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Preparing for plants

What is needed to cultivate the future skills required for workers and businesses in Saskatchewan and Manitoba's plant-based protein ecosystem?



PLACE Centre
Smart Prosperity Institute



Future Skills Centre

Centre des Compétences futures

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The PLACE Centre, which stands for Propelling Locally Accelerated Clean Economies, focuses on the complex challenges limiting clean economic growth in Canadian communities. Our core approach is “place-based,” meaning the PLACE team works with all levels of government, industry, and civil society organizations to ensure regions across Canada have the solutions needed to overcome the challenges they face in advancing clean economic growth. With this approach, the PLACE team can create practical, place-based recommendations where everyone involved can collaborate and work towards making progress in solving these problems. That way, every region and community across the country can be included in, and benefit from, Canada’s growing clean economy.

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Smart Prosperity Institute is a national research network and policy think tank based at the University of Ottawa. We deliver world-class research and work with public and private partners to advance practical policies and market solutions for a stronger, cleaner economy.

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About the Future Skills Centre

The Future Skills Centre (FSC) is a forward-thinking centre for research and collaboration dedicated to driving innovation in skills development so that everyone in Canada can be prepared for the future of work. We partner with policymakers, researchers, practitioners, employers and labour, and post-secondary institutions to solve pressing labour market challenges and ensure that everyone can benefit from relevant lifelong learning opportunities. We are founded by a consortium whose members are Toronto Metropolitan University, Blueprint, and The Conference Board of Canada, and are funded by the Government of Canada’s Future Skills Program.

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Abbreviations

AAFC	Agriculture and Agri-Food Canada
CAHRC	Canadian Agricultural Human Resource Council
FPSC	Food Processing Skills Canada
FSC	Future Skills Centre
FTE	Full-time equivalent
LMIA	Labour Market Impact Assessment
MB	Manitoba
MPAS	Manitoba Protein Advantage Strategy
NAICS	North American Industry Classification System
NOC	National Occupational Classification
PBP	Plant-based protein
PNP	Provincial Nominee Program
PR	Permanent residency
SK	Saskatchewan
SME	Small and medium-sized enterprise
SWPP	Student Work Placement Program
TFW	Temporary foreign worker
TFWP	Temporary Foreign Worker Program
WIL	Work-integrated learning

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Executive summary

The growth, development, manufacturing, and sales of plant-based protein (PBP) in Manitoba (MB) and Saskatchewan (SK) could be a driver of economic growth, but only if the region's major skills and labour challenges are resolved. Plants for manufacturing PBP products and processing crops like dry peas, canola, dry beans, soy, and wheat have received hundreds of millions of dollars of public and private investment over the last several years. Local policymakers have also encouraged and supported the push for more in-province value-added agriculture with strategies, marketing campaigns, and financial incentives.¹

However, there have been some concerns from stakeholders that the industry and its workers are not prepared to take full advantage of the opportunity presented by PBP products. Stakeholders have identified a range of challenges holding back growth, from severe labour shortages that can lead companies to hire “anyone with a pulse” to a lack of infrastructure for housing and wastewater processing to internal capacity challenges that make it difficult for small and medium-sized enterprises (SMEs) to innovate and hire within this growing supply chain. Some of the challenges faced in this supply chain are common across all sectors—such as increasing rates of retirements and a lack of understanding among the general public about potentially attractive career opportunities within the sector—while others are more sector or stakeholder-specific. For example, in agriculture, consolidation of farmland is forcing employers who used to be “one-man outfits” to increasingly professionalize their operations, seeking more specialized workers in roles like management, human resources, and sales. This shift is occurring before many educational institutions have been able to adapt, leading to a gap between the knowledge and skills graduates have upon completing their degrees and the experience that businesses are increasingly seeking in a shrinking labour pool.

This shift in employer expectations for their workers who are recent graduates is leading to friction in the labour market as crucial occupations may go unfilled and recent graduates may find it harder to enter the industry.

These challenges are not simply inconveniences for those looking to bolster profit margins. If unaddressed, these challenges could result in the PBP opportunity going unrealized. Some large-scale investments made five years ago have been unable to ramp up to full production capacity due to a lack of supporting infrastructure. Even industry leaders are struggling, such as Merit Functional Foods, which underwent bankruptcy proceedings in 2023.² For Manitoba and Saskatchewan to make the most of these opportunities, steps will need to be taken by stakeholders throughout the supply chain. This report is the second of three reports examining the PBP industry in Manitoba and Saskatchewan and the major challenges faced by stakeholders in the industry. [Table 1](#) below lists the challenges we cover in this report that need to be addressed for the PBP industry to fully seize this growing opportunity. We review the specific challenges and future skills needs for the manufacturing and agriculture sectors as well as for relevant government actors. We also cover the existing educational programs available to students and workers looking to upskill or train in the industry and the implications for the industry's labour supply. Our previous report, [Ingredients for growth: How the emergence of plant-based protein opportunities in Saskatchewan and Manitoba will impact workers and future skills needs](#), explores the current and future skills needed by workers in this growing field.

Table 1. Challenges facing the plant-based protein (PBP) supply chain

Sector	Challenge	Description
Agriculture	Organizations struggle with staff retention.	Almost 37% of the open vacancies in agriculture are in general farm labourers, and that percentage is projected to increase to 51% in 2029. ³ In addition, there are increased rates of voluntary turnover in agriculture at 10.3% compared to the wider Canadian economy at 7.1%. ⁴
Agriculture	Businesses need more certainty around retention for workers who enter through immigration programs.	The agricultural sector relies heavily on international workers, especially temporary foreign workers (TFWs), to fill its labour needs.
Agriculture	Farm consolidation is changing labour and skills needs within the agricultural sector.	There are fewer farms and farm operators due to a combination of industry consolidation and retirements. ⁵ Eight per cent of farm owners operate and control 38% of the farmland in Saskatchewan, and 4% of farm owners operate and control 24% of the farmland in Manitoba. ⁶
Agriculture	There will be a large number of retirements that will drive additional demands for skilled workers.	As the current group of farmers age and retire, young farmers are not replacing them in sufficient numbers to avoid current or future labour shortages in the sector. ⁷ In Manitoba, 44.4% of those working in agriculture are aged 55+. ⁸ From 2016 to 2021 in Saskatchewan, the number of farm operators aged 55+ grew by 5.7%, while the number of farmers under age 35 fell by 2.7% and those between the ages of 35 and 54 fell by 16.2%. ⁹
Agriculture	Employers' expectations are not aligned with the skills entry-level workers typically possess	There is a high risk for businesses to invest time and effort into newer workers. This leads to employers having higher expectations for the workers they have employed, requiring greater skills and knowledge capabilities for the same jobs.
Manufacturing	Wages paid within the sector are lower than in other industries.	The average pay across goods-producing industries was reported to be approximately \$30.36 per hour, while the average pay in food manufacturing was \$21.20 per hour. ¹⁰
Manufacturing	The location of a workplace can impact the ability to attract staff.	While most large PBP food manufacturing plants in Manitoba and Saskatchewan are located near large city centres, many smaller companies are located in more rural communities and towns. ¹¹
Manufacturing	There is limited in-house capacity to conduct research and develop new PBP products. This issue disproportionately affects small and medium-sized enterprises (SMEs).	With the emergence of technologies required to produce PBP products, such as extrusion, fermentation, and wet and dry fractionation, there are issues in both the costs associated with adopting these technologies and the attraction of technical and scientifically skilled workers needed to operate them. ¹² The percentage of full-time equivalents (FTEs) in agricultural biotech requiring only a high school education in Manitoba decreased from 26% in 2017 to only 10% in 2021. ¹³ Additionally, the number of FTEs designated as highly qualified professionals (holding a bachelor's degree or greater) increased from 44% in 2017 to 68% in 2021. ¹⁴
Manufacturing	There are severe labour shortages, primarily concentrated in lower-level positions.	Employers are so in need of labour that they have reported a willingness to hire individuals without relevant education or experience for entry-level positions and then train them on the job. The food manufacturing industry vacancy rate is 25% higher than manufacturing as a whole, and food manufacturing loses almost \$8.5 million in net revenue per day due to vacant positions. ¹⁵

Sector	Challenge	Description
Manufacturing	There is a lack of visibility and perceived attractiveness for careers in food manufacturing.	Only one in four Canadians said they were familiar with the food and beverage processing industry, and only one in six said they would consider applying for a nearby job in that industry. ¹⁶
Manufacturing	The sector is dominated by SMEs who require distinct kinds of policy support than larger businesses.	In Manitoba, 44% of total food processors are micro-enterprises (less than four employees) and 51% are small-sized (five to 99 employees). ¹⁷ In Saskatchewan, 44% of businesses are listed as non-employers and 49% are listed as small (one to 49). ¹⁸
Manufacturing	Concerns exist regarding the sector's reputation as an employer of choice.	Unfortunately, not all negative perceptions of the sector are misconceptions. For example, there are plenty of instances of racism, sexism, and employer abuse of TFWs. ¹⁹
Manufacturing	There are high rates of retirements and a lack of replacement workers.	In food manufacturing, much of the projected future increase in the industry-wide labour shortage stems from retirements and a lack of replacements. While not as severe as in agriculture, it still poses a major challenge for all companies in PBP manufacturing. By 2025, the food manufacturing industry could have as many as 65,000 vacant jobs, many of which will be caused by workers exiting the workforce and not being replaced by enough new workers under the age of 30. ²⁰
Government	Provincial governments are not designing support and settlement service programs to support the needs of specific communities.	Wide-ranging provincial programs are often not targeted to specific communities or could benefit from having a smaller focus. Local communities and municipalities are often some of the most directly involved parties in responding to business and worker needs but often lack the political or economic resources that provincial or federal governments have.
Government	Federal and provincial regulators are often slow in approvals, and their processes are not designed to incorporate PBP products.	Regulatory approval of new PBP products can often be slow, and existing regulations are not designed with the PBP industry's specific challenges in mind. Though recent legislative changes have streamlined the process, new regulations and a focus on PBP products are needed.
Government	Smaller businesses have difficulty accessing and using immigration programs.	SMEs often do not have the internal capacity or specific skills needed to use all immigration programs like the Temporary Foreign Worker Program (TFWP) or the Provincial Nominee Program (PNP).
Government	Businesses and governments are not sharing the necessary labour data to inform stakeholder decision-making.	Two major gaps that stakeholders noted repeatedly were the lack of specific labour data for the agricultural sector and discrepancies between federal and provincial data sources. Outside of large national sources like the Census of Agriculture and the Labour Force Survey, data on skills, training, and employee perspectives is hard to find. Data that does exist can also be contradictory.
Government	Some immigration programs do not include the sectors and industries found in the PBP supply chain.	Federal and provincial governments have created several programs to bring workers into Canada to fill occupations where labour needs are the greatest. As a more novel industry, PBP manufacturing has been ineligible for some programs intended to help food manufacturers bring in new employees.

Recommendations

This report makes the following recommendations to overcome these challenges by improving awareness of the opportunities in the PBP supply chain; fostering a sense of a shared ecosystem and industry; helping businesses recruit, attract, and retain workers; helping workers gain and develop new skills; and ensuring that communities can capture the benefits of the growth opportunity presented by PBP products.

What is needed from industry?

- 1 Explore offering flexible work environments,** holistic worker supports, and benefits beyond traditional compensation.
- 2 Partner with educational institutions to offer work-integrated learning (WIL) opportunities to students,** as well as to increase awareness of career options in the PBP supply chain and reduce stereotypes about agricultural and manufacturing work.
- 3 Promote job opportunities through non-profits to non-traditional farm communities and underrepresented and equity-deserving groups,** as well as expand the pool of potential workers to include individuals who might be interested in new careers in agriculture but do not have a personal or familial connection to the sector.

What is needed from governments?

- 1 Municipal governments for communities involved in PBP production and manufacturing should conduct a holistic analysis of worker needs** for infrastructure and support programs that can best attract, support, and retain workers.
- 2 Implement sectoral or region-specific work permits for in-demand industries and communities** that include automatic spousal visas for those same regions.
- 3 Expand access to federal programs** like the Agri-Food Pilot Program (an immigration program focused on bringing in workers for specific agriculture and agri-food businesses and occupations) and AgrilInnovate program (a cost-sharing program for agricultural businesses to adopt new technologies) for businesses in the PBP supply chain.
- 4 Provincial governments should implement industry-specific training grants** modelled after the Canada-Saskatchewan Job Grant.
- 5 Create provisions in the Temporary Foreign Worker Program (TFWP) that allow certain businesses to change the National Occupational Classification (NOC) code of workers** they have under the TFWP without affecting their immigration status.

- 6 Saskatchewan should expand its Provincial Nominee Program (PNP)** and reduce some of the existing requirements around post-secondary education for occupations. Additionally, Saskatchewan should implement additional temporary foreign worker (TFW) protections, similar to Manitoba's Worker Recruitment and Protection Act.
- 7 Create a national hub for agricultural workforce data** and collaborate with provincial and municipal actors to collect and share up-to-date labour market information.
- 8 Make international students eligible for the Student Work Placement Program (SWPP)** and increase provincial scholarships for studies in relevant fields.
- 9 Increase access to settlement services** for workers under the TFWP.

What is needed from post-secondary institutions and educators?

- 1 Work more with businesses and industry associations** to make students and recent graduates aware of the in-province opportunities in the PBP supply chain.
- 2 Create additional opportunities** for post-secondary placements, experiential learning, and WIL programs that are also open to international students.
- 3 Expand program options in certificates, diplomas, and training programs** at colleges and other educational institutions to include in-province programs for critically needed skills in the PBP supply chain for both new and existing workers.
- 4 Collaborate with industry bodies to explore the development and use of a decentralized learning program** that includes mechanisms like micro-credentials and delivers training in a more flexible manner.
- 5 Consider offering training in additional languages** spoken by the most common provincial immigrant populations.



Introduction

Plant-based protein (PBP) represents a significant global opportunity, with demand for protein worldwide expected to double by 2050 and demand for PBP products representing a third of this potential market.²¹ Manitoba (MB) and Saskatchewan (SK) are extremely well-positioned to take advantage of this growing demand. Both provinces have extensive productive farmland, existing production and processing capacity, recent investment in manufacturing facilities, and an existing agricultural and manufacturing workforce. Given these assets, the PBP industry could form a strong regional economic anchor in the Prairies.

To take advantage of this opportunity, communities in these two provinces need to be prepared for growth. This will involve all levels of government, private businesses, not-for-profit organizations, educational institutions, and workers. Importantly, seizing this clean growth opportunity and its associated benefits is not just about investment but also about ensuring that communities have the right tools and conditions in place.

The recent receivership of Merit Functional Foods offers an illustrative example of this need for holistic thinking. Merit's declaration of bankruptcy in the spring of 2023 occurred despite funding support from multiple levels of government and major investment into new production capacity. Rather, the organization cited challenges around the cost and supply of raw materials and a lack of skilled labour, two challenges that could be supported through changes in government policy and greater investment in domestic supply chains.²²

Merit's struggle shows that direct investment into companies, whether from public or private funding sources, is not enough to ensure that the PBP industry will be a future driver of economic growth in Manitoba and Saskatchewan. Both small and large

organizations need to have the right supports in infrastructure, utilities, and educational programs, as well as a labour force with the right skills, to ensure success. For the PBP industry to fulfill the projections that government agencies and private companies have made, actors from across the ecosystem will need to work together to ensure that Manitoba and Saskatchewan are ready for growth.

Report overview

This report advances this objective by examining the growth of the PBP industry through a systems-based perspective and what this opportunity means for changes to labour and skills needs for agriculture and agri-food manufacturing within Prairie communities. We examine the current challenges facing both workers and employers in food manufacturing and agriculture, as well as challenges for some of the existing educational programs and government initiatives related to the PBP industry. We then explore some of the projected future needs and trends affecting the PBP production and manufacturing sectors before moving into what can be done to address these challenges and trends. Tackling these challenges will involve all levels of government, private businesses, not-for-profit organizations, educational institutions, and workers, and our recommendations reflect this reality.

Given the nature of the growth opportunity presented by PBP products as a sub-sector of larger industries, many of the challenges it faces as a growing industry are similar to existing agricultural and agri-food businesses in Manitoba and Saskatchewan. Our findings are drawn from several sources, including industry consultations, a supply chain analysis, quantitative data analysis

of skills metrics, in-person and online workshops with relevant stakeholders, detailed interviews with experts, and a survey of individuals involved in the PBP ecosystem. Results are presented through an environmental analysis framework to illustrate conditions and factors that affect businesses and workers in the PBP supply chain. This report segments the challenges different sectors and stakeholders face into two categories: direct environment and macro-environment. Direct environmental challenges, which this report also refers to as capacity challenges, pertain to issues that impact a company's ability to maintain current levels of operations or support growth and are largely determined by decisions made within the company or the sector. These include challenges such as wage rates, physical location, and staff retention. Macro-environmental challenges, also referred to in this report as external environmental challenges, pertain to major economic or societal trends that shape or influence the outlook for an entire sector. These include issues such as an aging workforce, changing regulations, and the costs of emerging technologies.

This report details direct and macro-environmental challenges for three groups: the agricultural sector, the food manufacturing sector, and governments. Once these challenges are identified, the needs of each group are also discussed to provide deeper insight into the priorities of each stakeholder group when supporting the growth of this opportunity. We also provide an overview of the current educational programs available to students and workers in the PBP supply chain and the implications for the industry's labour supply. Finally, we offer recommendations for each group to help overcome their biggest challenges and meet their biggest needs. These recommendations are split into the same three stakeholder group categories and are specific to each province. Additionally, the recommendations are further categorized by which actors should lead on each item, identified as industry-led, government-led, or educational institution-led, to make them more actionable. This report aims to offer solutions tailored to tackling the intersecting labour, skills, and environmental challenges businesses and stakeholders face throughout the supply chain.



A cautionary tale

Despite the potential market for PBPs, not all recent investments have been entirely successful. What happened to Merit Functional Foods has diminished stakeholders' sky-high expectations for sectoral growth. Merit had been one of the leading companies investing in PBP in Manitoba, netting multi-million dollar funding agreements and building a new 94,000-square-foot processing facility in Winnipeg, MB. This plant was designed to process tens of thousands of metric tons of canola and peas by 2023 and eventually employ more than 200 workers.²³ In total, Merit received \$116.5 million in federal and provincial funding both directly and through training rebates.²⁴

Despite funding and supports from other organizations, by February 2023, Merit owed \$58.5 million to Export Development Canada and \$36.5 million to Farm Credit Canada.²⁵ Merit was thus sold in March 2023 to its parent company, Burcon, and around 75% of its workforce was laid off.²⁶ Company leaders placed its failure on inflationary and COVID-related pressures.²⁷ There were however, signs of sector-wide challenges that impacted the plant's success—the increased cost of raw materials, the lack of sufficient labour, and delays in new product development brought about by the closures of laboratory testing facilities.²⁸

Merit's struggle shows that investment into companies, whether from public or private funding sources, is not enough to ensure that the PBP industry is a future driver of economic growth in Manitoba and Saskatchewan. Small and large organizations need to have the right supports in the form of infrastructure, utilities, and education programs, as well as a labour force with the right skills, to ensure success. For the PBP industry to fulfill the projections that government agencies and private companies have made, actors from across the ecosystem will need to work together to ensure that Manitoba and Saskatchewan are ready for growth.

The overall labour challenge faced by agriculture and agri-food businesses

There is a significant labour shortage across businesses in the PBP supply chain, especially among entry-level workers such as general farm labourers and labourers in food and beverage manufacturing. In 2017, the agricultural sector in Canada had over 16,500 vacant jobs, which resulted in an estimated \$2.9 billion in lost revenues.²⁹ The food manufacturing sector is projected to need an additional 35,000 workers by 2025 to keep production at current levels.³⁰ These labour shortages risk inhibiting companies' abilities to maintain existing levels of operations, let alone their capacity to grow.

Complicating this lack of entry-level workers is the impending issue of large-scale retirements in agriculture and agri-food manufacturing and the lack of replacement workers. The agriculture sector is expected to see 112,200 workers retire between 2018 and 2029, equivalent to 37% of its workforce.³¹ Agriculture and agri-food both have older workforces than the Canadian median, with the age of the median farm operator in Canada being 58 in 2021, and only 8.6% of farm operators reported as young (generally aged 18-29) in the 2021 Census of Agriculture.³² This trend will likely exacerbate labour shortages by reducing the total number of available workers and removing potential managers and mentors from the workforce whose knowledge and experience younger workers would greatly benefit from.

As the sector struggles to replace workers and attract younger workers into agricultural and agri-food businesses, the increasing pace of technology adoption in the form of precision agriculture, digitization, automation, and Industry 4.0 (the implementation of smart, automated, and data integrated tools) is changing the nature of jobs. Workers will need to have more skills around the monitoring, maintenance, and operations of these technologies, but specific occupations will also find other changes to their skills requirements to accompany these shifts. In a labour-shortage environment, addressing the need to retrain and upskill

workers becomes more difficult. Employers are less enthusiastic about paying for training due to the greater need to have workers being productive. They are also more concerned about retention in an environment with greater competition for skilled workers and are less likely to invest in training for their existing workers, fearing they may depart at any time.

Additionally, companies struggle with general perceptions of the sector. Finding and attracting appropriately skilled workers in digital technology, engineering, biology, and other fields to agriculture and agri-food is a critical need for the growing PBP industry. Yet surveys by Food Processing Skills Canada (FPSC) and Canadian Agricultural Human Resources Canada (CAHRC) have found that workers are often unaware of the breadth of opportunities in agriculture and food manufacturing.³³ Furthermore, workers often have misconceptions about what the work entails and what career opportunities are available.³⁴ In one survey, 13% of respondents noted they did not believe there were any roles in the agriculture sector beyond "farmers."³⁵ These misconceptions limit the interest of candidates when considering professions within both sectors.

All the challenges detailed above are heightened by difficulties businesses face operating in, and recruiting workers into, more rural and remote communities (where primary production and ingredient processing facilities are typically located). Workers may not want to move away from more urban and dense communities, and significant gaps in rural infrastructure around critical services like transportation, health care, child care, and utilities make it harder for businesses to operate and for workers to remain in these communities.

Many of these challenges will rely on workers entering or staying in this sector, being supported by their employers, and being prepared with the skills and knowledge needed to succeed. For solutions to be effective, workers should be treated as major partners in preparedness, not just as inputs to the production process.



Findings from *Ingredients for growth*

Our first report, *Ingredients for growth: How the emergence of plant-based protein opportunities in Saskatchewan and Manitoba will impact workers and future skills needs*, concentrates on understanding the PBP supply chain and analyzing workers' current and future skills needs at key steps in the supply chain.³⁶ We conducted a supply chain analysis of the industries involved in the PBP supply chain and the key occupations for those industries, as well as a skill and knowledge analysis of those occupations (Figure 1, below).

We found that across positions, some of the most in-demand skills included job-specific technical knowledge, judgment and decision making, time management, and critical thinking. Regarding what skills will be most needed in the future, our research found that stakeholders expected digital literacy, machinery maintenance and repair, research, supply chain management, and regulatory and environmental, social, and

governance knowledge to be in demand in the next three to five years. The most in-demand positions included managers in agriculture, general farm workers, machine operators and assemblers, testers and graders, and sales and account representatives.

Additionally, it is important to understand who is currently working in these industries and positions. In agriculture, the workforce is older than the Canadian median, with the median farm operator aged 58 compared to the national median of 41 in 2021.³⁷ While there has been an increase in the number of women farm operators from 29% in 2016 to 31% in 2021, the overall percentage of women farm operators has remained stagnant since 1991.³⁸ Manufacturing also has a workforce that is often male-dominated and older than the Canadian average. In Manitoba, only 10% of workers were aged 15-24 and 72% were male in 2021,³⁹ while in Saskatchewan, only 8% were aged 15-24 and 82% were male in 2021.⁴⁰

Figure 1. A simplified supply chain diagram for plant-based protein (PBP) products, including selected North American Industry Classification System (NAICS) codes.

	Agriculture Raw materials	Manufacturing Ingredients	Manufacturing Final products	Retail market
Supply chain	Crops grown on farms: dry peas, lentils, chickpeas, beans, fava beans, etc.	Raw materials are cleaned and further processed into ingredients like flours, fibres, starches, and protein isolates.	Ingredients are used to manufacture final products like plant-based burgers, snacks, and protein-fortified staples.	Final products are sold to consumers.
Selected NAICS codes	Oilseed & grain farming (1111) Vegetable & melon farming (1112) Other crop farming (1119) Support activities for crop production (1151)	Grain & oilseed milling (3112)	Fruit and vegetable preserving and specialty food manufacturing (3114) Dairy product manufacturing (3115) Bakeries and tortilla manufacturing (3118) Other food manufacturing (3119)	Farm product merchant wholesalers (4111) Food merchant wholesalers (4131) Beverage merchant wholesalers (4132) Grocery and related product merchant wholesalers (4244) Grocery and convenience retailers (4451) Specialty food stores (4452) Warehousing and storage (4931)



Agriculture results

As noted, challenges in this section will be discussed in two categories: capacity challenges and external environmental challenges. Given the pronounced realities and challenges rural businesses face in the agricultural sector, solutions based on the sector's needs will prove critical for growing the PBP industry in Canada. This section details the two categories of challenges and then identifies the core needs of businesses in this sector to support recommendations made at the conclusion of the report.

Capacity challenges

Organizations struggle with staff retention

The lack of entry-level workers can best be seen in the reduction of the agricultural workforce as employers struggle to fill roles.⁴¹ In Manitoba, employment in agriculture fell 6.3% (-1,600) in 2021 and has had an average annual growth rate of -1.0% over the last decade.⁴² However, in Saskatchewan, this trend was more severe from 2019 to 2021, which saw a reduction of filled jobs of 29.4% (-12,000), compared to 2011 to 2019, which saw a reduction of 2.2% (-900).⁴³ Much of this is due to a combination of retirements and a lack of workers to replace those exiting the sector. This lack of entry-level workers in agriculture has affected both the industry's ability to train and retain workers as well as changed employer expectations for the workers they do have. Labour market projections from CAHRC have found that almost 37% of the open vacancies in agriculture are for general farm labourers, and that percentage is projected to increase to 51% in 2029.⁴⁴ In addition, there are increased rates of voluntary turnover in agriculture at 10.3% compared to the wider Canadian economy at 7.1%, leading to concerns from employers that they are not sure if they can invest as much time and training in what workers they do have.⁴⁵

Businesses need more certainty around pathways for workers that enter through all immigration programs

The agricultural sector relies heavily on international workers, especially temporary foreign workers (TFWs), to fill its labour needs. This reliance is contrasted by the low rates of foreign workers transitioning to permanent residency (PR), which impact the type of skills required and expected of these workers. In 2017, almost 90% of foreign workers in agriculture were working in crop production.⁴⁶ Of all the agricultural workers in 2017, 22.7% were foreign workers in crop production (compared to 9.9% in 2005).⁴⁷ Yet, only 2% of those in the Seasonal Agricultural Workers Program transitioned to receive PR between 2005 and 2009; this is the lowest transition rate by work permit type across all industry sectors that use similar immigration programs.⁴⁸ When international workers do not have a strong pathway to immigration, it can impact the types of training available and the nature of workforce development more broadly in agricultural businesses. Businesses are less likely to invest in training if they do not know if workers will be around long enough to get a good return on investment. This lack of certainty for workers also impedes their ability to prepare and upskill. These workers are filling a critical labour need in the Canadian workforce, and it is in both the workers' and businesses' interest that they have clearer pathways to PR.

Employers informed us in stakeholder engagements that they valued the ability to sponsor workers through programs like the Manitoba Provincial Nominee Program (PNP) because it reduced their risk of not having employees return for another season by helping international workers become residents. Moving temporary international workers to permanent workers can also

help rural towns and communities by bringing in new residents who invest and integrate into their communities rather than just doing seasonal work for several months of the year. Stakeholders held concerns that this rural ‘revitalization’ only works if these workers remain in those towns and positions after getting PR instead of moving to other industries, more urban areas, or even different provinces. Therefore, towns and communities can do more to ensure workers have access to services and amenities that make them want to stay and settle besides just having job opportunities.

External environment challenges

Farm consolidation is changing labour and skills needs within the agricultural sector

The landscape of farming in Canada is changing and the nature of farm work is changing along with it. There are fewer farms and farm operators due to a combination of industry consolidation and retirements.⁴⁹ Technological advancements in automation, modernization, and production operations have allowed farms to grow substantially in size, sales, and number of employees.⁵⁰ Eight per cent of farm owners operate and control 38% of the farmland in Saskatchewan, and 4% of farm owners operate and control 24% of the farmland in Manitoba.⁵¹ When small and mid-size farms disappear, rural communities shrink as well.⁵² These trends have strong social and economic implications for recruiting workers, both within Canada and internationally, because people want to live in places that have more to offer than just a job.

Another trend affecting consolidation is the increasingly high cost of farmland, which makes it harder for newer farms to get started or expand their holdings. The 2021 Census for Agriculture found that the total market value for farmland increased by 22.7% in the last five years.⁵³ This contributes to the difficulty for new owner-operators to establish themselves and grow their businesses. In 2022, the annual percentage change in cultivated farmland values increased by 14.2% for Saskatchewan and 11.2% for Manitoba.⁵⁴ In Manitoba, this increase is attributable to farmers wanting to expand operations, although there were also some hobby farmers and land developers.⁵⁵ Other factors causing the value of farmland to climb in Canada include strong commodity prices, low interest rates, and a growing demand for housing in urban and ex-urban areas.⁵⁶ Any trend that makes it harder for newer farmers to enter into the industry has strong implications for the types of skills needed by the remaining workers. As farms consolidate, teams grow, occupations specialize, and more managerial and technical skills are needed by workers and owner-operators alike.

One important consideration arising from this trend of increased skills requirements for the agricultural sector is the current prevalence of self-employed individuals, typically farm operators or owner-operators who own and run their farms. The sector with the greatest proportion of self-employed individuals in Manitoba is agriculture, with 62% of workers being self-employed.⁵⁷

In Saskatchewan, 72% of agricultural workers are self-employed.⁵⁸ Self-employed owner-operators have different job requirements than traditional employees; most are accustomed to taking on everything that needs to be done themselves, and many do not have additional employees to support expanding their operations. As such, owner-operators require a wide range of skills and knowledge that is hard to quickly train or scale, and they need to be supported in this skill transition as their teams expand.

Furthermore, with the growth of large-scale farms through consolidation, these businesses will need more workers, and those workers will need to be more specialized. For a larger farm with several employees, there is an increased need for management, specifically managers in agriculture, an occupation which is heavily in demand in both Manitoba and Saskatchewan.⁵⁹ Workers employed at a larger farm may become more individually specialized, such as becoming a dedicated machinery repair and operation technician. Additionally, as we will cover in more detail later, larger farms have the economies of scale to adopt newer technologies like large-scale mechanization, automation, and data-driven monitoring tools at a faster rate than smaller farms, which will lead to more technical skills requirements for workers.

The sector faces a large number of retirements, which is driving additional demands for skilled workers

As the current group of farmers age and retire, young farmers are not replacing them in sufficient numbers to avoid current or future labour shortages in the sector.⁶⁰ In Manitoba, 44.4% of those working in agriculture are aged 55+.⁶¹ From 2016 to 2021 in Saskatchewan, the number of farm operators aged 55+ grew by 5.7%, while the number of farmers under the age of 35 fell by 2.7%, and those aged 35-54 fell by 16.2%.⁶² As more workers retire, not only will businesses struggle to find workers to fill these roles, but it will also make it harder for previous generations of agricultural workers to train the next generation using on-the-job and experiential training. That replacement ratio is key to the future well-being of the agricultural sector as it relates to PBP production, and stakeholders at our workshops noted how much the ongoing labour shortage in agriculture will be exacerbated by the upcoming wave of retirements. Labour shortages already cost the agricultural sector in Canada around \$2.9 billion every year from lost sales, reduced production capacity, and lack of workplace efficiency.⁶³

Addressing these shortages will likely require several approaches, including greater outreach into equity-deserving communities. Currently, the agricultural sector has had difficulties attracting workers from equity-deserving communities. Only 2.8% of farm operators are Indigenous, and only 3.7% of farm workers are individuals from racialized groups (this does not include TFWs).⁶⁴ Stakeholders informed us that farm communities and businesses typically prefer to hire workers from similar rural or traditional agricultural farm communities. Expanding the

pool of potential workers by increasing outreach and confronting unconscious bias in employment preferences could help to reduce the impact of this pending wave of retirements.

Employers' expectations are not aligned with the skills entry-level workers typically possess

During our consultations, stakeholders identified that in an industry with historically thin profit margins, there is a high risk for businesses to invest time and effort into newer workers. This leads to employers having higher expectations for individual workers and the skills they possess. Workers are also often required to have the skills and knowledge to take on multiple roles. Specifically, our consultations found that agricultural employers wanted their employees to have some cross-training in adjacent skills like mechanical repair, digital literacy, botany, and machinery operations, in addition to core agricultural requirements and experience working on a farm. This presents an increased burden on the existing agricultural workforce because if employers only have a few workers, they will need some of these workers to cover the responsibilities from vacant positions, thereby requiring more from each worker. Additionally, given that many entering the workforce are recent graduates, these expectations are not often aligned with the knowledge attributes, experiences, and skill sets workers typically have at this point in their careers. While this mismatch of expectations has not yet been proven to hinder hiring entry-level workers because of the labour shortages, it still creates challenges for employers and workers that need to be navigated.

Future needs

As the agricultural industry changes, so will the skills needs of workers within the sector. The wider adoption of technologies like digital agriculture, drone monitoring, data-driven analytics, and the large-scale digitization of farming will increase and change what is needed from workers. As the pace of retirements is expected to increase in the future, newer workers will also need to take on additional responsibilities and learn new capabilities. Second, the agricultural industry already relies heavily on international workers, especially TFWs. Socially, these workers will need to not only learn language and cultural competency skills, but also integrate into the Canadian agricultural workforce. These trends will pose challenges for agricultural businesses in the PBP supply chain as they look to address their future skills needs.

Increase the rate of technological adoption

One of the more crucial trends affecting future skills needs is increased automation and digitization.⁶⁵ An example of this is the increased use of precision agriculture methods, which include technologies such as field mapping using global positioning system (GPS), geographic information system (GIS), drone imagery and monitoring, automated pesticide or fertilizer application, or "smart" irrigation monitoring to create more efficient farming operations that produce less waste.⁶⁶

Adoption rates of these technologies have varied across provinces and farm types but have become increasingly common in Canadian farms, and their operation requires new skills from workers.⁶⁷ In June 2023, the federal government had to release new guidelines for the use of drones in agriculture to spread pesticides. Workers must now be both certified for drone piloting under Transport Canada rules and via provincial standards for the safe use of pesticides.⁶⁸

For both agriculture and agri-food manufacturing, our research found that being able to repair and maintain equipment will be essential. Smaller companies, especially in rural areas, may struggle to find workers able to repair, operate, and improve such technology compared to larger firms. Automation will likely reduce the number of entry-level labourers needed while requiring more specialized technicians, mechanical engineers, and machine operators. Stakeholders noted that technological adoption is not an equal barrier for all farmers, as women who are farm operators often struggle with a sexist perception among their colleagues or from equipment sales personnel that they are not as knowledgeable or capable as their male counterparts about the purchasing, use, and repair of machinery. Stakeholders said this sexist perception and its subsequent consequences on anxiety and confidence (as well as potential additional financial costs they may be charged as a result of stereotyping) may be reducing the willingness to take risks, adding an additional barrier for women farm operators in learning new skills and adopting new technologies. Research has echoed these sentiments, with the Women Entrepreneurship Knowledge Hub finding that women in agriculture reported experiencing barriers in the form of stereotypes about gendered work, the amount of unpaid labour they are expected to undertake on farms, and the lack of access to training and financing.⁶⁹ These perceptions are often heightened for women of colour and Indigenous women, as reporting from the Canadian Council for Aboriginal Business⁷⁰ and the Canadian Black Chamber of Commerce has covered the additional burdens and stereotypes that women from these equity-deserving groups face in the workforce and as they adopt new technological innovations or skills.⁷¹

Recognize the increased use of immigrant workers, including TFWs

Due to the lack of entry-level labour in the Canadian workforce, agricultural businesses often rely on international workers, especially TFWs, to fill vacant occupations. As a component of their provincial agricultural workforce, Manitoba's TFWs are around 2% and Saskatchewan's TFWs are around 1.5%.⁷² Both provinces had similar TFW numbers as a percentage of their agriculture sector from 2019 to 2022, with a decrease in 2021 but a rebound in 2022 ([Tables 2 and 3](#)). These numbers will likely continue growing as farm operators hire TFWs as a solution to local labour shortages.⁷³ If these trends continue, economic immigration pathways will be used more in the future. However, businesses face some challenges when looking to hire and sponsor immigrant workers, especially in the agricultural PBP supply chain. When hiring immigrants for agriculture jobs, some contributing factors that made the employment transition

harder included applicants prioritizing taking English classes over job searching, no transportation options to reach rural work locations, and skills mismatches for those with post-secondary degrees.⁷⁴ Canadian citizenship and PR are powerful incentives for prospective temporary workers to undertake upskilling and retraining and to find more permanent employment opportunities. However, there is extensive ongoing debate among policymakers about how easy transition pathways to PR should be for foreign workers in entry-level and/or low-wage occupations or whether individuals in these occupations should remain limited to temporary status.

One study found that many immigrants working at a hotel in rural Manitoba had entered Canada through federal government programs like the Temporary Foreign Worker Program (TFWP) but gained PR through the PNP only when sponsored and selected by their employer.⁷⁵ The same study also found a pre-arrival “networked recruitment” system, where current employees recruited family and friends to work at the hotel and the hotel offered them jobs for their immigration applications.⁷⁶ PNPs, in general, tend to be “more flexible, adaptive, and responsive to shifting labour market and demographic needs,” making them simpler to support transitions to PR for individuals. Yet, some of the specific immigration streams relevant to the PBP industry, such as the Agriculture Worker Stream, the Seasonal Agricultural Worker Program, and the Low Wage Worker Stream, are used more often than the TFWP in certain agricultural occupations, making transitions to PR more challenging for workers and their employers.⁷⁷

Table 2. Temporary foreign workers (TFWs) in agriculture in Manitoba from 2019 to 2022.

Industry	2019	2020	2021	2022
Oilseed and grain farming [1111]	51	44	80	118
Vegetable and melon farming [1112]	335	325	274	337
Other crop farming [1119]	75	45	29	33
Total	461	414	383	488

Source: Statistics Canada. [Table 32-10-0218-01](#) Temporary foreign workers in the agriculture and agri-food sectors, by industry.⁸²

If accessible transition pathways are to be created, then major missing supports in the TFW journey also need to be addressed. These include a lack of pre-arrival information services, arrival orientation services, proactive on-the-job government monitoring to prevent employer abuse, and dedicated temporary integration services.⁷⁸ One important consideration for the increased use of TFWs is the potential for abuse of those workers. TFWs in agriculture often work in employer-provided housing and have work visas tied to their specific employer.⁷⁹ Recent reporting from the United Nations has covered the risks for agricultural TFWs, and even though the majority of agricultural employers are not engaging in harmful behaviour, creating pathways to reduce the harms and impacts caused by abuse and discrimination is a critical step to improving the conditions of TFWs.⁸⁰

We heard from workshop participants that smaller communities would benefit from developing materials that detail what it is like to live there and the available career opportunities to attract and recruit international workers. Additionally, communities should prepare by establishing the infrastructure required to grow, such as housing, transportation, daycare, and culturally appropriate settlement services. This report acknowledges that rural communities face different challenges and barriers in infrastructure provision than in more densely populated regions. Finding regionally appropriate models for service provision may be required to ensure communities can offer the supports workers and their families need to live in Canada.⁸¹

Table 3. Temporary foreign workers (TFWs) in agriculture in Saskatchewan from 2019 to 2022.

Industry	2019	2020	2021	2022
Oilseed and grain farming [1111]	281	287	221	237
Vegetable and melon farming [1112]	55	61	35	38
Other crop farming [1119]	34	25	92	132
Total	370	373	348	407

Source: Statistics Canada. [Table 32-10-0218-01](#) Temporary foreign workers in the agriculture and agri-food sectors, by industry.⁸³



Manufacturing results

Manufacturers of PBP products in Canada face several challenges in capitalizing on the PBP growth opportunity. Some of these are unique to PBP production, while others are the same as those faced by the broader food manufacturing sector. To meet the growth expectations for PBP production and manufacturing, these capacity-related and external challenges must be addressed and their core needs met.

Capacity challenges

Wages paid within the sector can be lower than in other industries

Even though, on average, wages within food manufacturing for the PBP supply chain are equivalent with non-PBP food manufacturing, a discrepancy in compensation often arises when we compare occupations in food manufacturing to roles in other manufacturing sectors that only require a high school diploma or general education development (GED) certificate.⁸⁴ Specifically, one report from FPSC found that the average pay across goods-producing industries was reported to be approximately \$30.36, while the average pay in food manufacturing was \$21.20.⁸⁵ This difference in earnings can make it harder to attract workers from other industries with comparable skills to food manufacturing occupations. Stakeholders further supported this trend as they informed us that compensation for roles at businesses working in PBP manufacturing was similar to equivalent roles at other food manufacturing businesses. But they also highlighted that the challenge of attracting and retaining workers with appropriate compensation remains, especially given that labour shortages across sectors are leading to increased rates of poaching between sectors. This was commonly cited by

stakeholders as a challenge given the number of workers being poached for roles in non-renewable resource sectors, such as potash or oil and gas extraction, which have some similar skills needs to manufacturing roles but pay higher wages and are currently in a “boom” phase.

Workplace location can be a challenge for attracting staff

The location of food processing plants and factories is also an issue for hiring and attracting workers. While most large PBP food manufacturing plants in Manitoba and Saskatchewan are located near large city centres, many smaller companies are located in more rural communities and towns.⁸⁶ While these smaller towns may have a lower cost of living as compared to larger cities, manufacturing workers in more rural and remote communities tend to earn nominally less than manufacturing workers in more urban or suburban locations.⁸⁷

Lack of in-house capacity to conduct research on PBP products, which disproportionately affects small and medium-sized enterprises (SMEs)

Given the emergence of technologies required to produce PBP products, such as extrusion, fermentation, and wet and dry fractionation, there are issues in both the costs associated with adopting these technologies and the attraction of technically and scientifically skilled workers needed to operate them.⁸⁸ Developing new PBP products often requires a great deal of market research to understand consumer desires and laboratory research to combine different PBP ingredients with

other components to create novel and desirable products. Large upfront costs for this research often cannot be absorbed by smaller companies or ones without significant capital reserves.⁸⁹ Businesses that cannot find laboratory space or skilled researchers may also be unable to pivot and adjust their products or take full advantage of new technologies. The number of new startups will also be limited, with most unable to get off the ground.⁹⁰

Furthermore, the types of workers needed to perform this work, occupations like chemists, biologists and related scientists, and specialized manufacturing managers, are highly in demand within and outside of food manufacturing and require more specific technical education. Data from the Bioscience Association of Manitoba identified that the percentage of full-time equivalents (FTEs) in agricultural biotech requiring only a high school education in Manitoba decreased from 26% in 2017 to only 10% in 2021.⁹¹ Additionally, the number of FTEs designated as highly qualified professionals (holding a bachelor's degree or greater) increased from 44% in 2017 to 68% in 2021.⁹² This has occurred during a time when overall provincial employment for agriculture bioscience has remained relatively stable, indicating an industry with increasing skill and knowledge requirements for its workers.⁹³ However, if businesses cannot hire workers with these increasing skills requirements or their existing workforce is unable to upskill or retrain, businesses will find it more difficult (and potentially be unable) to develop new products or keep pace as market demand changes. The dedicated non-private laboratory space that does exist for companies is highly in demand, with facilities like the Richardson Centre for Food Technology and Research and the Saskatchewan Food Industry Development Centre reporting immense and increasing demand for their services.⁹⁴

External environment challenges

The sector faces severe labour shortages, concentrated in entry/lower-level positions

Estimates from FPSC have vacancy rates within the food manufacturing industry at 25% higher than for manufacturing as a whole.⁹⁵ These vacancies cost businesses in lost output, reduced production, and an inability to capitalize on market opportunities.⁹⁶ The same report estimated that countrywide, food manufacturing loses almost \$8.5 million in net revenue per day due to vacant positions.⁹⁷ These high levels of vacancies also lead to a situation where there is a very tight labour market for skilled and experienced candidates. As a result, often the most available workers are those already in the field working for similar companies, which creates high competition between companies for skilled workers. This competition is exacerbated with the introduction of large-scale factories and productions, like Roquette or AGT Foods. From an economic perspective, these large facilities can afford higher salaries, offer subsidized transportation, and have access to on-the-job training. As a result, SMEs often cannot compete for the same pool of workers.

Nowhere in food manufacturing is the labour shortage more acute than in entry-level positions, like labourers in food and beverage manufacturing where employers have reported industry-wide shortages. Employers are so desperately in need of labour that they have reported a willingness to hire individuals without relevant education or experience for entry-level positions and then train them on the job. A survey from the Canadian Federation for Independent Businesses found that 63% of agri-food businesses could not hire all the staff they needed, and 62% of business owners said they found it difficult to very difficult to hire new staff.⁹⁸ Other in-demand roles that are the most difficult to find appropriate workers are positions for testers and graders, as well as product handlers. The main entry-level occupation is labourers and machine operators in food and beverage manufacturing, and these occupations cover many technical aspects of food production, ingredient fractionation, and the operation of machinery inside factories like conveyor belts, extruders, ovens, and other equipment. This skill set shows that even workers in entry-level positions will need to be more competent over a wider range of skills as more will be asked of them.

There is a lack of visibility and perceived attractiveness for careers in food manufacturing

One issue brought up repeatedly in our stakeholder conversations and research was the lack of awareness and visibility in Canada for the food manufacturing sector generally and PBP manufacturing specifically, and how that lack of visibility affects the labour supply. Workers who are less aware of the industry and the types of jobs offered within it, as compared to other manufacturing sectors, are less likely to seek out and apply for those positions. Survey research from FPSC found that respondents were largely unaware of the occupations and types of work within food manufacturing.⁹⁹ Specifically, they found that only one in four Canadians said they were familiar with the food and beverage processing industry and only one in six said they would consider applying for a nearby job in that industry.¹⁰⁰

Additionally, survey responses from prospective workers found that the average worker tended to be less attracted to working in food manufacturing than in other manufacturing sectors. This trend persisted when asked about occupations less directly involved in the production process, like researchers and operations managers; respondents said they were less likely to apply for those positions if they were at a food manufacturing company.¹⁰¹ This has major implications for the food manufacturing sector as it contributes to the longstanding sector-wide labour shortages and reduces the industry's chances of attracting new workers. Notably, this lack of awareness is occurring despite food manufacturing being the second-largest manufacturing sector in the country in terms of value of production and sales of goods, as well as a major component of the Canadian economy.¹⁰² Visibility and awareness around what type of occupations and skills are involved in food manufacturing broadly and PBP product manufacturing specifically can be improved.

Policies to support this sector are not always equally accessible for companies in the sector

The largest companies that employ hundreds of workers often garner the most attention. Yet, the reality is that most food manufacturing businesses in Manitoba and Saskatchewan are SMEs, and there is a discrepancy in the amount of attention and focus given to SMEs by policymakers compared to the largest companies.¹⁰³ A majority of manufacturing and ingredient processing companies in Manitoba and Saskatchewan are small businesses in terms of employees.¹⁰⁴ In Manitoba, 44% of total food processors are micro-enterprises, meaning they have less than four employees and 51% are small-sized (five to 99 employees).¹⁰⁵ The numbers are equivalent in Saskatchewan as most food manufacturing companies are quite small, with 44% of businesses listed as non-employers and 49% listed as small (one to 49).¹⁰⁶

But the challenges new smaller companies face around lack of HR capacity, low margins, difficulty in hiring or attracting workers, and the costs of technological adoption receive less attention and support from investors and policymakers than the challenges faced by new, much larger facilities. Program structures tend to prioritize supporting larger businesses, with the Saskatchewan Value-Added Agriculture Incentive providing a flat 15% tax credit on capital investment expenditures between \$10 million and \$400 million, but the tax credit increases to 40% for expenditures over \$600 million.¹⁰⁷ There is a lack of equivalent support for smaller-scale investments, and the disparity in getting access to capital for SMEs affects their ability to incorporate new technologies, hire new workers, and expand their businesses.

The size of a company has major implications for the capacity of businesses to handle training, human resources, worker retention, and application and reporting requirements for immigration programs. Within a larger employer, there is the potential for workers to observe and get on-the-job training for positions that require more experience and a different skill set, as well as for companies to have the budget for employee training. Furthermore, larger companies are often the ones most capable of navigating Canada's immigration systems, either PNPs or the TFWP. The Labour Market Impact Assessment (LMIA) paperwork required to hire international workers can very easily be a major barrier for a company with only one to five employees compared to one who can afford to hire dedicated staff to assist with international worker recruitment.

Addressing reputational concerns for the sector as an employer of choice

The state of their workplace must be considered since the industry has increasingly turned to using international workers, especially TFWs, to find replacements for ongoing and widening job vacancies. Manitoba has a significant population of TFWs working in the food manufacturing sector, with data from Statistics Canada finding that in 2022, there were 1,769 TFWs in the sector out of a provincial workforce of around 13,000 workers.¹⁰⁸

The use of TFWs in agriculture and agri-food has created negative perceptions of the sector, and unfortunately, not all of those are misconceptions. There are plenty of examples of racism, sexism, and employer abuse of TFWs that influence social perceptions of the sector.¹⁰⁹ Even if we recognize that the majority of individuals or employers do not embody these ills, some do. Therefore, creating pathways to reduce the harms and impacts caused by abuse and discrimination is a critical step in increasing inclusion within the sector.¹¹⁰ This means that some of the biggest changes in perception will likely be a result of changes to policies, programs, or practices that have been exploited by bad actors in the past, including reforms to the TFWP to better emphasize the well-being of workers and taking tangible steps to respond to harassment and discrimination. In the absence of these steps, the risk of exploitation or discrimination will remain, dissuading some from entering the sector.

The sector will need to keep up with high rates of retirements

Much of the projected future increase in the industry-wide labour shortage in food manufacturing stems from retirements and replacements. While not as severe as in agriculture, it still poses a major challenge for new and mature companies in PBP manufacturing. FPSC has estimated that by 2025, the food manufacturing industry could have as many as 65,000 vacant jobs, many of which will be caused by workers exiting the workforce and not being replaced proportionately by as many new workers under the age of 30.¹¹¹ The manufacturing workforce is aging and tends to be a male-dominated workforce in Manitoba (as of 2021, only 10% were 15 to 24 years old; 72% were male)¹¹² and Saskatchewan (as of 2021, only 8% were 15 to 24 years old; 82% were male).¹¹³ High levels of retirements and a lack of replacements impact the sharing of knowledge and skills between workers. As more experienced workers exit the industry either through retirement or finding other opportunities, there may not be ways for them to share their experiences and mentor or coach the next generation of workers, especially if there are fewer new workers. Hands-on training and shadowing more experienced workers are incredibly valuable tools for training new workers and a greater percentage of retirements than entries could put this at risk.

Future needs

Companies will need to support increased consumer awareness of products

One of the core business requirements that manufacturers of PBP products will face is ensuring that their products are able to keep in step with demand as consumers gain an increasing awareness and preference for the novel PBP products coming to market. Most food manufacturing has an extensive history of products and customer experience to build upon. However, PBP products are still emerging and consumer demand is liable to change. A survey from the Agri-food Analytics Lab at Dalhousie University found that about one in three Canadians is aware of

PBP products and other types of cultured proteins, but only one in five considers themselves knowledgeable about the products.¹¹⁴ Furthermore, the same survey found that despite only 6% of the Canadian population identifying as vegetarian, almost 31% had consumed at least one PBP product in the last month.¹¹⁵ Beyond Meat and similar PBP products have only become prominent in social and environmental consumer consciousness in the last decade, and since their introduction, there have been many changes and innovations. Ensuring that companies and their workers can keep pace with innovations and changes in consumer demand will be a matter of technological access and production agility, as well as marketing and sales capacity.

To do so, companies will need to have both the laboratory space, personnel with technical experience, and the capital required to experiment and understand new technologies. If consumers favour products that use higher levels of fermentation or more complicated die extrusion, those costs will be incurred by the companies through the increased purchasing of machinery and the time and effort required to retool production processes to fit the new innovations. Having a workforce that is skilled, agile, knowledgeable about the production process and empowered to improve the production line will help companies adopt new technologies better. Much of the versatility that makes companies manufacturing PBP products agile will also be determined by their ability to make changes based on the market and consumer demand. The ability for companies to market new PBP products to the public is a much-needed future skill set that our conversations with stakeholders identified as a gap in the current labour market. Building capacity within occupations like sales and accounts managers and marketing coordinators will be crucial.

Companies will need to adopt higher levels of automated and digital solutions

The implementation of technologies like automation, digitalization, advanced robotics, and the widespread use of data tools have generally been categorized as “Industry 4.0.”¹¹⁶ These innovations have created expectations about increasing efficiency, reducing the number of workers needed on lines and in plants, and revolutionizing manufacturing. New technologies always pose both benefits and risks, but with regard to the PBP manufacturing sector and its labour challenges, a more nuanced conversation is needed around what Industry 4.0 will actually do for workforces and companies. Automation is often considered as only reducing the number of workers needed or saving labour hours, but our research has found it is unlikely that automation will be critical to mitigating the adverse impacts of labour shortages in the next few years in the PBP manufacturing sector. Over the medium to long term, automation will most likely impact entry-level positions like labourers in food and beverage manufacturing, occupations that the industry already struggles to hire at optimal levels. Automation should then be considered not as taking jobs away from workers, but rather as helping companies by allowing them to maintain operational levels high enough that they can grow and keep their existing staff from burning out or leaving. These are critical needs for an already lean workforce.

As part of the growth of automated solutions, workers will need to become more digitally literate and gain new skills in operations and monitoring. Businesses as a whole will need more workers who can maintain and repair these more advanced technologies. This is especially critical for rural businesses, as there is often a local lack of repair technicians for advanced technologies like robotics and smart devices. Compared to other manufacturing industries, food manufacturing has tended to lag behind in digitization and use of “Internet of Things” devices and processes.¹¹⁷ Our survey from *Ingredients for growth* found that employers indicated that some of the most valuable workers are those who have the knowledge and confidence necessary to adjust and change the production line to improve efficiency or mitigate problems. Stakeholders also emphasized that in food manufacturing, given the multiple types of machinery involved and the wide range of skills and capacities across production methods, they prefer workers with critical thinking and problem-solving skills and are interested in learning and modifying various types of machines, equipment, and parts.

A survey from Food and Beverage Ontario found that while businesses were interested in the benefits of automation, two of their largest sticking points were the availability of capital for new technologies and the cost of hiring and training new employees to operate and maintain these technologies.¹¹⁸ While this survey was focused on Ontario businesses, the report surveyed the same sub-sector and types of food manufacturing businesses examined in this report so the general themes are likely applicable in Saskatchewan and Manitoba. When asked what would most help support and encourage increased use of automation, the second most common result (after more grant funding) was additional training for existing workers.¹¹⁹ This survey also found that automation offers different barriers and opportunities depending on the size of the company implementing it. Businesses of all sizes were worried about the impacts of a lack of funding and how the cost of delays between technology implementation and their full adoption into production processes could impede the use of automation.¹²⁰ SMEs however, were more worried about the impact of not having enough trained personnel.¹²¹ 73% of all SMEs identified the “cost of hiring and training of internal employees” as a barrier to adopting new automated technologies, compared to only 30% of medium-sized companies and 20% of large companies.¹²²

Province-specific differences

These current challenges and trends are common in all types of PBP manufacturing and processing, but there are some important differences to note between Manitoba and Saskatchewan. The types of crops grown in both provinces have major effects on the types of facilities and workers needed in both manufacturing sectors. The dominance of canola and wheat in Saskatchewan as compared to peas and dried beans in Manitoba leads to different types of processing facilities, and the associated provincial supply chains change as well. Food manufacturing in both provinces contributed roughly the same to the overall provincial gross domestic product, with \$6.3 billion in Manitoba¹²³ and \$6.4 billion in Saskatchewan.¹²⁴ Manitoba’s industry is a larger

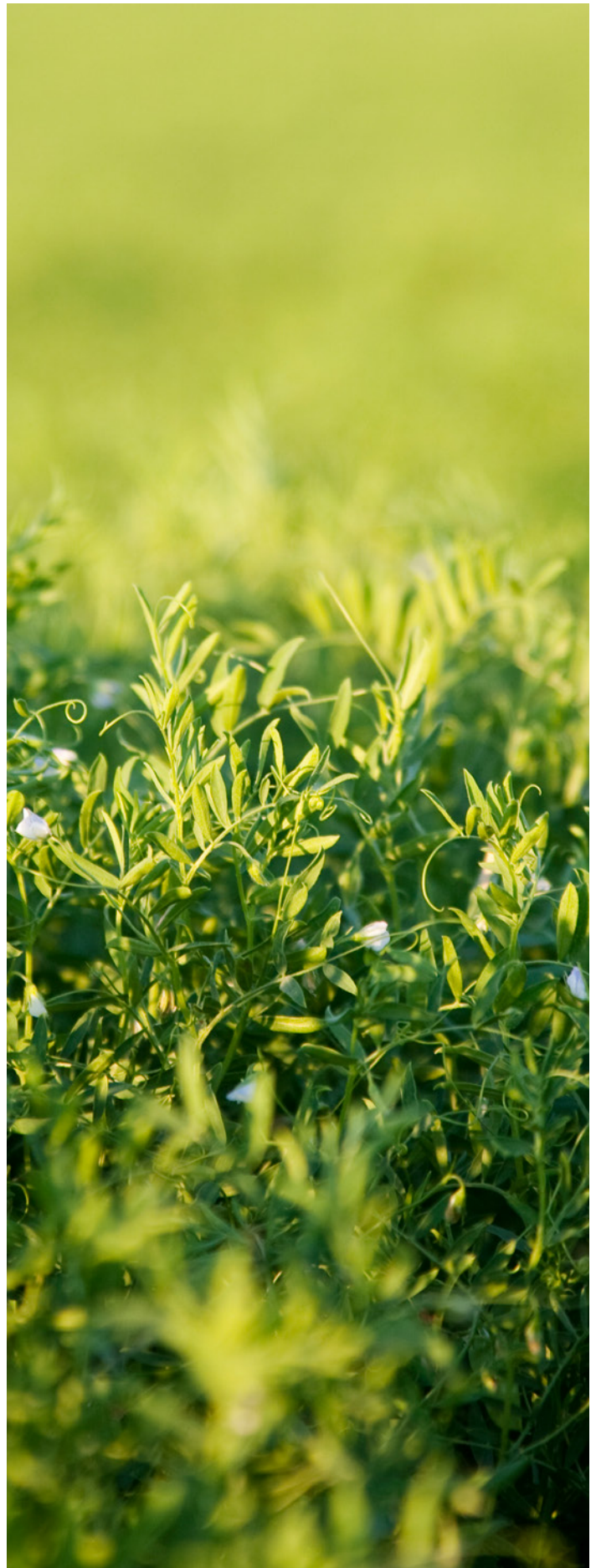
component of its overall provincial manufacturing sector.¹²⁵ Overall, food manufacturing in Manitoba constitutes around 30% of the provincial manufacturing sector by sales compared to Saskatchewan, where food manufacturing only constitutes 19% of the overall manufacturing sector.¹²⁶ However, employment remains similar in relative terms, and as of 2021, food manufacturing in Manitoba and Saskatchewan had 21% of overall sector employment.¹²⁷ There are many points of commonality between provinces, with both manufacturing sectors being focused in the major urban centres of Winnipeg, MB, Regina, SK, and Saskatoon, SK.¹²⁸

Research programs identifying skills and labour challenges and needs in the sectors

There are some ongoing major research initiatives to better understand the labour and skills challenges for businesses and workers in the PBP supply chain, above and beyond the reports associated with this project. While these projects are not yet completed, valuable insights have been generated in their interim reports.

Federally, Agriculture and Agri-Food Canada (AAFC) is currently undertaking consultations and working on an Agricultural Labour Strategy. This strategy focuses on developing regional and sub-sectoral solutions for long- and short-term issues. AAFC publicly released their interim report *What We Heard* in May 2023, which highlighted many of the same problems that are identified in this report.¹²⁹ The challenge of recruitment and retention for agricultural businesses is severely acute, and solutions around immigration and technology adoption, like automation, are of keen interest.¹³⁰ The continued work on this file is ongoing, but we are pleased by the interim progress of their research and consultations.

Additionally, through the Future Skills Centre (FSC), CAHRC is working on the *National Workforce Strategic Framework for Agriculture and Food & Beverage Manufacturing*. Their interim report from December 2022 focuses on five Strategic Pillars that will contribute to a strong and sustainable workforce for agriculture and agri-food manufacturing.¹³¹ While not focused specifically on PBP products and their associated businesses, this project has significant crossover with our work.





Government results

The challenges that the PBP industry faces are not restricted to issues that businesses must address but also to the broader ecosystem of actors and stakeholders. While the industries involved in the PBP supply chain have received varying degrees of attention from government bodies, more could be done to support the growth of this opportunity. This section captures the capacity and external environmental challenges currently facing governments while also detailing a number of available programs and policies already in place.

Existing provincial programs

While many programs exist to support manufacturing and agriculture in both Manitoba and Saskatchewan, our consultations found several programs often highlighted as particularly impactful in supporting the PBP industry. These programs are detailed below. This is not an exhaustive list, but it is representative of some of the work being done by governments in this ecosystem that stakeholders find useful and promising. Thus, it is important to explore what can be learned from these programs, as well as what can be expanded from one province to another to build a strong PBP ecosystem.

Immigration

Stakeholders highlighted that the most useful immigration program for finding workers was the PNP, with particular focus being given to Manitoba's PNP. The PNP is a federal immigration initiative to allow each province control over its "stream" of the program by creating its own targets and requirements for admission to Canada. Each program stream is administered by a province that can target admissions to the types of workers and skills that

best fit its needs, allowing businesses to create strong pathways to PR. The Manitoba PNP, and specifically the Manitoba Skilled Worker Stream, is used to bring international workers into the province or to give workers who are temporarily in-province, such as students or TFWs, the ability to work full-time while creating pathways to PR.¹³² Many stakeholders we spoke to had positive opinions of the program, saying it allowed businesses to operate even through labour shortages and was superior to several other federal and provincial alternatives. This is due to the "whole community" approach the program employed that went beyond simply pairing workers with businesses to examining factors like housing availability and settlement services. One issue with the Manitoba PNP raised during engagement sessions is that the program can be difficult to navigate and apply for if the organization lacks capacity, such as time, resources, and experience. This is especially true for SMEs.

Sectoral goals

The primary strategy stakeholders cited as most useful was the Manitoba Protein Advantage Strategy (MPAS). MPAS was created in 2019 with the purpose of growing the plant and animal protein industry. This strategy created the overall goal of bringing \$1.5 billion in new investment and 1,550 new jobs to the province by 2025.¹³³ While we do not have enough evidence yet on its full impact, the Government of Manitoba has reported that, since its inception, the province has seen 912 new jobs and \$823.5 million in investment in protein companies.¹³⁴ The strategy has ten focus areas, including environmental sustainability, innovation, workforce development, branding and innovation, and soil and biodiversity. This strategy was created through extensive stakeholder consultations and represents a

joint industry and government initiative. During consultations, stakeholders noted that the strategy helped create a shared sense of involvement and community in the PBP industry and that the MPAS supported ecosystem development.

Another program stakeholders cited as helpful for encouraging financial investment is the Saskatchewan Value-Added Agriculture Incentive. This incentive is designed to support the broader Value-Added Strategy in Saskatchewan, whose goal is to attract investment, domesticate a greater amount of the value chain, and sustainably increase the value-added sector's contribution to GDP.¹³⁵ The incentive provides a base non-refundable or transferable tax credit for capital expenditures valued at \$10 million or more for value-added facilities; for larger investments, the tax credit percentage provided increases. Thus, an investment of \$50 million would gain a 15% credit, but a larger capital investment to build a new canola crushing facility at a cost of \$500 million would increase the credit to 30%.¹³⁶ One example of this is last year's announcement of Cargill's \$350 million new canola crushing facility in Regina, where the facility is projected to employ around 50 full-time employees once fully operational.¹³⁷ One issue with this program that a stakeholder raised was that governments are generally willing to support investment in new facilities but not always for improvements within existing facilities that will reduce labour needs due to a desire to be seen as 'creating jobs in-province.' We want to ensure that government programs incentivize smart investment in the PBP industry, meaning investments that support both new and existing businesses and allow them to adopt new technological innovations.

Challenges for governments to address

While provincial and federal governments have made efforts to support the PBP industry, either directly through the Global Innovation Clusters or indirectly through adjacent research or programs supporting agriculture or agri-food, several other challenges need to be addressed.

Capacity challenges

Federal and provincial regulators need to adapt their regulations at a sufficient rate to support consumer safety, yet not impede innovation

As the industry changes in response to new demand and new technologies, regulatory bodies need to be able to change with them. An industry survey from Statistics Canada's Canadian Business Patterns Database found that the greatest challenge for food manufacturers (apart from the availability of labour) was regulatory requirements, with over 42% of respondents saying it was either an extreme challenge or somewhat a challenge.¹³⁸ For products that have been on the market for as short a time as final consumer PBP products, there are some legal and regulatory uncertainties around what new regulations could be required to keep consumers healthy and safe when eating newer PBP products, especially as the scientific understanding of PBP products and their nutritional values improve.¹³⁹ The federal government has already worked to standardize food regulations, first with the

updated *Safe Foods for Canadians Act* (2012) and then with the additional *Safe Foods for Canada Regulations* (2019). This latter change brought the previous 14 regulations together into one standard, vastly reducing the navigational difficulty for businesses, especially SMEs. However, challenges in the existing categorization system, the time for approvals, and the rapid growth of novel products still exist for food manufacturing companies, especially those that make PBP products. One recent example is an outbreak of illnesses in the United States that was tracked back to the use of a new ingredient, tara flour, in a PBP product, which highlights that more focused and specialized regulations could help.¹⁴⁰ A more agile and flexible regulatory process with better coordination between different provincial and federal bodies that recognizes PBP products as a new market niche with its own regulations could help reduce costs and improve access for Canadian businesses while also keeping consumers safe.

Smaller businesses have difficulty accessing and using immigration programs

Businesses, especially SMEs, often have capacity gaps in accessing and utilizing immigration programs that should help them fill critical labour needs. As discussed, almost half of food manufacturing businesses in Manitoba and Saskatchewan are SMEs and have fewer than five employees.¹⁴¹ These businesses often do not have the internal capacity to fulfill all the paperwork required for immigration programs, such as needing an LMIA to get TFWs. Even businesses that already have workers who are TFWs face a barrier when they want to make substantive changes to the contract of a TFW they employ—they need to submit a new LMIA to the federal government.¹⁴² This includes when they want to promote a worker, increase their pay by more than 2% or decrease their pay, change their job or duties, or make substantive changes to their hours or working environment.¹⁴³ There are strong reasons why this process is in place, namely to prevent abuse and reduce uncertainty for workers. Still, the impact of this rule is that it disincentivizes workers who wish to upskill and businesses looking to train and promote their workers. Ensuring that even small businesses can access and fully utilize the same immigration programs as the largest employers will help mitigate these important labour needs in PBP manufacturing.

External environment challenges

Businesses and governments are not sharing the necessary data to inform decision-making at the level stakeholders are requesting

Two major gaps that stakeholders noted repeatedly were the lack of specific labour data for the agricultural sector and the discrepancies between federal and provincial data sources. Outside of large national sources like the Census of Agriculture and the Labour Force Survey, data on skills, training, and employee perspectives is hard to find. Data that does exist can also often be contradictory. Stakeholders repeatedly cited situations where the federal and provincial understanding of labour market assessments have differed in both the scale and type of labour needs, even disagreeing if there is excess labour supply or a deficit (with one forecast showing a deficit and another

showing a surplus of workers in the same roles and sectors). While provinces have strong internal reporting of such data, those systems are often siloed.¹⁴⁴ This lack of clarity affects a business's ability to make decisions. Available data for the labour market is also challenging to access; the Agricultural Labour Strategy's survey found that only 53% of their respondents had access to the information they needed.¹⁴⁵ Furthermore, the data that does exist typically requires more specific knowledge around data analysis to be able to parse through. Better, more consistent, and easier-to-interpret data that improves up-to-date market information across jurisdictions (including more detail about occupations and skills) is a goal that federal and provincial governments should prioritize.

Some immigration programs do not include the sectors and industries found in the PBP supply chain

Federal and provincial governments have created several programs to bring workers into Canada to fill occupations where

the labour needs are the greatest. As a more novel industry, PBP manufacturing has been ineligible for some of the programs intended to help food manufacturers bring in new employees. One such example is the Agri-Food Pilot program, which seeks to address the labour needs of the agri-food sector by providing a pathway to PR for very specific occupations among a small group of industries (a group that has recently been extended).¹⁴⁶ Currently, the program only targets workers in meat production, greenhouse and nursery production, and non-aquaculture animal production.¹⁴⁷ While the labour shortages we have discussed here are common across the entire food manufacturing sector, the relative novelty and smaller current size of food manufacturing and processing for PBP products have left the PBP industry out of the Agri-Food Pilot program. This lack of inclusion can impede international workers from entering these industries, and businesses will need to rely more on the existing workers to fulfill all production tasks.





Education results

One of the critical components to understanding the labour needs of businesses in the PBP supply chain is understanding the inflow of prospective workers from training programs. This section details what is currently being done in the education sector to tackle the core challenges outlined above, how best to support and retain international students as permanent workers, and whether innovations such as micro-credentials could help the sector tackle some of its labour and skills challenges.

Current programs

Manitoba

Many post-secondary programs supporting the PBP supply chain exist within provincial colleges. A few notable examples are:

- The University of Manitoba offers degrees in agribusiness, agroecology, food science, human nutritional sciences, and agriculture, with the latter having specializations in animal systems, agronomy, and plant biotechnology. There is also a diploma in agriculture. The Faculty of Agricultural and Food Sciences incorporates practical, hands-on educational components to all fields of study.¹⁴⁸ The university is also home to research centres, such as the Richardson Centre for Food Technology and Research, which provides milling and dry fractionation, human nutrition studies, analytical testing, and food product development, amongst other services.¹⁴⁹
- Red River College offers an Introduction to Food Manufacturing certificate.¹⁵⁰ This is an in-person (Winnipeg, MB), full-time certificate that takes five months to complete and has a work-integrated learning (WIL) component. Graduates will be able to maintain and operate state-of-the-art equipment, follow safety procedures, and complete documentation to industry standards. Critical thinking, versatile communication, collaboration, and learning skills are developed in the course, as well as strategies to support employee health, wellness, and performance.
- Red River College also offers a Pharmaceutical and Food Manufacturing certificate.¹⁵¹ This certificate is also full-time, in-person (Winnipeg, MB), and takes one year to complete. Term 1 focuses on hands-on learning to gain foundational laboratory equipment skills. Term 2 is more specific, wherein students learn microbiology, bioprocessing, and advanced production processes, plus professional communication skills.
- Assiniboine Community College has options for an agribusiness diploma, an agriculture advanced diploma, and an agricultural equipment technician apprenticeship.¹⁵² Shorter courses or certifications on topics like integrated pest management, pesticide certification, commercial manure applicator, and manure management planner are available through their extension programming.¹⁵³ The Agriculture Extension Workshops currently include one on drone flying, an emerging farm skill need when combined with modern irrigation and plant management systems.¹⁵⁴ Additionally, to help mitigate Manitoba's critical agricultural sector labour shortage, Assiniboine Community College has designed a tuition-free, 13-week program for Indigenous people living off-reserve that covers the agriculture industry, farm safety, and farm machinery operation and maintenance.¹⁵⁵
- The Prairie Innovation Centre for Sustainable Agriculture is an expansion of Assiniboine Community College. It is set to launch in 2024 at their Brandon, MB campus with an

enrollment goal of approximately 800 students annually in their interdisciplinary agriculture, environment, and agricultural technology programs.¹⁵⁶ These programs include Industrial Automation and Robotics (Mechatronics), Sustainable Food Systems, Food Processing, Advanced Agriculture, and Chemical Technology, in addition to a Bachelor of Commerce in Agribusiness.¹⁵⁷ Future programs of note are a Chemical Engineering Technology Diploma and a Food Science Diploma, which Assiniboine Community College and Roquette are working together to create and will be open to both domestic and international students. These three-year diplomas are unique in Manitoba, and the Food Science Diploma will be the first in the Prairies and aim to prepare workers to participate in the growing PBP processing and manufacturing sectors.¹⁵⁸ As part of the college's Indigenization Strategy, Indigenous processors, communities, Elders, and Knowledge Keepers will be involved as partners.

Saskatchewan

- Saskatchewan Polytechnic has an Innovative Manufacturing Centre in Moose Jaw, SK, that works to train students in a wide variety of knowledge and skills in the industrial, agricultural, mining, textile, forestry, and food processing manufacturing sectors.¹⁵⁹ This centre also offers an 80-week Agriculture and Food Production diploma in Moose Jaw with three paid co-operative education work terms. Additionally, Saskatchewan Polytechnic has a 35-week Agricultural Equipment Technician certificate in Saskatoon, SK.¹⁶⁰ Students learn by assembling, servicing, repairing, and modifying various types of equipment, including used equipment from local dealerships and new, technologically advanced equipment from industry. There is a two-week work placement at an agricultural dealership at the end of the program to apply the skills learnt and build a professional network. Students taking this certification may be eligible for credit towards apprenticeship training. The course content is aligned with current industry needs because it is created in collaboration with the provincial and national agricultural equipment industry.
- The University of Saskatchewan offers degrees in agriculture, agribusiness, food and nutrition, food industry management, and renewable resource management.¹⁶¹ There are also two-year diploma programs in agribusiness and agronomy, as well as a certificate in precision agriculture. The university's Bachelor of Science in Food Industry Management [B.Sc. (FIM)] degree is an interdisciplinary combination of food science, agribusiness, agri-food economics, food industry policy, and marketing.¹⁶²

Potential new workers to the PBP supply chain could take many of these courses, which stakeholders identified were quite promising for filling knowledge and skills gaps. More detail can be found in Appendix C, which has a full list of current programs related to agriculture and agri-food offered at educational institutions in Saskatchewan and Manitoba.

However, one challenge exists for educational institutions that stakeholders claim needs to be addressed. There is a lack of registrants for some courses designed to get new entrants into different sectors in the PBP supply chain. In an era of labour shortages, numerous stakeholders in the education space noted that programs created specifically to offer interested students the skills requested by employers had historically low enrollment rates, with some even reporting that zero students had registered for a given semester or term. While this could be taken as a sign that this novel program is not needed, the reality is that employers are facing such significant labour shortages that they are hiring anyone willing to work — even though these individuals often do not have the skills or knowledge areas required for certain roles. One option is to consider shorter-term or mid-career professional development opportunities to give workers these skills. However, this solution could cause challenges around the concerns regarding worker retention and reservations regarding training workers that have already been detailed in this report.

What is the potential role of micro-credentials in training and educating the PBP supply chain?

Micro-credentials are certifications that an individual receives, typically following the completion of a course or program, that aims to recognize the possession of certain skills or knowledge.¹⁶³ Courses to earn micro-credentials can be taken by those looking to get their foot in the door as well as those already working in agriculture and agri-food. There seems to be significant interest in micro-credentials as a newer training method educational institutions offer. At our workshops with stakeholders, micro-credentials were brought up as a topic of focus in many discussions. Stakeholders appreciated the versatility and flexibility of workers being able to train in specific skills and demonstrate their capacity to employers, and that workers would be able to design their own skills and career development pathways. However, others stated that the presence of micro-credentials on a resume did not affect their hiring decision-making and that they were worried about it replacing or supplanting traditional educational methods.

Micro-credentials are still a novel concept in agriculture and manufacturing. While there has been some evidence of their efficacy in training or upskilling workers in pilot programs, there has not been much enrollment in or pickup of micro-credential programs in these sectors.¹⁶⁴ Broader research on the efficacy of micro-credentials echoes some of the benefits and concerns voiced by stakeholders. If administered through an online learning platform, micro-credentials offer a way to facilitate learning while minimizing the amount of time an employee has to spend away from work. This is particularly beneficial to SMEs as learning can be done without sparing workers in a time of labour shortages. Additionally, the ability to start training outside of traditional semester periods and more easily update curricula with new knowledge (or in different languages) are both cited as strengths of micro-credentials.

However, research has also identified challenges. Getting certain employers, such as owner-operators of farms, to recognize and value micro-credential certifications may be difficult as they are relatively new and less understood than a traditional degree. Hiring managers may, therefore, be skeptical that the job applicant possesses all the skills they list on their application. Additionally, recent research from the FSC highlights a common employer concern about micro-credentials, specifically that workers who complete these programs may not be learning and retaining the knowledge they learn.¹⁶⁵ The relative novelty of micro-credentials, despite the work involved in a specific program or the institution offering the credential, can make it harder for employers to trust that the workers have those skills and, as a result, may need to spend more time to independently verify the program and the workers' capabilities. In fact, the same FSC research found that employers still prefer traditional educational programs in hiring decisions and only use micro-credentials as deciding factors when they have too many applicants to choose between. These points indicate that more research is needed before micro-credentials can be widely useful to both employers and employees in demonstrating expertise and capacity in critically needed skills. However, in the interim, focused and specific micro-credential programs developed in tandem with businesses could help alleviate some of the challenges expressed while capturing a larger amount of the benefits.

International students

International students have become an increasingly large component of the Canadian workforce over the last half-decade. However, there has been some recent concern about the efficacy of the current work permit system and the number of international students in the Canadian workforce. The federal government has made several recent changes to rules governing international students working in Canada, which may affect their ability to live and work in Canada in the longer term.¹⁶⁶ For businesses in the PBP industry however, we heard at our workshops that international students are a valuable resource for filling critically needed occupations and that there are some difficulties with the current immigration system for international students that should be addressed. Many students take advantage of the Post-Graduation Work Visa Program to work in Canada on an open visa for eight months to three years after graduation. However, while this program is widely used to work in Canada and gain Canadian work experience, it is not a guaranteed pathway to PR.

Business owners and organization leaders at our workshop in Manitoba wanted more to be done to help retain international students in-province post-graduation. Employers at our workshop stated that they would prefer hiring international students with more experience in Canada, both personally and professionally, relative to hiring workers with more international experience but have never been to Canada. They also said it is better to hire international students after graduation because they already live locally, can start almost immediately, and know what to expect about living in these provinces. However, international students are also not eligible for many student subsidy programs, making them a comparatively less attractive choice than domestic students for programs like the Student Work Placement Program (SWPP). In spite of this issue, other workshop attendees still hired, and even sought out, international applicants with significant relevant domestic or international experience.





Cross-cutting issues that impact all stakeholders through the PBP supply chain

Several cross-cutting issues impact the growth of the PBP supply chain, many of which are attributable to its rural nature. While these do not directly contribute to the PBP industry's skills and labour challenges, these issues affect the ability of businesses to grow and scale, as well as attract skilled workers to their communities.

Need for stronger and more reliable utilities

One issue often arising in our research and consultations is the need for more reliable and resilient utility connections for businesses, especially in rural or remote communities.¹⁶⁷ Utility connections for businesses involved in the PBP supply chain include electricity, broadband, cellular, potable water, and wastewater and sewage.¹⁶⁸ In Manitoba, the City of Portage la Prairie's Water Pollution Control Facility had to upgrade their wastewater system by adding an anaerobic reactor so it could create its own biogas for its heat exchange system, allowing the system to adequately handle the increase in its municipal and industrial wastewater as a result of major investments by companies producing PBPs in the area.¹⁶⁹ This lack of wastewater infrastructure has proven to be such a challenge that some facilities cannot yet operate at full capacity. This negatively impacts their ability to produce their products and reduces the attractiveness of investment within similar communities in the Prairies. Additionally, other communities have recognized the need for investment in broadband and cellular service, working with companies like Starlink to ensure businesses and rural communities have fast and reliable internet connections.¹⁷⁰

Greater access to affordable housing

Access and availability of affordable housing is another challenge for workers, especially in more rural and remote communities.¹⁷¹ The federal government estimates that 24% of rural residents cannot find affordable housing of sufficient quality, which is more than double the rate for urban and suburban residents.¹⁷² Access to affordable housing can significantly increase a person's willingness to take a new job or move to a new community. In fact, Saskatchewan provides rental assistance for communities in select rural and northern communities through the Affordable Housing Program and local housing authorities for this purpose.¹⁷³ Ensuring that there is sufficient and affordable housing stock available for workers in the communities expected to see PBP industry growth could help attract and retain employees in a particular community.

Need for high-quality transportation infrastructure

Transportation impacts two critical aspects of the PBP supply chain: ensuring that goods can be transported quickly and inexpensively to market, and ensuring people can reliably get to their place of work. Transportation infrastructure can be a stumbling block for growing businesses in the PBP industry.¹⁷⁴ The 2019 Canada Infrastructure Report Card notes that almost 40% of roads and bridges were rated as fair (some deterioration and requires attention) or worse (unfit for service or seriously deteriorating) condition, and only 20% were constructed in the

last 20 years.¹⁷⁵ Of equal importance are the systems that transport employees between and within communities. If there are no regional and reliable public transportation systems, that puts additional costs on the individual worker and can affect their decision on where to live and work. Serious attention is required by all levels of government to address this need and ensure that rural communities have the connections and infrastructure needed to move people and goods around.

Access to affordable childcare and healthcare

Research from Statistics Canada has found that parents in rural communities have significantly less access to childcare and that children are in childcare for far less time than children in urban areas.¹⁷⁶ Rural children are more likely to be looked after by a family member or relative, as parents need to travel further to access private spaces because of lack of density, and the spaces that do exist tend to cost more than urban childcare providers because of the demand.¹⁷⁷ There are major social and economic implications from this lack of access, including how it severely impacts the workforce participation rate of women, as well as how it drives up the explicit and opportunity costs of living and working in more rural and remote communities where the PBP supply chain is located.¹⁷⁸ Ensuring that there are sufficient spaces for childcare in communities with businesses involved in the PBP supply chain can help attract and retain workers and improve the quality of life for workers living in these communities.

There is also a major gap in rural communities' access to healthcare. Studies from the Canadian Institute for Health Information found that despite almost one in five Canadians living in rural

areas, they are only served by 8% of physicians.¹⁷⁹ There is evidence that rural communities face worse health outcomes and have higher mortality rates for similar illnesses and medical issues than urban communities.¹⁸⁰ Rural communities need better access to regular family physicians, higher response rates for ambulatory services, and strong local health networks to help support the people living and working in these communities. One example of a program from a municipal and regional government is the Portage la Prairie Regional Childcare Project. This pilot program brought together Portage la Prairie, MB, seven other municipalities, and one First Nation to develop a streamlined daycare facility construction program.¹⁸¹ Their program design used the same model, project structure, and project management team to create a system that is being rolled out to create 11 other daycare centres in Manitoba. Childcare and eldercare for rural communities is a major asset not just for workers currently living in those towns and regions, but also for attracting future workers.¹⁸²

PBP businesses and their workers cannot be separated from the communities they work and live in. What we understand as supporting business readiness needs to encompass the wider ecosystem and community needs as well. Building more resilient, accessible, attractive, and supportive communities only benefits and improves the conditions for workers and businesses to thrive. The challenges laid out here are not specific to workers in the PBP supply chain, but are cross-cutting in the communities and towns where those workers are located and should be included in any analysis of what stakeholders of all types need to do to support worker and business preparedness.





Recommendations

Our recommendations in this report are separated by supply chain segment (agriculture and food manufacturing) and which category of stakeholder should lead its implementation. Several recommendations include coordination and cooperation between different stakeholders or across industries, but this structure was chosen to help make the actions easier to adopt. Broadly, the recommendations seek to improve awareness of the opportunities in the PBP supply chain; foster a sense of a shared ecosystem and industry; help businesses recruit, attract, and retain workers; help workers gain and develop new skills; and ensure that communities can capture the benefits of the growth opportunity presented by PBP products.

Agriculture recommendations

We have created several recommendations for stakeholders involved in agricultural business in the PBP supply chain. Overall, these recommendations focus on growing the agricultural workforce; improving access to, and adoption of, new technologies; and sharing accurate and compelling narratives about careers in agriculture.

Led by industry

Conduct outreach activities with non-profits to promote job opportunities amongst non-traditional farm communities and underrepresented groups to expand the pool of potential workers outside traditional agricultural communities.

Sharing job opportunities and working with non-profits supporting their equity-deserving populations to increase awareness about working in agriculture can help expand the potential pool of workers and provide opportunities to groups like Indigenous communities, women, and urban and suburban

communities. Given the lack of new entrants into the agricultural sector compared to retirements, this could help mitigate some of those concerns.¹⁸³ Two examples of this type of program are the federal AgriDiversity Program, which funds projects focused on getting underrepresented and marginalized groups into agriculture,¹⁸⁴ and the Indigenous Food Systems and Agriculture Skills and Training Program in British Columbia, which looks to recruit and train Indigenous people into agriculture.¹⁸⁵

Expand and work with educational institutions (both kindergarten to grade 12 and post-secondary) on outreach programs, like Agriculture in the Classroom,¹⁸⁶ to increase awareness of the career options available in the industry and to reduce stereotypes about agricultural work to students of all ages.

Industry involvement in educational outreach programs will ensure that content remains up-to-date on what working in agriculture entails. These programs should also reduce the stigma around agricultural careers and break down stereotypes. This can be particularly impactful for students who do not come from a farming background and may not be aware of the career options available—including careers for those with only a high school education or minimal prior relevant work experience. These programs could also work with guidance counsellors to help advise students who may not want to pursue further education outside of high school. Outreach activities should also occur at the post-secondary level to share local job opportunities.

Partner more with educational institutions to offer additional WIL opportunities to students.

This would ensure that graduates have more agricultural knowledge and first-hand experience working on a farm. Building

these professional networks benefits both graduates and businesses. One example is the Algonquin College Business–Agriculture program in Ontario, which prepares students to manage or work in agricultural businesses and provides several experiential WIL opportunities.¹⁸⁷ In Manitoba, the Enterprise Machine Intelligence and Learning Initiative has created a website that collects and organizes resources and opportunities for businesses, students, and educational institutions to connect and collaborate on WIL projects about digital agriculture.¹⁸⁸

Collaborate with educational institutions on developing a skills framework that includes recognizing the use of micro-credentials.

Businesses can share specific skills and knowledge requirements during program and framework development to ensure that these programs are up-to-date and respond to labour needs. A stronger and more consistent framework for micro-credentials can take the uncertainty out of hiring and make it easier for businesses to train workers to fill needed roles. Manitoba is currently exploring the development of its own micro-credential framework in the Invest in Manitoba: Opportunities for Economic Growth Action Plan, but stronger consultation with industry experts can help to improve the efficacy of such a plan, especially as any framework will need to expand to include more jurisdictions.

Led by governments

Federal

Make it easier for businesses to apply to the AgrilInnovate program with simpler application pathways and allow SMEs and businesses providing crops for PBP production to benefit from the increased cost sharing for underrepresented groups.

The program is well-meaning in its intention to support businesses in the commercialization and adoption of new technologies by sharing costs between the federal government and individual businesses. However, SMEs often do not have the capital needed for these commercial-ready technologies, especially if they also need to hire or train new workers to operate them. Additionally, the barriers to entry can be high for businesses with less capacity to complete federal paperwork for reporting requirements. Increasing the cost share provided by the federal government and reducing the application requirements can help those smaller businesses adopt new technology and become more competitive.

Create a national hub for agricultural workforce data and collaborate with provincial and municipal actors to collect and share up-to-date labour market information.

The lack of access to accurate and up-to-date data on workforce demographics and statistics for agricultural and rural communities is essential, and creating one body with the mandate of coordinating and organizing data for this sector would help businesses and governments make decisions. British Columbia has already started to implement a data hub through the Invest Agriculture Foundation's Workforce Analysis and Planning

Program, wherein the first funding stream focuses on labour market intelligence, research, and analysis, and the second stream focuses on strategies and planning.¹⁸⁹ Another useful project for comparison is Canada's National Index on Agri-Food Performance, a public-private partnership of industry associations and businesses working in agriculture whose aim is to share an integrated picture of Canadian agricultural sustainability through data metrics in the areas of environmental, economic, societal wellbeing, and food integrity.¹⁹⁰

Implement sectoral or region-specific work permits for in-demand industries and communities that include automatic spousal visas for those same regions.

This will help make transitions between workplaces easier while reducing the amount of overhead and paperwork required by SMEs. Provincial governments could recognize communities and industries with significant labour needs and pre-approve visas for those particular cases. This differs from PNPs as they would not require sponsorship from an employer directly, but would allow individuals to move into a specific region or sector. This would allow workers more flexibility in moving between companies, as well as allow family members with similar skill sets to join the workforce since many individuals working in agriculture often have family members with agriculture experience also seeking employment. Given the need for entry-level workers in both manufacturing and agriculture, this could help increase the available labour pool.

Make international students eligible for the SWPP and increase access to settlement services for TFWs, such as language training and employment services.

The former would help international students gain work experience in these specific industries, and businesses would be better able to recruit and attract international students who could eventually become permanent workers after graduation. There is significant use of TFWs in agriculture and agri-food businesses, but their lack of access to language training programs so they can meet the English proficiency requirements for PR, their ineligibility for wage subsidy programs like the SWPP, and the uncertainty of the current timelines for immigration approval while they are in Canada impedes their ability to transition to PR. Businesses may want to invest in training for their TFW workers who are already familiar with Canadian agriculture, but they face a disincentive with the current system making it harder to transition them into more permanent or skilled positions.

Provincial: Manitoba

Look to Saskatchewan's AG Scholarship program and create a similar scholarship program to support and encourage students to get into careers in agriculture.

The Saskatchewan program provides scholarships to Grade 12 students who are planning to work in agriculture and will study agriculture-related post-secondary programs.¹⁹¹ This benefits students as they begin their careers while using their stories to promote what careers are available in agriculture. While many agriculture scholarships already exist in Manitoba, most of

these are privately funded and focused on niche sections of the workforce.¹⁹² One combined public scholarship program could make it easier for applicants to apply, allow for greater inclusion of diverse candidates, and change the narrative about the sector by telling accurate, more compelling stories to students about career opportunities in agriculture.

Provincial: Saskatchewan

Explore expanding its PNP and reduce some of the existing requirements around post-secondary education for occupations and industries with acute labour needs.¹⁹³

Currently, the International Skilled Worker stream has many requirements, notably, the completion of a post-secondary education relevant to their field of work and comparable to credentials from Canadian institutions.¹⁹⁴ However, businesses in agriculture and manufacturing are clear about their desire for on-the-job training for entry-level positions. The province could expand the number of workers admitted and, in certain critical occupations and industries, change the requirement to a partially completed training or a commitment for training from the employer. The Semi-skilled Agriculture Worker with Existing Work Permit stream¹⁹⁵ could also be expanded to include more occupations, specifically National Occupational Classification (NOC) 8431 (General farm workers), as these jobs are becoming more skills-intensive.

Consider implementing additional TFW worker protections similar to Manitoba's *Worker Recruitment and Protection Act* to accompany our recommendations that will increase immigration and the use of TFWs.

This act created a registry of businesses using TFWs and tracks their working conditions, requires monetary deposits for companies using TFWs that can be disbursed after reports of abuse, and gives the power to penalize businesses abusing TFWs.¹⁹⁶ This can support and accompany existing worker protections in-province and help prevent the exploitation of TFWs by employers.

Led by educational institutions

Prioritize incorporating experiential learning and WIL components in programs.

Educators and post-secondary administrators should work with industry groups and employers so that students can gain experience with local businesses within the province. Our survey found that employers want graduates with more agricultural knowledge gained through working on a farm. Workshop participants told us that while farm businesses are often willing to hire anyone available and teach them on the job, there are expanding skills expectations for farm workers that have come with increased technology adoption and farm consolidation.

Design shorter and more specific agricultural courses to fit around farming schedules (from November to March) rather than traditional semesters.

In primary agriculture, planting to harvesting happens from spring to early fall, and workers are in high demand during this period. In the fall and winter, there is downtime when workers are

either part-time or not employed. This change in training schedule could encourage farm employers to keep employees on over the winter if they can work part-time and attend a training program, returning to the next growing season with new skills. This may also be useful for other industries along the supply chain that have annual 'boom and bust' cycles in terms of work availability.

Explore increasing course options offered in a decentralized format that is efficient, flexible, and cost-effective.

Training institutions are increasingly offering course options which are shorter, more flexible, and often available online. For example, the Saskatchewan Indian Institute of Technologies offers a free 12-week Agri-Food Processing Micro Credential Program for Indigenous youth (aged 18-29) that focuses on developing essential industry skills and fostering networking opportunities.¹⁹⁷ Educational institutions with government funding should explore models where educational experts go to farm workplaces to discuss their skills needs and build relationships of trust around improving skills development. A workshop participant said the most in-demand agricultural skills and knowledge include workplace safety, mechanics, and introductory welding—these could be taught as one-off courses to supplement existing training. Creating a more decentralized format which incorporates ideas like micro-credentials, digital badges, on-site training, and adjustments around off-seasons could help reduce uncertainty in hiring for businesses and allow workers to train and upskill on specific capabilities.

Consider offering specific training and education courses in additional languages, such as Ukrainian, Tagalog, Arabic, and Punjabi.

This would be beneficial in expanding immigrants' abilities to simultaneously train language skills and critical job-specific skills, as well as increase the speed of their entry into the workforce. If the government has implemented specific migration programs like resettling Ukrainian or Syrian refugees, or employers have concentrated their immigration recruitment efforts in certain countries, this could indicate which languages to offer first. Institutions should also consider working with settlement services and cultural non-profits to help provide training for skills like basic workplace safety, food safety, and quality control training courses, as well as cultural competency, all of which are essential in the Canadian job market. What these topics have in common is the importance of learning them rapidly upon arrival in Canada. Translation for courses should be prioritized for the topics that will impact individuals swiftly upon arrival in the Canadian labour market before they may have had a chance to strengthen their English or French language skills. If offered online, there is potential for immigrants to complete these courses before arriving in Canada and starting to work.

Manufacturing recommendations

For the manufacturing sector, we offer several recommendations that have been developed to improve business readiness, workforce preparation, and those businesses' ability to scale and grow. Overall, these recommendations focus on attracting more

workers to food manufacturing, improving skills and training access for workers, and helping businesses take advantage of the international protein market.

Led by industry

Explore offering flexible work environments, holistic worker supports, and benefits beyond traditional compensation.

Surveys from FPSC found that younger workers increasingly look for jobs that provide a more supportive environment and workplaces that offer benefits like flexible hours or on-site daycare.¹⁹⁸ Our workshop discussions also revealed the importance of employer values for workers in areas like sustainability, being environmentally conscious, and having an equity, diversity, and inclusion lens.¹⁹⁹ Where possible, companies should explore holistic worker supports like health and dental benefits, personal performance benefits, access to transportation or parking, mental health supports, and well-maintained lunch and break rooms.

Partner with educational institutions to offer WIL opportunities to students.

This would ensure that graduates are better prepared for the workplace and have first-hand experience on job sites. Building these professional networks benefits both graduates and businesses. One example of such a program is the Food Futures Program at the University of Lethbridge, which offers wage subsidies for businesses to take on students for WIL placements in several critical fields, including nutrition, food science, engineering, food safety, information technology, human resources, and logistics.²⁰⁰

Led by government

Municipal governments for communities involved in PBP production and manufacturing should conduct a holistic worker support analysis on what infrastructure and support programs can best attract, support, and retain workers.

Preparing for growth is more than tax incentives and zoning requirements, and we have heard from employers that communities could be more ready for new businesses and the subsequent workers it attracts to the community. Bus lines located close to new facilities and housing alike, sewer and utilities hookups sufficient for plant operations, childcare or eldercare facilities, increased cellular service and broadband, and road quality and access to transportation and logistics networks are all relevant supports, but their delivery will differ for each community.

The federal government, in partnership with provincial ministries, should implement sectoral or region-specific work permits for in-demand industries and communities that include automatic spousal visas for those same regions.

This will help make transitions between workplaces easier while reducing the amount of overhead and paperwork required by SMEs. Provincial governments could recognize communities

and industries with significant labour needs and pre-approve visas for those particular cases. This differs from PNPs as they would not require sponsorship from an employer directly, but would allow individuals to move into a specific region or sector. This would allow workers more flexibility in moving between companies, as well as allow family members with similar skill sets to join the workforce, given the need for more entry-level labour in manufacturing and the ability to train for these roles on the job.

The federal Agri-Food Pilot program should be made permanent and expanded to include industries and occupations that are a component of the PBP manufacturing sector.

This program has successfully mitigated some of the most crucial labour shortages in traditional meat manufacturing and processing. The federal government however, needs to recognize the program's importance for other food production sectors.²⁰¹ Specifically, it should include Grain and oilseed milling (NAICS 3112), Other food manufacturing (NAICS 3119), and Specialty food manufacturing (NAICS 3114), along with some of the most important occupations for those sectors: Labourers, Machine operators, Testers and graders, and Mechanical assemblers and inspectors.

The federal government should make international students eligible for the SWPP and increase access to settlement services for TFWs, such as language training and employment services.²⁰²

The former would help international students gain work experience in these specific industries, and businesses would be better able to recruit and attract international students who could eventually become permanent workers after graduation. There is significant use of TFWs in food manufacturing, but their lack of access to language training programs, their ineligibility for wage subsidy programs like the SWPP, and the uncertainty of the current timelines for immigration approval while they are in Canada impede their ability to transition to PR. Businesses may want to invest in training for their TFW workers who are already familiar with Canadian manufacturing, but they face a disincentive with the current system making it harder to transition them into more permanent or skilled positions.

The federal government should create provisions in the TFWP that allow certain businesses to change the NOC code of workers they employ under the TFWP without affecting the workers' immigration status.

Currently, when a business wants to make substantive changes to the contract of a TFW they employ, they need to submit a new LMIA to the federal government.²⁰³ This includes when they want to promote a worker, increase their pay by more than 2% or decrease their pay, change their jobs or duties, or make substantive changes to their hours or working environment.²⁰⁴ While there are good reasons to protect TFWs and their employment contracts from employers seeking to make unreported or abusive changes, this can disincentivize businesses from promoting or training TFWs. For instance, smaller businesses may not want to, or be able to, go through the renewed paperwork of an LMIA.

To address these obstacles while offering greater protections and opportunities for TFWs, businesses should be allowed to make some changes in a TFW contract that arise from a promotion or a change in the type of occupation (i.e., where the worker earns new skills or responsibilities) without a new LMIA. This would give greater flexibility to businesses by allowing them to invest in and train their TFWs. The change could also help to reduce underemployment and uncertainty for TFWs by separating economic mobility from concerns about immigration status. The federal government already made allowances for changing NOC codes during the global COVID-19 pandemic, so Immigration, Refugees and Citizenship Canada has the authority and ability to make such changes.²⁰⁵

Provincial governments should implement industry-specific training grants modelled after the Canada-Saskatchewan Job Grant to support and encourage workers' training for in-demand occupations for businesses in the PBP supply chain.²⁰⁶

This program would help businesses involved in PBP manufacturing or production expand existing capacity or train new or existing workers on core skills in agriculture or manufacturing. The employer pays a third of the training costs and the provincial government covers the remainder. This will help attract new workers into this sector if they know upskilling is included and will help mitigate their concerns about future skills changes.

The Government of Saskatchewan should explore and expand its PNP and reduce some of the existing requirements around post-secondary education for occupations and industries with acute labour needs.²⁰⁷

Currently, the International Skilled Worker stream has many requirements, notably, the completion of a post-secondary education relevant to their field of work and comparable to credentials from Canadian institutions.²⁰⁸ However, businesses in agriculture and manufacturing are clear about their desire for on-the-job training at entry-level positions amid their acute labour shortage. The province could expand the number of workers admitted and, in certain critical occupations and industries, change the requirement to a partially completed training or a commitment for training from the employer.

Led by educational institutions

Work more with businesses and industry associations to make students and recent graduates aware of the in-province opportunities of the manufacturing and biotech industries.

Recruiting students can help mitigate some of the labour shortages these sectors are currently experiencing. Furthermore, reaching out to students in a wider range of fields can help bring in a greater variety of applicants with unique skills who may not otherwise be aware of the employment opportunities in these sectors. Outreach could also be extended to communities currently underrepresented in the industry, like Indigenous peoples. One strong example is the Inclusivity, Diversity, Equity, and Access (IDEA) initiative from Food and Beverage

Manitoba, which supports its members in creating more diverse and inclusive workplaces by reaching out to equity-deserving populations.²⁰⁹

Create additional opportunities for post-secondary placements, experiential learning, and WIL programs, and ensure that international students are also eligible to participate.

Businesses should collaborate with local education institutions to create more work placement and WIL components that provide students with hands-on education and make them aware of the career opportunities available in the manufacturing sector. Since companies have proprietary procedures that are taught on the job and because new innovative machinery will become available over time, on-site learning will prepare graduates by allowing them to become familiar with using and adopting new technology. If existing programs like the SWPP were to include international students, employers could collaborate with educational institutions to ensure that these programs help students develop valuable in-demand skills.

Expand program options in certificates, diplomas, and training programs for new and current workers at colleges and other educational institutions to include in-province programs for the following areas: beverage processing, food processing operations, food safety and quality, and food management.

Research from FPSC found that of the total number of training programs in Canada involved in food manufacturing, the majority are teaching culinary arts or food nutrition, with only a small amount covering food processing operations, food management, and food safety.²¹⁰ They also found that, as of 2021, Manitoba had only 6% of all food industry-relevant training programs in the country and only one program on food safety and quality, with Saskatchewan having 4% of the training programs and no programs in food safety or quality.²¹¹ Creating more program options of variable length and greater flexibility can help to increase the supply of potential workers in Manitoba and Saskatchewan, better inform students at these institutions what career options are available, and break down misconceptions about the food and beverage industry.

Collaborate with industry bodies to explore the development of a decentralized training program for manufacturing.

Ideally, the program should be flexible by being offered online, having short units, being highly specific, and without set times to attend classes so that workers can study at their own pace and do not need to leave their workplace for extended periods. The program would include key production and manufacturing skills, as well as have associated levels of proficiency and capability that are recognized across businesses. One example of a comparative program is the Agri-Jobs program from CAHRC, which works to build nationally validated information about specific jobs' skills, knowledge, and responsibilities so they can provide targeted training tools to businesses.²¹²



Conclusion

Growing and manufacturing PBP products in Canada is both a strong and novel clean growth opportunity, but more is needed to ensure Manitoba and Saskatchewan are ready to meet this opportunity. One of the overarching difficulties we encountered is that this growing PBP opportunity is still not thought of as a whole industry on its own, but rather as a series of businesses inside of other industries and sectors. Compared to aquaculture, traditional meat manufacturing, or even other crop production and greenhouse agriculture, PBP production does not yet have a strong shared identity as an industry within the broader agriculture and agri-food sector. Some of this is due to its novelty and relatively small size at the moment, but fostering and cultivating a sense of shared identity should be a collective priority for all actors. Greater cohesion and understanding of the barriers to, and enablers of, success for businesses in the PBP industry can help when advocating for changes to federal or provincial policy. This also raises the industry's visibility and opportunities for policymakers, potential investors, and future workers. People involved in making PBP products should do more to advance a sense of shared identity around PBP products and the companies and people who make them in Canada.

Addressing the significant sector-wide labour shortages and the impending wave of retirements in agriculture and agri-food is paramount. Workers will need access to skills and training programs for new and emerging skills, and those programs will need to combine traditional delivery mechanisms with both online and on-the-job training. Businesses will need to attract and retain workers by expanding the awareness of what career options are available and by supporting the needs of a younger generation of workers. Moving supply chains for ingredient processing and manufacturing to in-province will increase local economic value generation and provide environmental benefits

by reducing emissions from transportation. Policymakers at all levels of government will need to create stronger and clearer pathways to PR for international workers and adopt a holistic approach to designing the infrastructure and community support around workers and their families.

Accomplishing all of this will not be easy, but if PBP production in Canada is going to grow to be a \$25 billion industry, then it will need the resources, focus, capital, and skilled workers to get there. Plants alone, both in terms of production facilities and biological photosynthesizers, are not enough to capture these benefits, and more needs to be done to cultivate this industry's ecosystem to take advantage of the opportunity presented by PBP products.

Appendix A: Methodology

Workshop design

As a major component of the research and to help facilitate Smart Prosperity Institute's model of study, the research team held workshops to convene key stakeholders and ecosystem participants as an opportunity to share our initial research and gather valuable qualitative data on the trends, challenges, and opportunities in the plant-based protein (PBP) industry.

We held two workshops, one focused on primary agriculture and the other on food processing and manufacturing. The primary agriculture workshop was held online, and the food manufacturing workshop was held in person in Winnipeg, MB. This was designed to include involvement from the widest possible range of stakeholders and to focus the discussion of each workshop on the specific needs, challenges, and opportunities of each sector. For both workshops, we identified and partnered with local stakeholders who collaborated on both inviting attendees and developing content for the workshops. These partners were essential to our planning process and the success of the workshops as they helped improve our structure, helped gain local buy-in, and provided valuable feedback. Both events were held in May 2023.

To ensure appropriate attendance, the research team identified over a hundred organizations or individuals located in Saskatchewan or Manitoba who were involved in the PBP space. These came from our conversations with stakeholders, partner recommendations, or publicly available information about businesses working in PBP manufacturing or research. These stakeholders were invited to the event by email, with coordinated follow-up emails leading up to the event. When necessary, direct phone calls to organizations and individuals who had publicly-available phone numbers or provided such information to the research team were used. Additionally, partner organizations for both events were asked to invite their stakeholders and community members to the workshops.

The workshops themselves were split into slightly different formats. The in-person event included a panel discussion with speakers from our partner organizations. This panel discussion helped introduce the topics of discussion and the areas of interest we wanted to cover. Questions were taken from the attendees during this panel which helped to prime participants for the later discussions. After the panel discussion, we delivered a short presentation on our initial findings and research. The attendees were then split into pre-determined groups for both breakout sessions. This was done to ensure equal splits of attendees from all sectors and to have a broad base of perspectives. Each breakout session had at least one researcher who served as facilitator and note-taker. All workshop discussions took place under the Chatham House rule, and individual participant names or quotations are not included in this report for privacy concerns. The online event was slightly shorter than the in-person event as

we did not have a panel discussion. Instead, we moved directly from the introductions of our team and our workshop partner to our research presentation into the breakout sessions. Since the focus was on primary agriculture, the breakout sessions were split into provincial groups to better discuss issues specific to each region.

Data gathering and coding

Data was gathered both through the use of physical note-taking and by audio recorders. At each breakout group table or Zoom room, one researcher acted as both facilitator and note-taker, taking personal notes by hand or typing. Once both workshops were finished, the recordings of the breakout tables and Zoom sessions were transcribed using the software Trint to create transcripts, and then the transcripts were reviewed, corrected, and approved by researchers. These transcripts were then coded using NVivo, the method for which is laid out in more detail below.

For each breakout session, researchers prepared questions based on the area of focus and the concerns, trends, and issues that had come up in our investigations. These questions were less of a survey to be followed but a method of guiding and driving conversations. The questions for the first breakout session focused on current challenges and trends, while the questions for the second breakout session were more focused on solutions and projected changes.

The transcriptions were uploaded into the NVivo program for qualitative analysis. The codes used for NVivo were determined by the previously conducted scoping interviews as well as thinking about what would be needed from the in-depth, semi-structured interviews. The research team chose this initial set of codes, but one researcher reviewed all the files. Relevant phrases were highlighted and coded; one phrase could have multiple codes. Codes were grouped into categories like skills, occupations, challenges, trends, solutions, and recommendations. New codes were added as needed. Due to the structure of the workshops wherein multiple discussions occurred with the same people, specific individuals would bring up the same topics in different groups. Therefore, the qualitative codes were used to verify what was discussed, but the number of occurrences does not indicate importance.

Attendees (online workshop)

Organization Type	Number of Attendees
Industry associations	3
Educational institutions	2
Private businesses	2
Government representatives	3
Non-profit organizations	1

Attendees (Manitoba in-person workshop)

Organization Type	Number of Attendees
Industry associations	6
Educational institutions	3
Private businesses	2
Government representatives	8
Non-profit organizations	2

Semi-structured interviews

Another research task was to supplement the data gathered from the workshops and to have more detailed semi-structured interviews with key stakeholders who were not able to fully participate in the workshops about solutions and recommendations for the identified trends. For this step, we reached out to several identified stakeholders with whom we had engaged previously and with individuals who had filled out the survey and asked for a more thorough conversation. After making initial contact, some of the identified contacts were either unavailable or not interested in having further conversations. Still, we identified a few industry experts from different sections of the value chain (agriculture, manufacturing, and research) who were willing to participate in the interviews, and meetings were scheduled and set up using Zoom video conferencing.

Before the interviews occurred, questions were prepared for each participant based on research findings and were tailored to each participant and their area of expertise. Verbal consent was made before the interviews, and notes were taken by research staff while the interviews occurred. These mostly verbatim notes were then added to NVivo for coding using mechanisms and code structures similar to the workshop transcripts. Notes were taken during virtual interviews, uploaded to Trint for transcription, and then put into NVivo for qualitative analysis. The same NVivo codes were used for the workshop and interview transcriptions, although the workshops and interviews were completed separately.

Appendix B: Assumptions and limitations

As with any piece of research, there are limitations and challenges to our work that we must consider and recognize. In addition to the inherent instability of assessing multiple different businesses and occupations that compose the PBP supply chain, as well as using interviews and survey responses to look at broader sectoral trends, there are a few discrete assumptions and limitations that we should list here.

For our workshops, there was a difference in structure between one workshop being held in-person in Winnipeg and one being held online. The nature of online videoconferencing impeded some of the cross-discussion and debate that was easier in an in-person session. The participants for both workshops tended to be government representatives and industry experts, both groups who have more experience and comfort discussing issues of labour needs and skills development but are slightly less connected to the day-to-day hiring and training activities of businesses. Additionally, as the online workshop was focused on agriculture, it was decided during the planning process with stakeholders that holding it in a physical location would make it harder for participants to travel and participate. Cost and time limitations did not allow for multiple smaller workshops in several locations in both provinces, and the online workshop had to serve as the agricultural convening event for both provinces.

Another difficulty inherent in this work was the specific and limited nature of both National Occupational Occupation (NOC) and *North American Industry Classification System* (NAICS) codes to identify and codify these newer types of businesses. The PBP industry exists across several NAICS codes, which also encompass other industries and types of work, and the NOC codes that we identified for these industries are also shared by similar workers in adjacent industries. A machine operator for seafood processing and one for PBP might have the same NOC code but may not have exactly similar skills or knowledge requirements. Additionally, the NAICS codes which are used

to identify this sector in our supply chain analysis are, by their very definition, generalizations which include other adjacent industries, all of which could throw off the specificity of our skills analysis if the PBP industry and its associated skills move more away from other existing industries over time.

During the workshops, as in our survey responses and expert consultations, there was still a lack of specificity around occupations and skills. Our discussions included the key issues and trends arising in growing the sector but did not drill down to specific future skills or occupational changes. This meant that our analysis needed to combine the trend discussion with our quantitative analysis.

Finally, the PBP industry is still a rapidly emerging and changing industry and that volatility makes future predictions and trend analysis uncertain. The technology and consumer demand for PBP products is not even a decade old compared to more mature industries and sectors. The recent creation of the PBP industry and the novelty of PBP products demonstrates why it is such an attractive clean growth opportunity. Still, this relative newness also means there is a great deal of uncertainty in any industry projection. Newer technologies like laboratory-grown animal proteins could disrupt this market, as could wider shifts in consumer preferences or unknown health or environmental risks. Furthermore, PBP manufacturing, from the farm to the workshop floor, has not been perceived as particularly novel or separate by the larger sector outside of food and plant research. Rather, in food manufacturing and agriculture, stakeholders seem to see this industry as an addition to their business as usual. While new techniques and changes in what is grown on-farm may be impacted, it seems stakeholders perceive this to be within the norm of changes that would occur anyway. This also made it more challenging to tease out changes brought about by increased jobs from PBPs in the two provinces from changes that would occur in the sector without this new industry.

Appendix C: Current educational programs related to agriculture and agri-food in Saskatchewan and Manitoba

Table 4. Current programs related to agriculture and agri-food offered at educational institutions in Manitoba (MB) and Saskatchewan (SK)

Prov.	Institution	Location(s)	Program Name	Format	Program focus and additional information
MB	Red River College	Portage la Prairie	Introduction to Food Manufacturing certificate ²¹³	<ul style="list-style-type: none"> In-person Full-time Five months Work-integrated learning (WIL) component 	<ul style="list-style-type: none"> How to maintain and operate state-of-the-art equipment Safety procedures Industry standards
MB	Red River College	Winnipeg, Notre Dame Campus	Pharmaceutical and Food Manufacturing certificate ²¹⁴	<ul style="list-style-type: none"> In-person Full-time One year Hands-on learning 	<ul style="list-style-type: none"> Laboratory skills Microbiology, bioprocessing, and advanced production processes Professional communications
MB	Assiniboine Community College	Brandon	Agribusiness diploma ²¹⁵	<ul style="list-style-type: none"> In-person Full-time Two years Co-op work placement 	<ul style="list-style-type: none"> Agronomy, GIS, GPS and computer applications, communications, networking, customer service, sales and marketing, and business management skills
MB	Assiniboine Community College	Brandon	Agriculture advanced (post-credential) diploma	<ul style="list-style-type: none"> In-person Full-time One year 16-week paid work placement 	<ul style="list-style-type: none"> Students should have a business background. Topics include crop production and protection. Skills include communications, customer service, networking, sales and marketing, and management
MB	Assiniboine Community College	Brandon	Agricultural equipment technician (apprenticeship)	<ul style="list-style-type: none"> In-person Full-time Variable length Apprenticeship training 	<ul style="list-style-type: none"> Service, repair, assemble, and maintain agricultural equipment
MB	Assiniboine Community College	Brandon	Integrated Pest Management	<ul style="list-style-type: none"> In-person Part-time Variable length Course/seminar/workshop 	<ul style="list-style-type: none"> Pest control that is cost-effective and minimizes the use of pesticides Graduates must register through Manitoba's certification program
MB	Assiniboine Community College	Online	Pesticide Core	<ul style="list-style-type: none"> Online Part-time Variable length Course/seminar/workshop 	<ul style="list-style-type: none"> Professionals must be certified and licensed through Manitoba Agriculture Re-certification required every five years
MB	Assiniboine Community College	Online	Commercial Manure applicator	<ul style="list-style-type: none"> Online Part-time Six weeks Course/seminar/workshop 	<ul style="list-style-type: none"> Prepares students to write the licensing examinations
MB	Assiniboine Community College	Online	Manure Management Planner	<ul style="list-style-type: none"> Online Part-time 13 weeks Course/seminar/workshop 	<ul style="list-style-type: none"> Agrologists learn how to prepare manure plans to fertilize with environmental considerations
MB	Assiniboine Community College	Brandon	Ag Extension Workshops ²¹⁶	<ul style="list-style-type: none"> In-person One to two days Workshop 	<ul style="list-style-type: none"> Current focus is on drone flying, an emerging farm skills need when combined with modern irrigation and plant management systems

Prov.	Institution	Location(s)	Program Name	Format	Program focus and additional information
MB	Assiniboine Community College	Brandon	Agriculture Equipment Operator ²¹⁷	<ul style="list-style-type: none"> In-person 13 weeks Indigenous students living off-reserve Free 15 student capacity Industry-recognized credential 	<ul style="list-style-type: none"> Covers the agriculture industry, farm safety, and the operation and maintenance of farm machinery
MB	University of Manitoba	Winnipeg	Agriculture diploma ²¹⁸	<ul style="list-style-type: none"> Two years Hands-on educational components Specialize in a program option 	Program options: <ul style="list-style-type: none"> Business management Crop management Livestock management General agriculture
MB	University of Manitoba	Winnipeg	Agribusiness degree Agroecology degree Food science degree Human nutritional sciences degree Agriculture degree with specialization options in animal systems, agronomy, or plant biotechnology	<ul style="list-style-type: none"> Four years Traditional degree Hands-on educational components 	
SK	Saskatchewan Polytechnic	Moose Jaw	Agriculture and Food Production diploma	<ul style="list-style-type: none"> Three years/80 weeks Three paid co-operative education work terms 	<ul style="list-style-type: none"> Agricultural technology, agriculture machinery, farm management, production and land management, and sustainability
SK	Saskatchewan Polytechnic	Saskatoon	Agricultural Equipment Technician certificate ²¹⁹	<ul style="list-style-type: none"> 35 weeks Two-week work placement at an agricultural dealership at the end Potential credit towards apprenticeship training 	<ul style="list-style-type: none"> Students learn by assembling, servicing, repairing, and modifying various types of equipment Course content created in collaboration with the provincial and national agricultural equipment industry
SK	University of Saskatchewan	Saskatoon	Precision agriculture certificate	<ul style="list-style-type: none"> In-person Open to current University of Saskatchewan students only, concurrent with a degree program Experiential learning 	<ul style="list-style-type: none"> How to use ag tech to precisely manage crops
SK	University of Saskatchewan	Saskatoon	Agribusiness diploma	<ul style="list-style-type: none"> Two years 	<ul style="list-style-type: none"> Aimed at specific employment opportunities Ladders into a B.Sc.
SK	University of Saskatchewan	Saskatoon	Agronomy diploma	<ul style="list-style-type: none"> Two years 	<ul style="list-style-type: none"> Aimed at specific employment opportunities Ladders into a B.Sc.
SK	University of Saskatchewan	Saskatoon	Agriculture degree Agribusiness degree Food and nutrition degree Renewable resource management degree	<ul style="list-style-type: none"> Four years Traditional degree 	
SK	University of Saskatchewan	Saskatoon	Bachelor of Science in Food Industry Management [B.Sc. (FIM)] degree ²²⁰	<ul style="list-style-type: none"> Four years Full- or part-time Can begin off-campus 	<ul style="list-style-type: none"> An interdisciplinary combination of food science, agribusiness, agri-food economics, food industry policy, and marketing

Prov.	Institution	Location(s)	Program Name	Format	Program focus and additional information
SK	Saskatchewan Indian Institute of Technologies	Saskatoon, Prince Albert, Regina, Online	Agri-Food Processing Micro Credential Program ²²¹	<ul style="list-style-type: none"> • In-person and online • Indigenous youth (aged 18–29) • Free • 12-weeks • Short focused units/ micro-credentials • Three-week work placement 	<ul style="list-style-type: none"> • Essential industry skills • Each micro-credential is focused on a specific job and skill • Creates networking opportunities • Program Advisory Committee helped design and deliver the program
SK	Saskatchewan Polytechnic	Online	Precision Farming micro-credential series ²²²	<ul style="list-style-type: none"> • Online • Variable length • Eight micro-credentials in this series 	<ul style="list-style-type: none"> • Programs: • Data analysis and answering the what-if questions • Drones in agriculture • Farming using smart technology • Internet of things and other sensors in agriculture • Machine monitoring and maintenance scheduling • Software for agriculture data analysis

Appendix D: Additional tables

Table 5. Food manufacturing (employer establishments by employment size category and province/territory, 2022):²²³

Province	Micro (1-4)	Small (5-99)	Medium (100-499)	Large (500+)
Manitoba	51	157	16	4
Saskatchewan	43	115	13	1

Table 6. Grain and oilseed milling (employer establishments by employment size category and province/territory, 2022):²²⁴

Province	Micro (1-4)	Small (5-99)	Medium (100-499)	Large (500+)
Manitoba	3	16	2	0
Saskatchewan	4	16	5	0

Endnotes

- 1 Value-added agriculture is the process whereby agricultural products or by-products are transformed into upgraded products or isolated components of the original product. Often this process is also referred to as creating “domestic” economic value by ensuring that the processing and manufacturing of agricultural products takes place close to where those products are grown. One example of value-added agriculture is the “crushing” of canola crops to create the end products of oil and meal from the original seed.
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