formulation, and food composition are where the key opportunities can be found in Western Canada.

4. The Plant Protein Sector in the Netherlands: Main Players in Research and Industry

Question 3

Who are the main players - (applied) research, industry/SME and innovation hubs - in the Netherlands? Which subsector of the plant protein sector in the Netherlands has the most potential for collaboration with Canada? Please give an overview of the most innovative players in the plant protein sector.

The following section will provide an overview of the main players in plant protein research, innovation, and industry in the Netherlands. The subsectors of the plant protein sector in the Netherlands with the most potential for collaboration with Canada will become clearer in the following chapter ([Opportunities and Tactics](#)). However, the main opportunities lie in ingredient production and food processing. Those subsectors in the Netherlands with knowledge on innovative ingredient production techniques, and research around new food applications, are well placed to collaborate with the emerging plant protein industry in Western Canada.

4.1 Industry Overview – Netherlands

The Netherlands is a powerhouse regarding agri-food companies. Innovation is being pushed forward through [The Protein Cluster](#) (TPC). TPC is a global platform for ingredient suppliers, food manufacturers, retailers, caterers, and other stakeholders seeking ready to use plant-based, vegan, or vegetarian solutions. TPC assists present and future suppliers of plant protein ingredients, semi-finished products, consumer products and technologies in developing and commercializing their innovative products.

Much of the innovation in the Netherlands is coming from Dutch food entrepreneurs, the majority of which are in the Dutch provinces of Gelderland and Overijssel. These small and medium-sized enterprises (SMEs) tend to be experimenting with a broader range of inputs in their plant protein sector in comparison with Canada. In Canada, the focus has really concentrated on yellow peas and canola, whereas in the Netherlands entrepreneurs are experimenting with soy protein, microalgae, quinoa, hemp, and various other plant-based proteins.

If the scope is extended beyond those entrepreneurs entering the plant-protein space, the Netherlands is also home to many well-established food companies



that are beginning to diversify into plant-based proteins. For example, companies like Vivera and Zwanenberg Food Group are actively developing plant-based meat alternatives, either to broaden their portfolio or with the objectives of moving out of the meat sector entirely.

One of the most prominent international companies operating in this space in the Netherlands is Unilever, which has recently relocated its R&D centre to Wageningen University. Kraft Heinz and Royal FrieslandCampina are two other major food companies with significant operations in the Netherlands. Both companies have R&D centres in Gelderland focusing on developing plant-based alternatives.

A last key group of actors in the plant protein sector includes the applied and fundamental research and education grouping. This group focuses on expanding knowledge and experimenting with new ideas that are required for further development. The leading academic institution in the region is Wageningen University. The Netherlands is also home to global leaders in private research, including NIZO and TOP B.V. These two companies are service providers in food and process technologies, with a key focus on plant extraction and applications. The third key players in research and development are the pilot plant facilities. These would be like the food development centres across the Canadian prairie provinces. The Green East Centre is one Eastern Netherlands leading pilot plant facilities. Green East complements the services provided by the country's leading universities and private research companies. It is where companies experiment with applied knowledge for the development and scaling-up of plant-based ingredients and products and related production processes.³

4.1.1 Main Players in Research and Industry in the Netherlands

Ingredient Producers		
FUMI Ingredients	Produce animal-free food ingredients from micro-organisms. The company works with microorganisms as a source of high-value ingredients.	Wageningen, Gelderland 6708 WH, NL
Corbion B.V.	Specialize in cutting edge lactic acid and emulsification technologies that contribute to developing food products that have enhanced flavour profiles and that stay fresh and remain stable as long as possible.	Piet Heinkade 127, 1019 GM Amsterdam, Netherlands
Royal Avebe	Avebe develops nutritional and healthy food products with potato-based solutions. They focus on the characteristics of our products: pure potato starch and potato protein.	P.O. Box 15, 9640 AA Veendam, The Netherlands
Ruitenbergh Ingredients B.V.	Strong knowledge of ingredients, processes, and finished products. The company combines state-of-the-art processing equipment in their tech centres with a focus on meat, fish and meat substitutes, bakery, snacks and confectionery.	Griftstraat 8, 7391 TM Twello, Netherlands

³ The Protein Cluster in Foodvalley provides a valuable [interactive map tool](#) to help companies find facilities to help pilot industrial scale plant-protein foods, semi-finished products, and consumer products.

DöhlerGroup	Döhler is a global producer, marketer and provider of technology-driven natural ingredients, ingredient systems and integrated solutions for the food and beverage industry.	Albusstraat 5, 4903 RG Oosterhout, Netherlands
Food Manufacturers		
SoFine Foods B.V.	Specialises in producing tofu products for the European market. The company has been operating for many years, but they have recently began to branch out and develop new product lines.	Sperwerweg 9, 6374 AG Landgraaf, Netherlands
Schouten Europe B.V.	Food manufacturer in the Netherlands that has been around for over 100 years. They are now specializing in producing new vegetarian and vegan plant-based products.	Burgstraat 12, 4283 GG Giessen, Netherlands
Phycom Microalgae	This company is one of Europe's largest and most innovative producers of algae. Phycom has developed a sustainable and completely closed production system for algae. Phycom's cultivation techniques and process technology are highly innovative in the international market.	Koningsschot 11 3905 PP Veenendaal The Netherlands
NoVish Vegan Foods Wholesale	Specialize in plant-based fish substitute food products such as vegan fish burgers and fish sticks. They make plant-based fish substitutes from plant proteins.	Saskatoon, SK
Upfield	Upfield is the largest plant-based consumer product company in the world. They are also specializing in vegan cheeses and other plant-based alternative products	Amsterdam, Netherlands
Vion	Vion is an international producer of meat, meat products and plant based alternatives with production locations in the Netherlands and Germany.	Multiple locations in the Netherlands
Traders		
MFH-Pulses	MFH pulses sells and advises on several protein-rich food/feed products and ingredients: pulses, peas, lentils and legumes. The company advises on new pulse applications like lupin flour in meat substitutes, lentil flour in healthy chips, pea protein in protein-rich pastas, emulsifiers for sauces and pre-cooked and dried-back pulses that can be applied instantly. Alternatives to replace animal protein and bind nitrogen (so no fertilizer is needed) to contribute to a more sustainable protein consumption balance.	Molenstraat 94, 4793 RC Fijnaart, Netherlands
Research and Development		
Keygene	Keygene is an agricultural biotechnology company research crop yields and quality. They specialize in crop improvement by molecular breeding.	Agro Business Park 90, 6708 PW Wageningen, Netherlands

NIZO	Develops food technologies in their food processing centre. They focus on the development and applications of innovations for the global food industry and related markets.	Kernhemseweg 2, 6718 ZB Ede, Netherlands
TOP B.V.	Specializes in innovation for the food industry. They work for and with food producers and equipment manufacturers from all over the world. They design and implement unique and useful innovations.	Agro Business Park 10, 6708 PW Wageningen, Netherlands
The Protein Brewery	The Protein Brewery focuses on researching novel ways of producing food proteins, deploying fermentation technologies using locally produced, non allergic and water efficient crops.	Goeseelsstraat 10, 4817 MV Breda, Netherlands
Wafilin Systems B.V.	Wafilin Systems brings over 40 years of experience in designing specialized membrane-based solutions for high-efficiency applications in the food & beverages, textile and dairy industries. It is our mission to deliver unique technology concepts to reduce the costs of complex processes and unlock hidden values for higher profitability and growth.	Agora 4, 8934 CJ Leeuwarden, Netherlands
Bodec	Bodec specializes in process optimisation in the food industry. The company designs new technology for food processing.	Scheepsboulevard 3, 5705 KZ Helmond, Netherlands
Wageningen University	Wageningen is one of the leading research institutions in the Netherlands, with the plant-based protein research taking place through its Food & Biobased Research team.	6708 PB Wageningen, Netherlands

4.2 Findings

The main players in applied research, industry/SME and innovation hubs in the Netherlands have been identified as shown in the table above. Many of these companies are in the Dutch provinces of Gelderland and Overijssel. These small and medium-sized enterprises (SMEs) tend to be experimenting with soy protein, microalgae, quinoa, hemp, and various other plant-based proteins. The Netherlands is also home to many well-established food companies like Vivera and Zwanenberg Food Group, which are actively developing plant-based meat alternatives to broaden their portfolio. There are also prominent international companies like Unilever, Kraft Heinz and Royal FrieslandCampina. The latter two have R&D centres in Gelderland focusing on developing plant-based alternatives.

One subsector that stands out as having potential to collaborate with Canada are the private research institutes like NIZO and TOP B.V. These companies are service providers in food and process technologies, with a key focus on plant extraction and applications. Much of the feedback from stakeholders knowledgeable about the development of Canada's plant-protein sector emphasized the need to improved ingredient production technologies and applications. Companies with advanced technology in these spaces would find opportunity to collaborate.

5. The Netherlands and Canada: Matching supply and demand

Question 4

What could be the added value of the Netherlands to the Canadian industry such as access to market, co-product development, specific knowledge on processing?

Question 5

What could be the added value of the Canadian industry to the industry of the Netherlands such as high-quality ingredients, new products, co-development of products?

Question 6

How can the supply and demand of the Netherlands and Canada be matched for complementary collaboration? Which part of the plant protein chain has the most potential for both countries in the upcoming five years? Are there any specific niche or subsectors that have the most potential for collaboration?

The purpose of the following section is to provide insight on how best to leverage the initiatives that are occurring in the two countries through specific applications at the industry level in the plant protein sector. This section addresses the question around what industry from both Canada and the Netherlands can do to collaborate.

5.1 Target Growth Areas in Western Canada – Plant Protein

The opportunities for collaboration are generally focused on ingredient production and food production. Within these categories there are various opportunities around improving methods, transplanting technology, or collaborating on product innovation. The following two sections provide an overview of these opportunities.

5.1.1 Ingredient Production

The collaboration opportunities for ingredient production are separated into three key areas: (1) improving fractionation processes, (2) targeting sustainability, and (3) diversifying inputs. There is still opportunity in the fractionation sector in the prairie provinces. Companies considering entering this space need to consider the following points. Companies investing in ingredient production need to offer innovative ingredients, innovative production or innovative production techniques in order to compete with the large company players in Canada already established in this market.

Table 1: Opportunities for Collaboration on Ingredient Production

<p>Improving Fractionation Processes: Wet & Dry</p>	<p>Wet Fractionation: First, for wet fractionation there is an opportunity to further apply advanced membrane filtration techniques currently more commonly used in the dairy processing industry. These techniques are also commonly used for producing fractions from potato and other “wet” vegetables, but they are less efficient when being adapted to pulses. The Netherlands is a leading country in this research and there is a potential opportunity to leverage this knowledge and further adapt it to the plant protein space (pulses).</p> <p>Dry Fractionation: Second, new technologies are required in the lower cost dry fractionation process that will improve the quality of outputs. Specifically, a cost-effective process to remove more of the protein from starch would make it a more useable product and increase the margins for the processing sector. Currently, all dry fractionated plant proteins are occupying this middle ground, where they are “not cheap but not great”. A cost-effective process to remove more of the protein from starch would make it a more useable product and increase the margins for the processing sector. In some of the arid regions of the prairies that have the ideal agronomic conditions for growing pulses there are limited water resources and thus limited opportunity for wet fractionation (e.g. regions of the yellow pea producing regions in Alberta). Improving the dry fractionation methods or applying innovative technologies in this space would offer an investors a competitive advantage in their ability to locate a plant in a region that otherwise cannot produce these products but has ample raw commodities. This would be a game changer for the industry.</p>
<p>Focusing on Sustainable Production Methods</p>	<p>Improve Sustainability: In general, this opportunity is connected to the previous points on improving wet and dry processing techniques. The consultation process indicated that the current methods are outdated and in need of innovation. This goes beyond improving the quality of the outputs being produced, it also includes improving the sustainability of production methods. This would benefit this industry in two ways: (1) more sustainable methods could potentially reduce production costs, and (2) they would link well with the growing consumer demand for sustainable sourcing.</p> <p>Reduce Production Costs: Applying technologies that more effectively reduced and/or recycled water in the wet fractionation process would position a new fractionation plant at a competitive advantage to the current players in the market. Water and Natural Gas are costly inputs to the fractionation process. Improving the sustainability of production would make fractionation more economically viable in the drier locations that are major pulse producers in the prairies. This is particularly important for the semi-arid region of east-central Alberta.</p> <p>Improve Consumer Perception: Second, improving the sustainability of outputs would also play into the increasing demand from consumers for sustainable products. This trend will only become more important, any investor that is able to improve the sustainability and have the Life-Cycle Analysis (LCA) data to prove it, would position themselves competitively going forward. This factor is even more important for export to the European markets, but it is rapidly growing in North</p>

	America. Canada is a leader regarding carbon research and there may be opportunities for collaboration going forward.
Diversify Inputs in Fractionation Process	<p>Move Beyond Yellow Peas: While yellow peas are the current driver of the fractionation industry in Western Canada, as more fractionation capacity comes online there will be a growing need to diversify outputs to stay competitive. More research into other crops (e.g. Chickpeas, Lentil and Lupinus) and the diversity of pulses being grown in the prairies. At the same time, the agronomic conditions in the drier regions of the prairies are equally or more favorably suited to growing lentils and chickpeas. For example, Saskatchewan currently supplies upwards of 40% of global lentil exports, suggesting that there is an opportunity to get into this market and have access to ample raw commodities. Investors that can improve the flavor profiles of these other inputs and adapt fractionation techniques to these other commodities would be able to position themselves in a market that has yet to be capitalized on.</p>

5.1.2 Food Production

The collaboration opportunities for food production are divided into two key areas: (1) product innovation, and (2) technology use. Research shows that the provinces are funding product innovation through their food production centres and testing new technology for food production. Both areas offer opportunity for collaboration with the Netherlands.

Table 2: Opportunities for Collaboration on Food Production

Food Product Innovation	<p>As a leading global food manufacturer, there is considerable opportunity for Dutch collaboration in this space. Particularly in the area of starch, production of flexitarian products, and innovative food products beyond meatless patties.</p> <p>Applications for Starch: First, there is opportunity for Dutch innovation for starch applications. Bioplastics is a key opportunity for starch. This is driven by two key factors: (1) the abundance of starch currently on the market, and (2) Canada’s goal of phasing out single use plastics by 2030.</p> <p>Flexitarian Products: Second, various food research centres are reportedly working on flexitarian products. Western Canada is a large producer of beef, poultry and pork, and the concept of combining plant-based foods with animal-based proteins fits well with the entire agri-food system. Finding these synergies between the emerging plant-protein space and the traditional livestock sector would position an investor well to not only tap into the momentum behind plant-based proteins, but also the well-established animal protein industry. The livestock sectors in Western Canada are increasingly coming to terms with the growth of plant proteins and the provinces are providing funding to help bring both along with the current wave of growth.</p> <p>Alternatives to “Meatless Patties”: Third, there is an opportunity to produce innovative products as the market for plant-based meats will come to saturation in the next 5 years. Companies like Beyond Meat, Impossible Foods and the various other players in the market will soon see the market for alternative meat products hit its ceiling. The next phase in plant-based foods is predicted to focus on</p>
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	<p>alternative dairy and alternative fish (seafood) products. The Netherlands is leading the way in this form of research.</p> <p>Advisory Services on Food Composition: Lastly, companies in the prairies are seeking expertise on incorporating ingredients into their food compositions processes. There is a potential opportunity for industry in the Netherlands to collaborate and provide knowledge on how to incorporate these ingredients into products, especially as more ingredients continue to be produced in the prairies (leading to import substitution).</p>
<p>Technology Application in Food Production</p>	<p>Expertise Using Extrusion Technologies: Various research centres are working on develop prototypes for plant-based meats using extrusion technologies. Some have already sought connections in the Netherlands regarding how to make plant-based products. Each provincial food development centre is working on developing extrusion capacity to produce novel plant-based foods, however, feedback from stakeholders suggests that they are far behind some of the cutting-edge processes. While there may be an element of competitiveness involved with trying to collaborate with the development of this technology in Canada, feedback indicates that the various development centres are working in their individual silos and there could be opportunity to provide advisory services to this sector, if they are approached with consideration. This may present an opportunity for collaboration with food production expertise being generated out of Foodvalley in the Netherlands. Canadian science has tended to focus on agronomic plant qualities rather can food engineering, and this may present an opportunity for further collaboration with Dutch industry and food science research.</p>

5.4 Plant Protein Collaboration between the Netherlands and Canada

The tables above outlined specific opportunities for collaboration between the Netherlands and Canada in several areas. In general, both countries have strengths and weaknesses with regard to further developing their plant protein sectors. The priorities per country going forward are driven by their comparative advantages and where they see opportunity developing in the agri-food sector in the future. Their strategies are linked to what each country is able to specialize on based on their productive potential and development in innovation in the industry.,

Canada currently has expertise in agronomic oriented crop research such as increasing yields, crop standability and disease resistance. Furthermore, Canada has a strong supply chain distribution logistics to transport commodities, and benefits from considerable arable land for production. Canada is seeking to increase the value of Canadian crops such as pulses by improving genomics to increase nutritional qualities, develop novel processing technology and create "digital solutions" for traceability along the supply chain. Canada faces the challenges of undeveloped value-added processing expertise, relatively outdated agri-food regulations, and the relatively isolate location of the prairie provinces.

The Netherlands benefits from its highly developed port infrastructure, access to European markets, and strong expertise in value-added food processing. Plant protein policy in the Netherlands is pushing for protein production by means of side stream waste valorization (i.e. Circular Economy), and by funding research and innovation into the development and testing of new plant-based products. However, the Netherlands faces challenges with limited arable land and the resulting need to import commodity supply for processing. The natural

As a form of comparative analysis, Table 3, provides a cross comparison of the two protein strategies.

Table 3: Cross Comparison of Protein Clusters

Canada: Protein Industries Supercluster	Netherlands: Protein Cluster (TPC) ⁴
Goal: “make Canada a world leader in the expanding plant-based protein, create over 4,500 jobs and add \$4.5 billion to Canada’s GDP over the span of a decade”	Goal: “help suppliers of plant-protein ingredients, semi-finished products, consumer products and technologies to develop and commercialize their products”
Areas of Overlap: <ol style="list-style-type: none"> 1. Targeting the production and cultivation of protein rich crops. 2. Development of innovative protein sources; and 3. Protein production through side stream valorization (circular agriculture, waste minimization) 	
Canada and the Provinces target improving plant product traits. Research is focused on improving product characteristics, which are needed by plant protein processors, and ultimately consumers. The second key target is to develop new production methods in the food development centres.	The Netherlands targets transitioning to a circular economy by prioritizing the food and biomass sectors, with specific objectives for protein transition. Food and biomass is one of the five key priority areas, with a strategic goal revolving around the implementation of new modes of production and consumption.

5.5 Findings

This section has outlined opportunities where value could be added to Dutch and Canadian industry through product development, specific knowledge, production of high-quality ingredients, co-development of products, and various other opportunities outlined above. The focus of the opportunities outlined throughout the consultation process were for Dutch companies seeking to collaborate on research and development to enter the plant proteins sector through production of ingredients and application of those ingredients to produce agri-food products. While there are other opportunities, this was the main feedback from stakeholders.

With wet fractionation, there is an opportunity to further apply advanced membrane filtration techniques currently more commonly used in the dairy processing industry. For dry fractionation, there is a need to develop cost-effective processes to remove more of the protein from starch, which would make it a more useable product and increase the margins for the processing sector. Both processes would benefit from technologies that improve the sustainability of production and begin diversifying the inputs beyond yellow peas. Improvements in the technology and diversifying inputs would allow new investors entering the market to differentiate themselves.

The opportunities identified in food processing focused on developing innovative uses for starch, researching opportunities for flexitarian products, and moving beyond “meatless patties”. This latter point is particularly important for investors from the Netherlands, as some of the companies leading the drive into plant-based dairy and seafood products are Dutch. In general, the need for more expertise in how to incorporate these ingredients into food products in Canada has been identified. Canadian food scientists are not as well developed as the Dutch in this area. This indicates an opportunity for Dutch expertise in food processing, such as using extrusion technology.

⁴ <https://www.theproteincluster.com/>

6. Conclusion

This report describes the many opportunities in the plant protein sector in Canada, but also specific opportunities to follow up with stakeholders regarding some of the points raised throughout the report. The plant protein sector in Western Canada will see more refined processes in the fractionation industry, that produce higher quality protein and starch through both wet and dry fractionation methods. The ingredient processes techniques will become increasingly more sustainable, and the diversity of crops being processed will move beyond peas. Food processing research will focus on flexitarian products, extrusion techniques and uses for starch, among other opportunities.

First and foremost, there is opportunity for Dutch companies to collaborate on protein fractionation in the prairies. While Manitoba has successfully attracted some big names to the province over the past five years, Saskatchewan and Alberta are eagerly looking for companies in this space. Conversations with representatives from the provincial ministries indicate that they are actively looking to support companies in this space and there are various opportunities presently available for collaboration. The opportunity lies with the smaller (20,000 to 50,000 MT annual throughput) for investors that can apply some of the innovative production methods described in this report. Various processing techniques are coming down the pipeline and could potentially be applied to ingredient production. The production techniques used by new investors entering this space must allow them to either produce niche products or produce fractionations at a higher quality than the larger players in the market at this time if they hope to compete.

An advantage to collaborating with some of these smaller ingredient producers is that they are more able to shift production lines to create custom compositions, compared with high-profile examples like Roquette supplying Beyond Meat. The large fractionation plants are not going to be making custom compositions for a diverse assortment of end-users. Smaller ingredient producers are coming online across the prairies and they could be making specific prescriptions (e.g., hemp, quinoa, yellow pea, fava bean, or any number of protein combinations). This type of investment would not only secure supply of ingredients for food processing in the Netherlands, but it may also offer another opportunity for Dutch companies that are seeking to expand production and grow into the North American market. These companies would be entering a region (prairies) that is open and supportive of plant-based protein investments. Similarly, an investor could establish a relationship with an ingredient supplier and set up a food production facility nearby or seek a Canadian company to become a co-packer for an existing Dutch company. There are many opportunities in this space for Dutch collaboration.

Another conclusion from this report is the push in the prairies to improve ingredient compositions. Canadian companies are working with the provincial food development centres to produce ingredients for use in a variety of industries, including meat analogues, bakery, snacks, and cereals. The provinces are all investing in applied plant protein research/product development to enhance plant protein taste, quality, costs, functionality (e.g. purity, solubility), composition, texture, and flavour. Included in this trend is the overarching push from end-user (food companies) for ingredients that will allow them to incorporate fewer additives in their products, i.e. clean labels and gentle processing techniques. During interviews, the representatives from companies have confirmed their growing desire for "clean labels". This links up well with Wageningen University's research focused on clean labels and gentle processing techniques. This sustainability and clean labels trend will become more important in the future and it is something that companies should keep in mind when considering collaboration opportunities.

Similarly, included in this drive for improved ingredients is the motivation to develop alternatives for soybean. Soybean is the current leader in plant-based foods, and there would be benefit for the Netherlands in developing flavour profiles in other pulse ingredients that could compete. Research towards making other ingredients competitive with soy would be beneficial for the Netherlands. This could offer an opportunity for mutual gain. Canada would continue to improve capacity (both through physical infrastructure investments and technical expertise) by collaborating with Dutch technology providers and in turn processors in the Netherlands invest (both

greenfield and brownfield) in processing capacity in the prairies to secure future supply of ingredients that help to diversify supply sources.

Finally, when considering collaborating in the food production space of Canada it is important to keep in mind the challenge of limited availability of experienced food scientists in Canada. As described in the introduction, based on the traditional nature of Canada's agri-food system that has historically focused on growing and exporting commodities, there is limited expertise in food processing. While the provinces are investing heavily into their own capacity through their feed development centres, there is potentially an opportunity to leverage the expertise from Foodvalley and Wageningen University for this purpose. There are also leading Dutch companies with expertise in this space.

In conclusion, there are many opportunities currently available for Dutch companies, which are expected to increase in the future. The opportunities identified in the report show that this industry is still in its early days and there is considerable opportunity to become involved at this stage in development. There is opportunity right now for Dutch companies to establish connections at this early stage and benefit as the sector continues to develop. Dutch expertise in secondary processing could be leveraged to increase the quality and improve the supply of plant protein ingredients for partner food processors located in the Netherlands. The prairie provinces in Canada are primed for growth in the plant-based protein sector, there is abundant supply in the region, and the trade agreement between Canada and the European Union all make it preferable/favourable location for collaboration with international partners from the Netherlands.

7. Recommendations

The recommendations outlined below are focused on emerging opportunities. While the overarching areas of (1) ingredient production, and (2) food production, have already been identified in detail in the [Target Growth Areas in Western Canada – Plant Protein](#) section. The following recommendations build on the growth areas identified and take it one step further. The focus below is on further refining the opportunities for Dutch entrepreneurs, SMEs, food companies, public and private applied and fundamental research institutes, and policy makers to see where the key opportunities are in Western Canada's emerging plant protein space.

Ingredient Production for Mutual Gain

- One key area that is already the target of collaborative efforts is for Canadian plant protein suppliers to supply food processors in the Netherlands. For example, the major food companies in the Netherlands are now stepping into the plant-based meat alternatives (e.g. Unilever, Kraft Heinz, and Royal FrieslandCampina). Partnerships between Canadian ingredient producers and Dutch food manufacturers is an obvious opportunity for collaboration. Western Canada could meet its objective of increasing the value-added processing and the Netherlands could continue to develop new plant-based food products. There are a few examples of this sort of trade relationship already in place, including the Beyond Meat relationship with Roquette (opening a co-manufacturing facility in [Zoeterwoude](#)). Another Impossible Burger processing facility will soon be following suit in the Netherlands. Another example is Vion, which has [entered the plant-based proteins](#) with its ME-AT initiative.

Improve Fractionation Processing Methods

- There is an opportunity to further apply advanced membrane filtration techniques. Wageningen University is working closely with companies like NIZO on this technology. Application of new ingredient production methods that focus on higher value, multi-stage processing with cleaner labels could be an opportunity for both regions to collaborate. The Protein for Life department at Wageningen University is highly experienced in this area. There is an opportunity for private contract research centres like TOP N.V. and NIZO to potentially sell food and process technologies, provide consulting expertise on its use, or various other approaches to improving wet processing techniques.
- New technologies are also required in the lower cost dry fractionation process that will improve the quality of outputs. Companies in Alberta are looking to build dry yellow pea fractionation plants (20,000 to 50,000 MT throughput). Specifically, any expertise from Dutch research institutes engaged in the research and development of new technologies for extracting more protein from starch using dry fractionation methods would be a game changer. The current methods produce a product that is less valuable because of the middle ground it occupies (i.e., the protein products being produced are relatively low in protein content and the starches still contain a lot of protein). The resulting products are not as valuable for secondary processing as a result.

Prioritize Sustainable Production Methods and Research

- Reducing the water consumption in wet fractionation processing could also be a game changer for Western Canada. First, applying technologies that more effectively reduce and/or recycle water in the wet fractionation process may position a new fractionation plant at a competitive advantage to the current players in the market that are either water intensive in their process, or are required to locate themselves

further from supply (i.e., yellow peas are a dry climate crop, and wet fractionation requires access to considerable water resources). Improving the sustainability of production would make fractionation more economically viable in the drier locations that are major pulse producers in the prairies. This is particularly important for the semi-arid region of east-central Alberta, which are a leading yellow pea producing area of the prairies.

- There is also an opportunity for collaboration on sustainability research with a focus on quantifying the environmental impacts associated with plant-proteins. Researchers in both Canada and the Netherlands are researching sustainability and Life-Cycle Analysis (LCA). LCA is going to increasingly become important for plant-based proteins, especially as food companies position themselves as a sustainable alternative to meat products. An example could be Roquette and their recent collaboration with Beyond Meat. Canada is leading in climate action and has expertise around measuring carbon. Wageningen University is also leading the way with research around the circular economy. Ultimately, linking research from both countries and using sustainability measures (e.g. [Field to Market Canada](#) and [SAI Platform](#)) as a driver would certainly facilitate acceptance by consumers. Both countries have demonstrated their commitment to sustainable production, so this is an obvious area of overlap.

Leverage Dutch Expertise in Applied Food Production Technology

- Regarding food production, the key opportunity to collaborate is for Dutch entrepreneurs, SMEs, food companies, and public and private applied and fundamental research institutes to provide expertise to Canadian counterparts. Canada is a global leader regarding research focused on agronomic characteristics, with less experience in applied food research. Dutch entrepreneurs who experiment and bring change by innovating new ingredients, products, and processes, would likely find ample opportunity for collaboration. Any Dutch companies that are active in developing plant-based meat alternatives may find opportunity to collaborate by forming a consortium with Canadian companies and seeking to develop products through PIC or in one of the three prairie provinces food development centres.
- Specifically, we recommend targeting food and industrial applications for starch, and innovative products to target the flexitarian consumers and those seeking alternatives to “meatless patties”. Bioplastics appears to be one of the key opportunities for starch. Innovative companies such as Netherlands-based [Rodenburg Biopolymers](#) has found ways to sustainably develop bioplastics from starch, an abundant byproduct of protein fractionation. Research on bioplastics in the Canadian context is important for two key reasons: (1) the abundance of starch currently on the market as a by-product of the growing fractionation industry, and (2) Canada’s goal of phasing out single use plastics by 2030. Companies with knowledge of applied uses for starch may find funding opportunities through the federally funded National Research Council (NRC) and the Innovative Assistance Program (IRAP). Phasing out plastic is a publicly stated goal of the current federal administration (government) and there may be opportunity to leverage that for funding into bioplastics research in Canada.

Opportunity for Entrepreneurs in Food Product Innovation

- Flexitarian products are another area where there could be potential opportunity. Western Canada is a large producer of beef, poultry and pork, and the concept of combining plant-based foods with animal-based proteins fits well with the entire agri-food system. Finding these synergies between the emerging plant-protein space and the traditional livestock sector would position an investor well to not only tap into the momentum behind plant-based proteins, but also the well-established animal protein industry. Canada and the Netherlands are similar in this regard: both regions have a strong animal protein export industry that is looking to position itself favorably as demand for plant-based products increases.

- The final recommendation for collaborating on the development of plant-based food products is to target alternatives to meatless patties. While this has driven the growth to date, the market for plant-based patties, sausages, etc. will come to saturation in the next 5 years, according to stakeholders in both Canada and the Netherlands. The next phase in plant-based foods is predicted to focus on alternative dairy and alternative fish (seafood) products. The Netherlands has innovative companies in this space like [The Vegetarian Butcher](#) and [Those Vegan Cowboys](#). Canada tends to be slightly behind Europe and the United States with these emerging food trends, therefore, an emerging plant-based food trend in the Netherlands may still be an innovative product on the horizon in Canada.

Advisory Services Needed for Incorporating Plant-Based Ingredients

- What is true of all the recommended target areas describe above is the potential for advisory services. For example, feedback from companies in the prairies suggested that there is a gap in knowledge on how to incorporate new plant-based ingredients into their products. There are already European consultants specializing in advising Canadian business on incorporating ingredients like hydrocolloids into their food compositions. An example of a Canadian company seeking assistance could be a longstanding SME sized bakery that has previously been importing ingredients (flours) from Asia to incorporate into their gluten free bread products. Now that more ingredients are being produced in the prairies these companies are working out how to incorporate the new ingredients into the baked goods. Canada has less expertise in this area and there may be an opportunity to provide advisory services. Interested parties should connect with the investment attraction units at the provincial level, as these are the points of contact to SMEs in the province.
- Similarly, various food development centres and universities in Canada are working on developing prototypes for plant-based meats using extrusion technologies, but there is often a lack of trained food scientists with this knowledge. Some of these centres have already sought connections in the Netherlands regarding how to make plant-based products. While there may be an element of competitiveness involved with trying to collaborate with the development of this technology in Canada, feedback indicates that the various development centres are working in their individual silos and there could be opportunity to provide advisory services to this sector, if they are approached with consideration. This may present an opportunity for collaboration with food production expertise being generated out of Foodvalley in the Netherlands.

8. Appendix

For the content of this report Serecon spoke with various stakeholders in the Netherlands and Canada for to develop this plant protein market study for the Ministry of Foreign Affairs of the Netherlands. The contacts provided in Figure 6 are a selection of the consultations included in the consultation process for this research. They have been included in the table below because they agreed to have their name inserted as a key point of contact. The remainder of the consultations were willing to discuss opportunities for plant protein but have asked that their contacts information not be included in this report.

Figure 6: Contacts for Interviews

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Denis Tremorin	Director, Sustainability	Pulse Canada	dtremorin@pulsecanada.com
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Yuri Schaap	Founder and CEO	Food XLerator BV (15+ years experience within the Food Ingredient industry)	yuri@foodxlerator.com
Julianne Curran	Vice President of Market Innovation	Pulse Canada	jcurran@pulsecanada.com
Norm Janssen	Consultant, (formerly Investment Attraction Manager @ Government of Alberta)	Janssen Connex	normjanssen@telus.net
Diederik Beutener	Trade Commissioner	Agriculture and processed foods, Fish and seafood, Forestry and wood products, Infrastructure at the Embassy of Canada in the Netherlands	diederik.beutener@international.gc.ca
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