REGIONAL SPOTLIGHT

Prairies

Close-up on the bio-economy

LABOUR MARKET INTELLIGENCE

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Report Partners

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About this report

BioTalent Canada's 2021 series of labour market intelligence (LMI) reports, *Close-up on the bio-economy*, aims to provide the perspective bio-economy organizations need to find, recruit, train and retain talented teams based on real, meaningful understanding of the labour market.

Building on the last national full LMI study conducted in 2013,[1] the new series gives a much-needed update on the complex, multi-dimensional bio-economy, the companies within it, and the skills and talent they require. Its insights are based on surveys, stakeholder roundtables and interviews, an environmental scan and extensive data analysis.

For the first time, the data offers deeper insights into the labour market conditions specific to individual regions within Canada. This report looks at the **Prairies** (which includes Manitoba and Saskatchewan), including labour supply projections and labour market outlooks based on econometric models to estimate hiring requirements.

The study considered three time periods for its economic forecasts: immediate (to explore pandemic-related changes between 2019 and 2020), short term (2021 to 2024) and medium/longer term (2025 to 2029).

Due to the small sample size of bio-economy companies in the region, all data and comparisons in this report should be interpreted with caution.

1 *Sequencing the Data, 2013. A previous LMI report, Splicing the Data, was published in 2008.*

Other reports in the series

The *Close-up on the bio-economy* LMI series is published as part of BioTalent Canada's mission to provide bio-economy stakeholders with valuable, evidence-based labour market intelligence and job-ready human resources.

It includes:

- **National LMI report**
- **Demand and Supply Outlook**
- **Regional spotlights** (Atlantic Canada, Quebec, Ontario, Prairies, Western Canada)
- **Metro hub spotlights** (Greater Montreal, Greater Toronto Area, Metro Vancouver)
- Research briefs on topics such as bio-economy education and work-integrated learning

Visit biotalent.ca/LMIStudy to download these and other LMI reports, briefs and articles.

Research partners

The following researchers contributed to the development of this research and report:

- DPM Research Inc.
- Prism Economics & Analysis Inc.
- EKOS Research Associates Inc.
- Ipsos

Executive summary

The Prairie bio-economy is likely to require **3,400 additional workers by 2029**.[2] Companies will be challenged to fill positions due to a highly competitive labour market and difficulty finding candidates with the right skill sets. R&D capacity will be a particularly urgent area of need across all sub-sectors.

A reflection of Canada's overall bio-economy

The Prairie bio-economy consists of roughly **700 establishments** that collectively employed some **9,800 people** in 2019. Similar to most other regions, its companies are mainly **small or medium-sized businesses**: 74% have 20 employers or fewer, and 46% generate annual total gross revenues of less than $1 million. Almost half (49%) of the Prairie bio-economy is made up of primarily **bio-health companies**, with another third (37%) made up of **agri-bio companies**.

The Prairie bio-economy workforce covers a wide range of occupations, with **R&D and manufacturing** together accounting for just under half of all jobs. The distribution of employees across sub-sectors echoes the distribution of companies, with bio-health accounting for the largest proportion.

Slight growth with a focus on bio-health and agri-bio

The Prairie bio-economy is **expected to grow slightly** during the 2021 to 2029 forecast period. Current estimates indicate there will not be enough workers to meet labour needs by 2029, with significant pressure existing now and mounting throughout the decade. Most of these new hires will be required by the bio-health sub-sector, with a significant number also needed in agri-bio.

Some of the most severe shortages are expected in bio-manufacturing and processing. Forecasts suggest Prairie employers will be able to fill only 25% of job openings in these areas between now and 2029. The shortage is expected to intensify as Canada seeks to expand its manufacturing sector in response to the lack of capacity highlighted by the COVID-19 pandemic.

2 *Because of significant post-COVID-19 contraction, 2021 has been treated as an outlier and is excluded from all hiring estimate forecasts for the Prairie bio-economy.*

While **labour shortages are expected for nearly all bio-economy job functions** throughout the forecast period, two areas stand out as likely to experience persistent, severe shortages until 2029 and beyond:

- Manufacturing and production jobs
- Management, finance and administration jobs

How the Prairies can address the shortfall

While some shortages may be mitigated by more active recruitment of new graduates in relevant fields, the region's post-secondary institutions are not expected to be able to meet the sector's full labour needs. Additional strategies will be required to meet the demand for labour, such as recruiting skilled immigrants and looking beyond traditional talent pools.

The Prairie bio-economy has a tremendous **opportunity to seek talent from under-represented groups**. On average, women make up 43% of Prairie bio-economy workers overall. Other equity-seeking groups have less representation: visible minorities make up 17% of the bio-economy workforce, recent immigrants 12% and internationally educated professionals 11%. Indigenous workers make up 3% of the bio-economy workforce and people with disabilities just 1%.

As many employers also report that **candidates lack essential "soft skills"** such as problem-solving, collaboration and the business development skills that support commercialization, **work-integrated learning may be an important lever** for strengthening the talent supply.

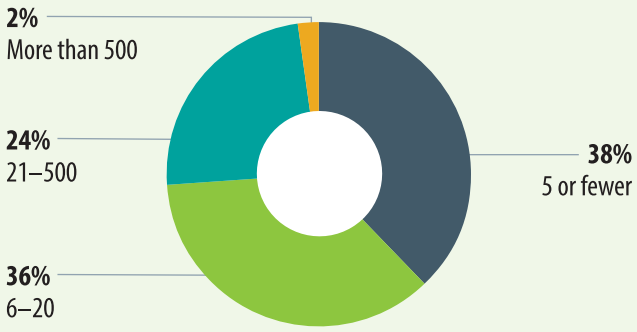
Who makes up the Prairie bio-economy?*

THE COMPANIES

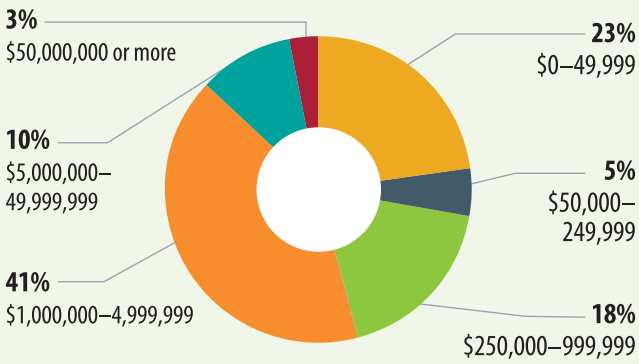
~700 bio-economy organizations

Most are small to medium-sized

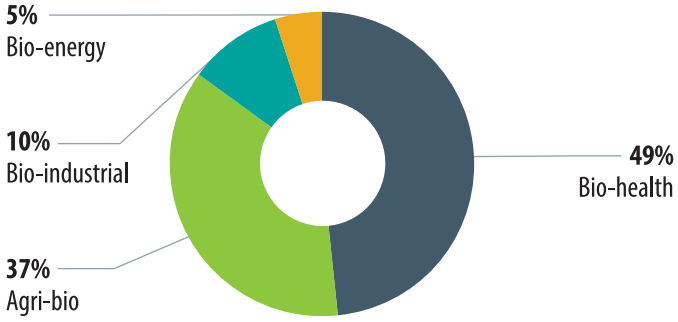
Number of employees



Annual total gross revenue†



Bio-health is the biggest sub-sector†



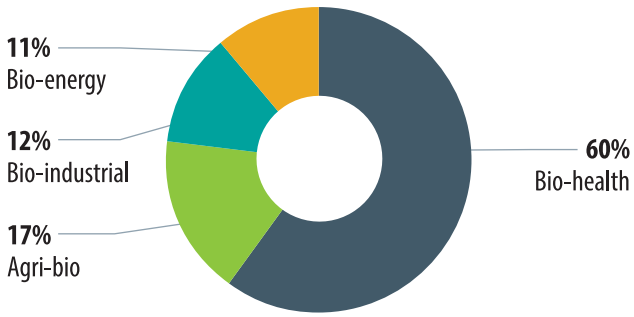
* *The Prairies include Manitoba and Saskatchewan.*

† *Percentages may not add up to 100% due to rounding.*

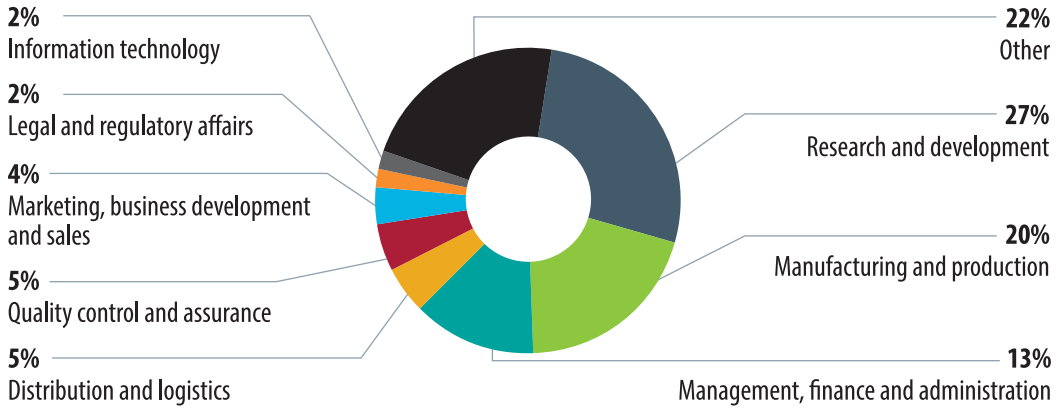
THE PEOPLE

~9,800 workers

Most work in bio-health



Jobs are concentrated in R&D and manufacturing



The sector has an opportunity to improve diversity

- Women: **43%**
- Internationally trained professionals: **11%**
- Visible minorities: **17%**
- Indigenous people: **3%**
- Recent immigrants‡: **12%**
- People with disabilities: **1%**

7% of undergraduate... **7%** of master's... **6%** of doctorate...

...students in Canadian bio-economy-related programs go to school in the Prairies

‡ *Recent immigrants are those who have been in Canada less than five years.*

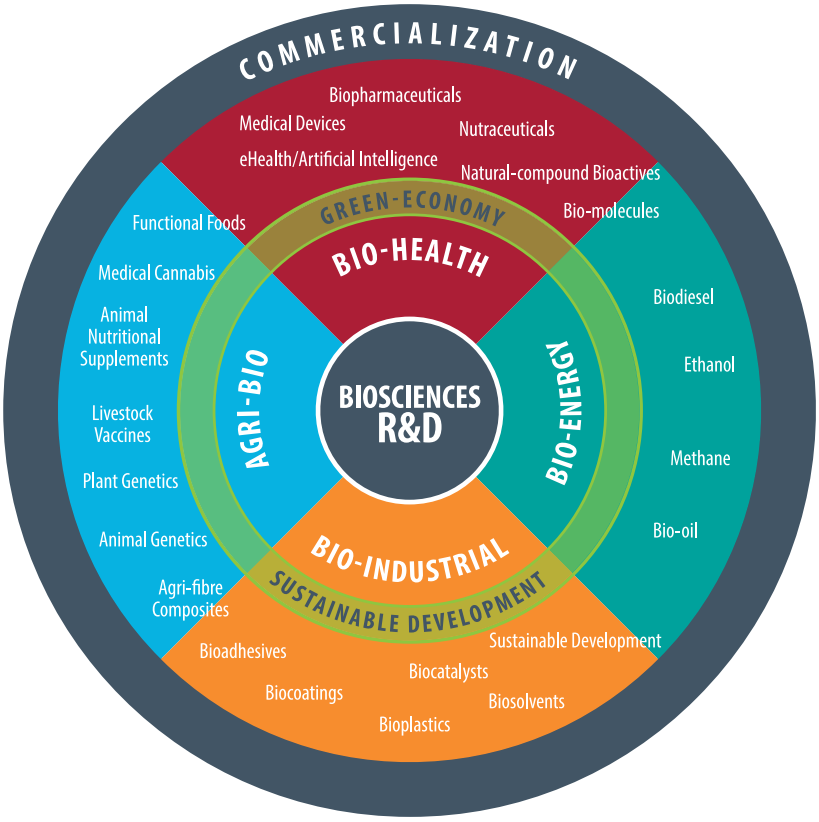
Note: Due to the small sample size of bio-economy companies in the region, all data and comparisons in this infographic should be interpreted with caution.

DEFINING THE BIO-ECONOMY

The bio-economy today

The bio-economy is defined as the economic activity associated with the invention, development, production and use of primarily bio-based products, bio-based production processes and/or biotechnology-based intellectual property. It includes the use of resources from agriculture, forestry, fisheries/aquaculture, organic waste and aquatic biomass.

The field is multidisciplinary in that it cuts across the bio-health, bio-energy, bio-agriculture (agri-bio) and bio-industrial (chemicals and materials) sub-sectors. These four are all rooted in their own foundations of research and development and all have products, processes or intellectual property that are involved in the "green" or sustainable development economy as well, to a greater or lesser extent. The bio-economy sub-sectors share a common objective: the commercialization of resultant bio-products, processes and/or intellectual property.



The **bio-health** sub-sector encompasses the invention, development, manufacturing, commercialization and use of products that improve therapeutics, diagnostics, prevention and health administration, as well as the development and production of nutraceuticals and applications of medical cannabis. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property related to the production of bio-health products and technologies.

The **bio-energy** sub-sector encompasses the invention, development, production, commercialization and use of renewable fuels through the conversion of organic material into heat or power. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property related to the production of bio-energy.

The **bio-industrial** sub-sector encompasses the invention, development, manufacturing, commercialization and use of goods for industrial use, such as bio-chemicals and bio-materials, through the conversion of organic material. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property related to the production of bio-industrial products. Among others, the development and production of biocatalysts are an integral part of this sub-sector.

The **agri-bio** sub-sector encompasses the invention, development, production, commercialization and use of new or modified products resulting from the manipulation, modification or alteration of the natural features of plants and crops, animals and/or other food sources. Research and development activities contribute to the development of new products, bio-based technologies and intellectual property that support improved quality, yield and efficiency in the agricultural sector and food production.

Profile of the Prairie bio-economy

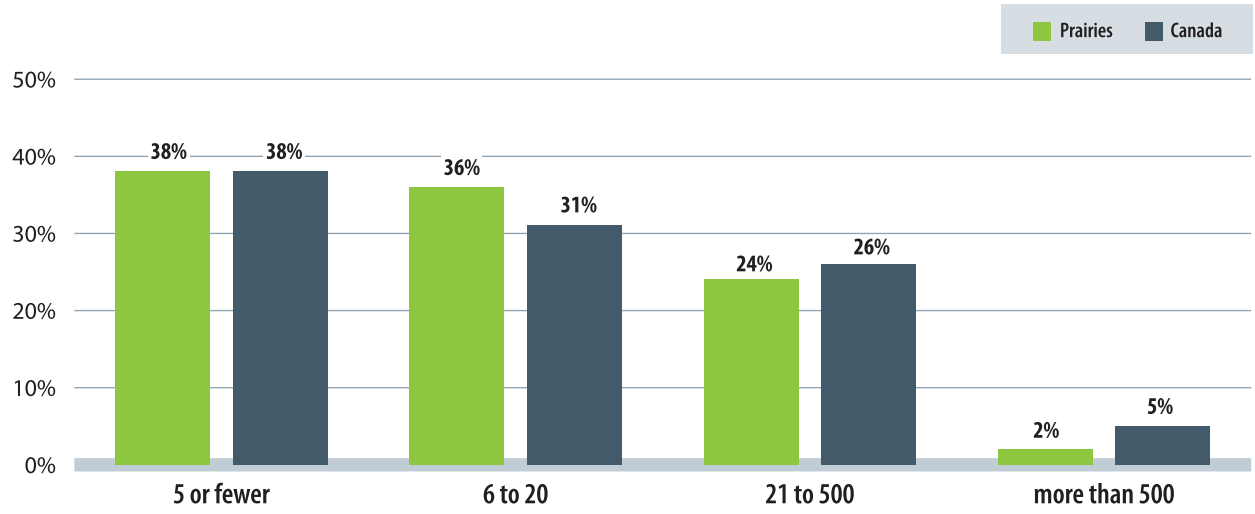
The Prairie bio-economy contains some 700 organizations, accounting for 9% of Canada's bio-economy companies. These organizations collectively employed around 9,800 people in 2019. It includes commercial businesses as well as hospital and university research institutions.

Employers

Overall, bio-economy companies in the Prairies are of similar size as those in the rest of the country. Of the organizations surveyed by BioTalent Canada, **around three-quarters (74%) had 20 or fewer full-time employees**. Only 2% had more than 500 full-time employees.

Revenue figures differ between the Prairies and the rest of the country, particularly among companies reporting annual total gross revenues of $50,000 to $250,000 in 2020 (5% in the Prairies vs. 17% in Canada overall) and among those reporting revenues of $1 million to $5 million (41% in the Prairies vs. 26% in Canada overall).

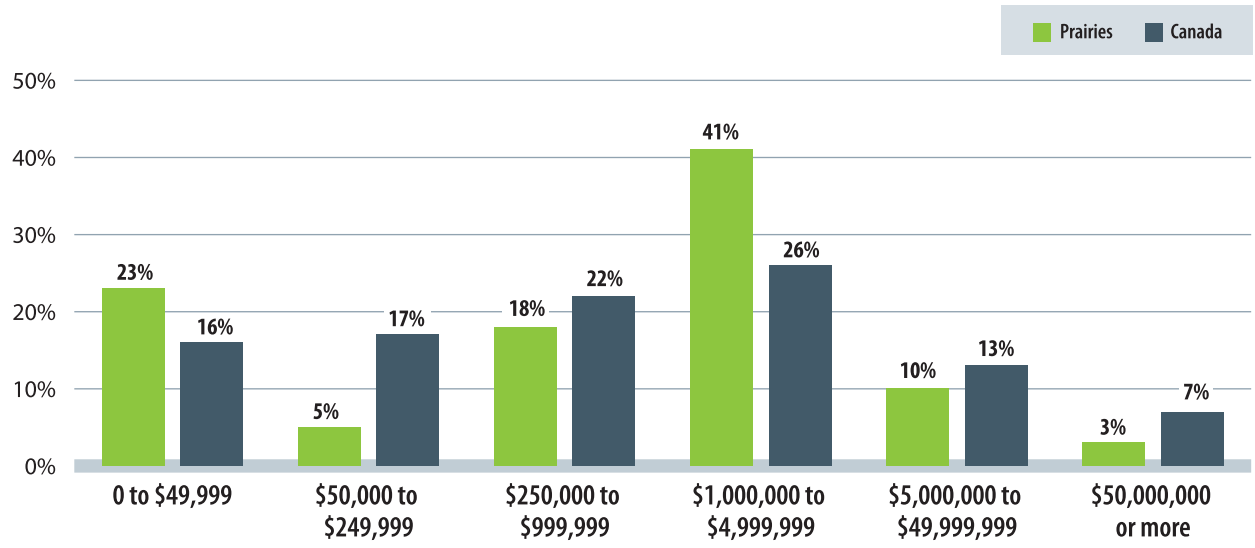
FIGURE 1. Bio-economy companies by number of full-time employees, Prairies vs. national



Source: BioTalent Canada, Survey of Employers 2020

The overwhelming majority of bio-economy companies are small or medium-sized businesses.

FIGURE 2. Bio-economy companies by annual total gross revenue, Prairies vs. national



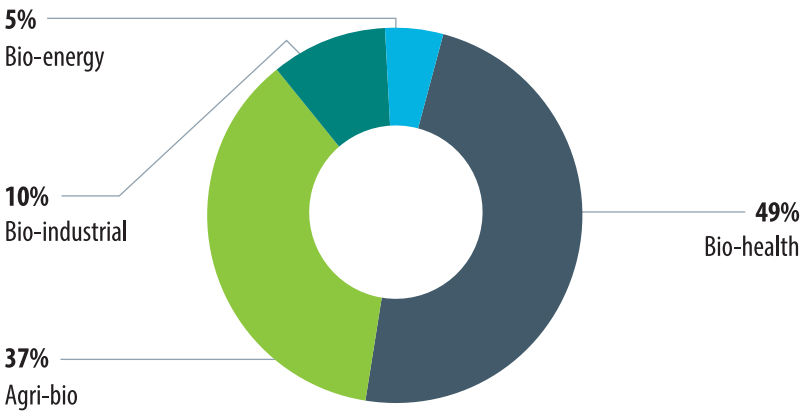
Source: BioTalent Canada, Survey of Employers 2020

The overall age of the Prairie bio-economy aligns closely with the national average. Nearly **two-thirds (59%) of the region's bio-economy companies are younger than 15 years** and around one-quarter (27%) have been operating for more than 25 years (compared to 24% for Canada overall).

As in Canada overall, **bio-health is the largest sub-sector** in the Prairie bio-economy, accounting for around half (49%) of all companies in the bio-economy. Unlike the rest of the country, another third (37%) of the bio-economy in the Prairies is devoted to agri-bio compared to 21% nationally.

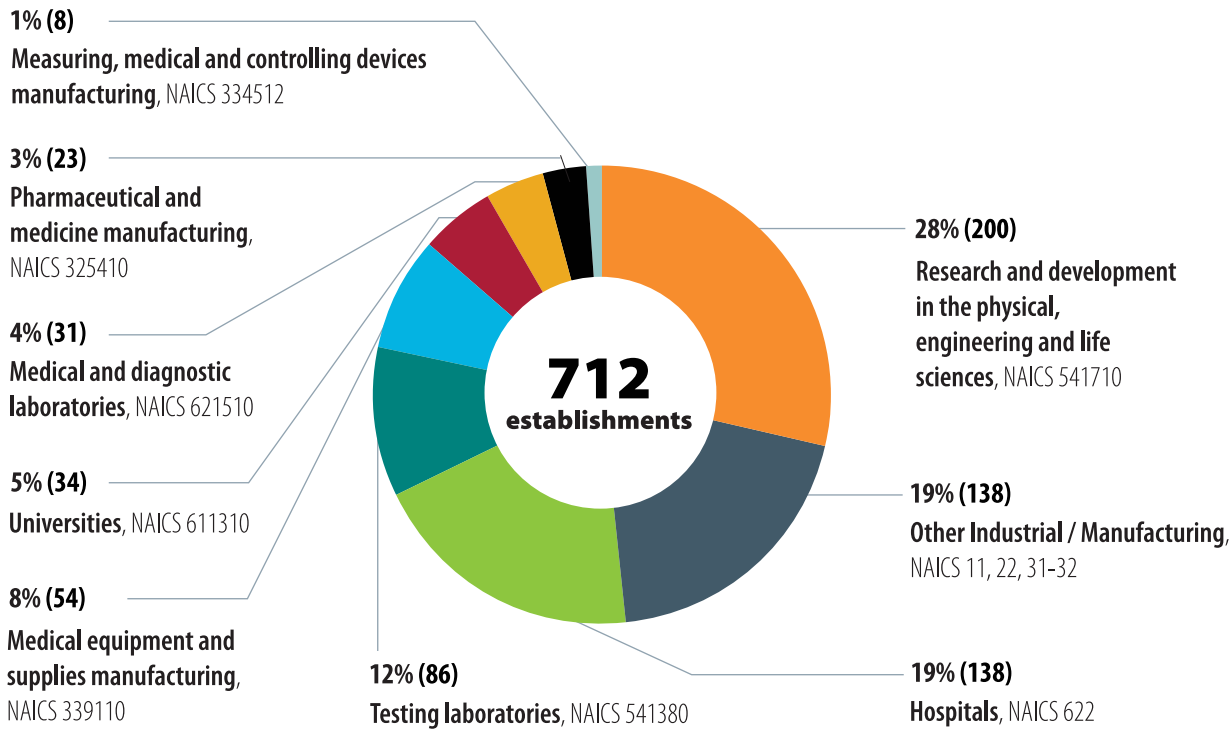
More than one-third of companies are in agri-bio.

FIGURE 3. Companies by primary sub-sector, Prairies



Note: Percentages may not add up to 100% due to rounding.
Source: BioTalent Canada Survey of Employers (2020)

FIGURE 4. Prairie bio-economy establishments by NAICS industrial sector



Note: Percentages may not add up to 100% due to rounding.
Source: BioTalent Canada Modeling and Projections (2020)

The North American Industry Classification System (NAICS) gives a different and complementary view of the Prairie bio-economy and its areas of focus. NAICS 541710 refers to physical, engineering and life sciences R&D — which makes up more than a quarter (28%) of bio-economy establishments. The next largest segments are other industrial/manufacturing (NAICS 11, 22, 31–33) and hospitals (NAICS 622), at 19% each.

Workers

R&D and manufacturing account for just under half of bio-economy jobs in the Prairies overall (27% and 20%, respectively). Despite higher numbers for R&D jobs overall (due to its prevalence in the dominant bio-health sub-sector), manufacturing jobs are the most common in most sub-sectors, accounting for more than one-third of all jobs in agri-bio, bio-energy and bio-industrial.

Employment in the Prairie bio-economy is highly concentrated in bio-health. Nearly two-thirds (60%) of all employees work in this sub-sector, with the rest divided fairly evenly among the agri-bio, bio-industrial and bio-energy sub-sectors.

Around one-third of agri-bio, bio-energy and bio-industrial jobs are in manufacturing and production.

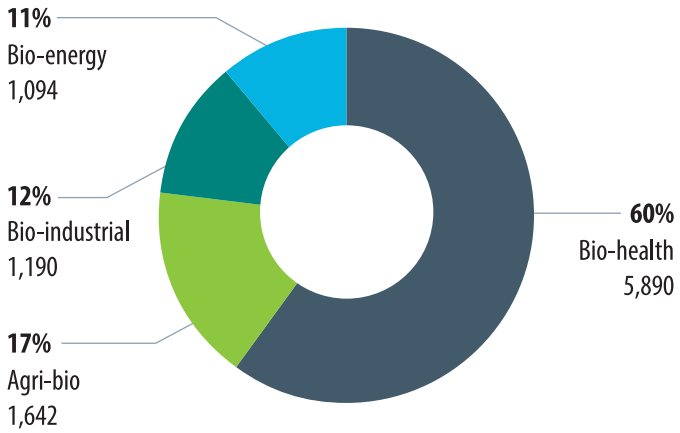
TABLE 1. Employment by job category and sub-sector, Prairies

Job category	Total	Agri-bio	Bio-energy	Bio-health	Bio-industrial
Research and development	**27%**	20%	18%	32%	22%
Manufacturing and production	**20%**	35%	39%	10%	36%
Management, finance and administration	**13%**	18%	10%	12%	12%
Distribution and logistics	**5%**	7%	7%	5%	4%
Quality control and quality assurance	**5%**	6%	7%	4%	3%
Marketing, business development and sales	**4%**	6%	3%	4%	4%
Legal and regulatory affairs	**2%**	1%	1%	2%	1%
Information technology	**2%**	2%	2%	2%	1%
Other	**22%**	6%	12%	29%	16%

Percentages may not add up to 100% due to rounding.

Source: BioTalent Canada Modeling and Projections (2020)

FIGURE 5. Bio-economy employment estimates by sub-sector, Prairies

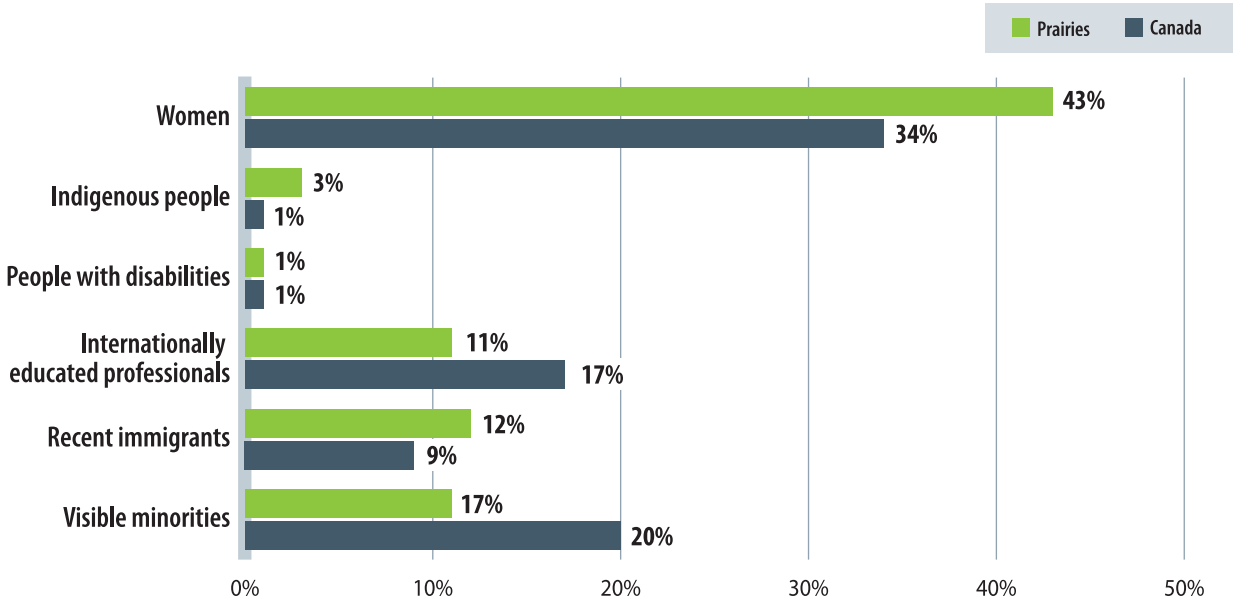


Source: BioTalent Canada Modeling and Projections (2020)

Equity and diversity in the workforce

Representation of equity-seeking groups in the Prairie bio-economy is generally similar to that of Canada overall. On average, **women make up a larger proportion of the Prairie bio-economy workforce** (43% compared to 34% across Canada). Other groups have less representation: visible minorities make up 17% of the bio-economy workforce, recent immigrants (those who have been in Canada less than five years) 12% and internationally educated professionals (IEPs) 11%. At an average of 3%, Indigenous workers make up a slightly larger share of the Prairie bio-economy than the Canadian bio-economy overall, while people with disabilities represent 1% of the workforce. These findings suggest under-represented populations could be important sources of new talent for the bio-economy going forward.

FIGURE 6. Average proportions of workers by equity-seeking group status, Prairies



Source: BioTalent Canada, Survey of Employers 2020

For deeper perspective on the bio-economy labour market in other regions across Canada, see our series of regional LMI spotlights at biotalent.ca/LMIStudy.

Ag-Quest Inc.

Accelerating development when timelines are short

The time frame to train new recruits is short for agricultural contract research firm Ag-Quest Inc., With only one field season a year for recent hires to learn new skills, it can take years to develop into fully productive researchers. The company has responded by pairing summer students with senior staff who can bring them up to speed more quickly.

Company profile: Ag-Quest Inc.

Location: Minto, Manitoba

Employees: 39 full-time,
40 seasonal employees

Bio-economy sub-sector: Agri-bio

Ag-Quest Inc. is an agricultural contract research organization that conducts agronomic research trials, herbicide resistance testing and other crop research in major growing zones and climactic regions across western Canada, serving both domestic and international agricultural clients.

Q: What's your focus at Ag-Quest?

DANA MAXWELL, PRESIDENT AND CEO: We're an agricultural contract research organization (CRO). We do crop and herbicide and pesticide efficacy research as well as pesticide environmental fate studies, and we support agronomic development for new crop varieties in multiple locations throughout the Canadian Prairies.

Q: What are the big areas of opportunity for your business?

DM: We've seen good growth in our variety trial services and we expect that to increase. We're also seeing more demand for herbicide-resistant weed assays. As long as weeds continue to evolve farmers will need herbicides.

"It takes five years for a researcher to reach their maximum capacity, and they need a lot of coaching to get there."

Q: What's the biggest challenge you face?

DM: It takes close to five years for a full-time researcher to reach their maximum capacity and they need a lot of coaching to get there. With only one growing season in a year, the development windows are short. Some researchers will work with just one crop; others work with 10 or more. There's lots of agronomy to learn, different situations and growing zones to operate in and protocols to interpret. And it takes a long time for a researcher to build efficiencies into their work. An early-career researcher can't manage a full workload without burning out; we want to build up our people to be productive.

Q: How do you help people along that path?

DM: One way is by starting the development process sooner, with our summer students. Summer positions are basically four-month job interviews. Students who return have already built up their practical skills and can start to work more quickly than someone who's entirely new to Ag-Quest or to field research. They also make excellent candidates to become Research Associates-in-training. We assign Research Associates-in-training responsibility for a small set of trials and pair them with more senior researchers who can mentor them. That lets them gain experience in managing their programs. We've had good success with that.

Q: How important are soft skills?

DM: Critical. We need people with good observational, teamwork and communications skills. A lot of our large projects involve large team events and it takes a lot of collaboration to complete them successfully. Self-organization and time management are important, too, because we're balancing multiple trials and priorities. Each researcher needs to know exactly what must happen in a week and be able to organize their time and resources to make it happen.

Q: As you look to fill positions, is diversifying your workforce a specific goal?

DM: We welcome diversity. It's not a specific goal but we do have a diverse workforce. We've hit the inflection point of having more women as research associates than men. And our permanent staff come from many different backgrounds. They bring a lot to the table.

Q: Where do you find your talent?

DM: We recruit summer students through the universities and colleges. For our permanent staff, we advertise at universities, sometimes through the Agrology Institutes. It's also helpful to hire through BioTalent Canada programs, which give access to workers with salary support and provide good candidates for research associates.

Prairies labour market outlook

Estimates suggest the Prairie bio-economy will need an additional 3,400 workers by 2029.[3] Based on anticipated conditions, labour supply will not be sufficient to meet that demand.

While the overall economy in the Prairies declined as a result of COVID-19, employment in the regional bio-economy expanded by almost 16% in 2020. In the short term, annual employment growth in the bio-economy is expected to be minimal and will fall below zero in 2025. For the rest of the decade, growth will rebound and remain stable at around 1.4% per year, with the sector **employing nearly 11,400 workers by 2029**.

Youth (those under 25 years old)[4] have historically been critical to the labour supply, but the youth share of the population in the Prairies has been declining steadily since 2000 and will likely continue to do so, while the share of individuals aged 55 years and older continues to rise. This combined trend is concerning for the future bio-economy because **a strong supply of youth is needed to age into the workforce and replace older workers**. This makes immigration key to meeting labour demand. Currently, only 12% of Prairie bio-economy workers are recent immigrants and 11% are IEPs, suggesting an opportunity to expand recruitment from these populations.

The share of immigrants to Canada choosing to settle in the Prairies has been growing in recent years, despite a drop in total numbers in 2020 as a result of the COVID-19 pandemic. These numbers are expected to rise again, increasing by a total of 10% from 2020 to 2029. The number of immigrants arriving with post-secondary degrees has trended upward since 2005 and is expected to hold steady through 2029. **The number of international students is also on the rise**, particularly in engineering and physical and life sciences.

For more detail on bio-economy labour needs in Canada, read our demand and supply outlook at biotalent.ca/LMIStudy.

3 *While this report focuses primarily on private sector employers, all forecasts and modelling include actual and potential workers from the public, education and private sectors. As well, because of significant post-COVID-19 contraction, 2021 has been treated as an outlier and is excluded from all hiring estimate forecasts for the Prairie bio-economy.*

4 *The definition of "youth" varies depending on the source. While BioTalent Canada typically defines "youth" as under 30, the source data for this report defines youth as under 25.*

Employment demand and skills requirements

While employment in the Prairie bio-economy is expected to grow over the forecast period, the individual sub-sectors will experience their own patterns of expansion and contraction.

TABLE 2. Employment outlooks by sub-sector, Prairies

Year	Overall	Bio-health	Bio-industrial	Agri-bio	Bio-energy
% change 2019 to 2020	**+15.7%**	+16.7%	+39.4%	+8.2%	(-3.9%)
Employment 2020	▲ **11,400**	▲ 6,900	▲ 1,650	▲ 1,800	▼ 1,050
Employment 2024	▼ **10,750**	▼ 6,450	▼ 1,300	▲ 1,900	▲ 1,100
Employment 2029	▲ **11,400**	▲ 6,700	▲ 1,400	▲ 2,100	▲ 1,150

Source: BioTalent Canada Modeling and Projections (2020)

Bio-health

Bio-health grew substantially in 2020, largely due to increased pharmaceutical and medicine manufacturing as well as greater demand for R&D services. Employment is expected to decline by 9.2% in 2021 and then grow modestly in the short term, reaching 6,450 workers by 2024. Following another employment dip in 2025, the sub-sector will see annual employment growth of approximately 1.4%, employing around **6,700 workers by 2029**.

Bio-industrial

Bio-industrial grew by 39.4% in 2020 — significantly more than any other sub-sector in the region. Although it will decline by 27% in 2021, strong employment growth is expected in the short term (2.6% per year), employing 1,300 workers by 2024. Over the longer term, annual growth is expected to weaken to 1.2%, with total employment reaching **1,400 workers by 2029**.

Agri-bio

Growth in food-related R&D drove an 8.2% employment growth in the agri-bio sub-sector in 2020. Following a decline in 2021, employment is expected to grow by 3.7% annually between 2022 and 2024, and by 2.5% for the rest of the forecast period. The sub-sector will employ **2,100 workers by 2029**.

Bio-energy

Bio-energy employment in the Prairies fell in 2020 but is expected to return to close to pre-pandemic levels by 2021. Although national energy-related trends are exerting downward pressure on the bio-energy sub-sector overall, the Prairies region may benefit from interest in renewable diesel and new blend requirements for ethanol and biodiesel, leading to slight employment growth during the forecast period. The sub-sector is expected to employ **1,150 workers by 2029**.

The Prairies bio-manufacturing gap

COVID-19 highlighted a significant gap in the Canadian bio-economy: bio-manufacturing and processing capacity. Canada was initially unable to produce sufficient personal protective equipment (PPE) to meet its needs and had no domestic capacity to develop and manufacture vaccines. Commitments have been made to build facilities to remedy this, but those facilities will require skilled people to operate them — a supply of talent does not currently exist.

Estimates suggest that, between 2022 and 2029, the Prairies bio-economy will need an additional 800 bio-manufacturing workers, representing approximately one-quarter (23%) of all new bio-economy hires during this period. Agri-bio will require the largest share (41%), followed by bio-health and bio-industrial, each accounting for 20–25% of the need. Only 25% of these positions will be fillable by predicted supply. In comparison, while similar numbers of additional workers will be needed for research and development (780), the supply issues will be less severe during the same period, and employers are expected to have less difficulty filling these roles.

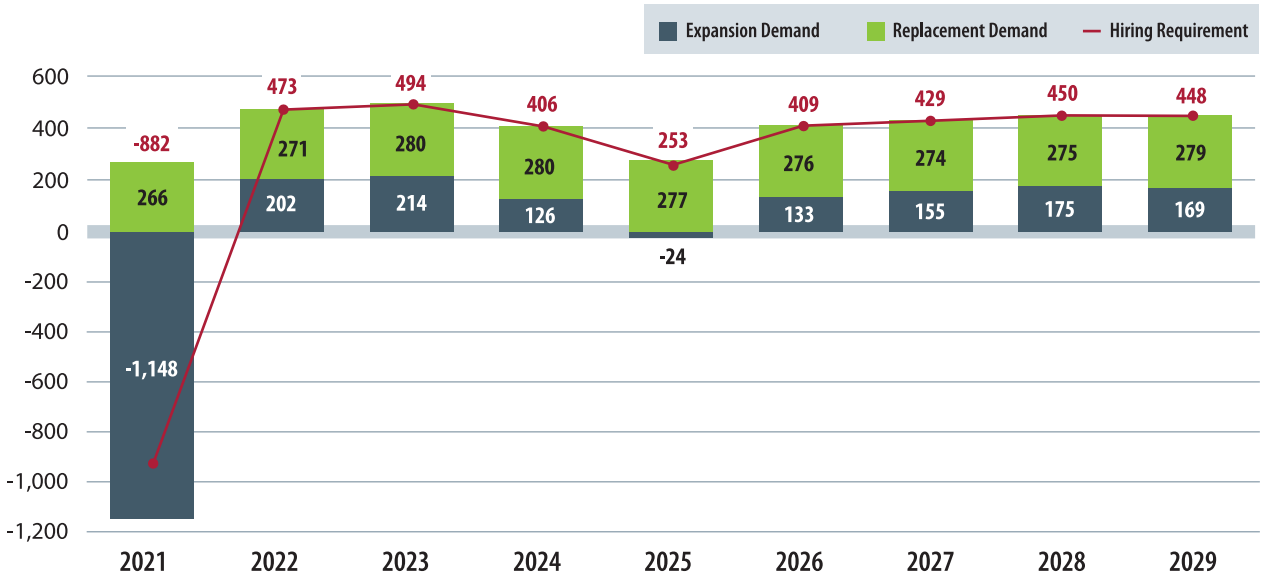
To fill the shortages, the bio-economy will need to develop new strategies, such as training workers from other sectors and more actively recruiting from outside traditional labour pools, including people from demographic groups under-represented in the bio-economy such as Indigenous persons, newcomers to Canada and persons with disabilities.

Expansion and replacement

Most of the requirement for 3,400 additional workers across the Prairie bio-economy between 2022 and 2029 will be to replace retirees or individuals leaving the workforce for other reasons — in other words, to fill *replacement demand*. Yet a portion will also be needed to fill new jobs as their industries grow (*expansion demand*).

While **replacement demand is expected to remain relatively stable across the forecast period, expansion demand is expected to fluctuate slightly**. 2021 will see strong negative expansion as the bio-economy contracts back to pre-pandemic levels. Expansion demand will peak in 2023 before falling to just below zero in 2025 as Canada's economic recovery results in higher interest rates, which will likely lead to reduced investment (including in labour) in the bio-economy. After that, expansion will grow slightly through to the end of the forecast period.

FIGURE 7. Hiring requirement outlook by demand type, Prairies



Source: BioTalent Canada Modeling and Projections (2020)

TABLE 3. Hiring requirements by sub-sector from 2022 to 2029, Prairies

Sub-sector	Workers needed	Demand type	Key roles
Bio-health	1,700	Mostly replacement	▸ Other, including nursing and related medical professions (31%) ▸ R&D (29%) ▸ Management, finance and administration (14%)
Bio-industrial	440	Mostly replacement	▸ Manufacturing and production (43%) ▸ Management, finance and administration (19%) ▸ R&D (19%)
Agri-bio	850	Around half replacement	▸ Manufacturing and production (37%) ▸ Management, finance and administration (21%) ▸ R&D (18%)
Bio-energy	380	Nearly all replacement	▸ Manufacturing and production (38%) ▸ R&D (26%) ▸ Other (21%)

Source: BioTalent Canada Modeling and Projections (2020)

R&D roles are among the top three areas where employers need to hire in all four sub-sectors in the Prairies, with manufacturing and management roles also well represented. Overall, manufacturing and production roles are the most critically needed, making up nearly one quarter (23%) of the sector's hiring needs from 2022 to 2029 (see Table 4)

Manufacturing and production will face critical shortages in most sub-sectors.

TABLE 4. Hiring requirements by job function, Prairies

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	%
Manufacturing and production	(-230)	120	120	100	70	90	100	100	100	**800**	**23%**
Research and development	(-50)	110	110	90	50	100	100	110	110	**780**	**23%**
Management, finance and administration	(-160)	80	80	70	40	70	70	70	70	**550**	**16%**
Distribution and logistics	(-30)	30	30	20	10	20	20	30	20	**180**	**5%**
Quality control and assurance	(-40)	20	20	20	10	20	20	20	20	**150**	**4%**
Marketing, business development and sales	(-30)	20	20	10	<10	20	20	20	20	**130**	**4%**
Information technology	(-30)	10	10	10	10	10	10	10	10	**80**	**2%**
Legal and regulatory affairs	(-20)	10	10	10	<10	10	10	10	10	**70**	**2%**
Other	(-280)	90	100	80	60	80	90	90	90	**680**	**20%**
Total	**(-870)**	**490**	**500**	**410**	**250**	**420**	**440**	**460**	**450**	**3,420**	**100%**

Source: BioTalent Canada Modeling and Projections (2020)

Anticipated employment demand can be combined with expected supply to model where labour needs will be most acute throughout the forecast period. Overall, **55% of surveyed companies across all sub-sectors reported already experiencing some or significant challenges recruiting and retaining qualified staff**. The outlook suggests these will continue and likely worsen through to 2029.

Overall labour market ratings by job category are calculated by comparing hiring requirements in each forecast year to the number of expected new bio-economy workforce entrants in the same year. A three-tiered rating scale shows the severity of the hiring challenges:

Level 1

Labour supply is **greater than 75%** of labour demand.
Low to moderate labour shortages are expected.

Level 2

Labour supply is **between 25% and 75%** of labour demand.
Moderate to serious labour shortages are expected.

Level 3

Labour supply is **less than 25%** of labour demand.
Serious to severe labour shortages are expected.

Tables 5–8 show that, overall, **nearly all job categories are expected to face serious-to-severe labour shortages throughout the forecast period**, though the numbers vary widely across sub-sectors. In bio-health, shortages will be serious to severe for all job categories in all years except 2021 and 2025. In bio-industrial, the numbers vary, with the more severe shortages expected in quality control and assurance and distribution and logistics. Agri-bio will experience consistent serious-to-severe shortages in all job categories except legal and regulatory and R&D. Bio-energy will have little need for new talent in legal and regulatory or information technology roles, but all other categories will be subject to serious-to-severe shortages throughout the forecast period.

Some shortages could be mitigated by more active recruitment of new graduates from relevant fields, but this will not fully address demand. Additional strategies, such as recruiting skilled immigrants and looking beyond traditional pools to attract candidates with a wider variety of backgrounds, will be required.

TABLE 5. Overall bio-economy labour market ratings outlook by job function, Prairies

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Manufacturing and production	1	3	3	3	3	3	3	3	3
Distribution and logistics	1	3	3	3	3	3	3	3	3
Management, finance and administration	1	3	3	3	3	3	3	3	3
Information technology	1	3	3	3	3	3	3	3	3
Quality control and assurance	1	3	3	3	3	3	3	3	3
Legal and regulatory	1	3	3	3	3	3	3	3	3
Marketing, business development and sales	1	3	3	3	2	3	3	3	3
Research and development	1	3	3	2	2	2	2	2	3
Other	1	2	2	2	2	2	2	2	2
Overall	**1**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**

Source: BioTalent Canada Modeling and Projections (2020)

TABLE 6. Bio-health labour market ratings outlook by job function, Prairies

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Information technology	1	3	3	3	3	3	3	3	3
Management, finance and administration	1	3	3	3	2	3	3	3	3
Legal and regulatory	1	3	3	3	2	3	3	3	3
Quality control and assurance	1	3	3	3	1	3	3	3	3
Marketing, business development and sales	1	3	3	3	1	3	3	3	3
Distribution and logistics	1	3	3	3	N/A	3	3	3	3
Manufacturing and production	1	3	3	3	1	3	3	3	3
Research and development	1	3	3	2	1	3	3	3	3
Other	1	2	2	2	2	2	2	2	2
Overall	**1**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**

Source: BioTalent Canada Modeling and Projections (2020)

TABLE 7. Bio-industrial labour market ratings outlook by job function, Prairies

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Quality control and assurance	3	3	3	3	3	3	3	3	3
Distribution and logistics	1	3	3	3	3	3	3	2	3
Research and development	1	3	3	2	3	2	3	3	3
Information technology	3	N/A	3	N/A	3	N/A	N/A	3	N/A
Management, finance and administration	1	3	3	2	2	2	2	2	2
Manufacturing and production	1	3	3	2	2	2	2	2	2
Legal and regulatory	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Marketing, business development and sales	1	1	1	1	1	1	1	1	1
Other	3	3	3	3	3	3	3	3	3
Overall	**1**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**

Source: BioTalent Canada Modeling and Projections (2020)

TABLE 8. Agri-bio labour market ratings outlook by job function, Prairies

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Distribution and logistics	1	3	3	3	3	3	3	3	3
Manufacturing and production	1	3	3	3	3	3	3	3	3
Management, finance and administration	1	3	3	3	3	3	3	3	3
Marketing, business development and sales	1	3	3	3	3	3	3	3	3
Quality control and assurance	1	3	3	3	3	3	3	3	3
Information technology	1	3	3	3	3	2	3	3	3
Research and development	1	2	3	2	2	2	2	2	2
Legal and regulatory	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	N/A
Other	1	2	2	2	2	2	2	2	2
Overall	**1**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Source: BioTalent Canada Modeling and Projections (2020)

TABLE 9. Bio-energy labour market ratings outlook by job function, Prairies

Job function	2021	2022	2023	2024	2025	2026	2027	2028	2029
Research and development	3	3	3	3	3	3	3	3	3
Distribution and logistics	3	3	3	3	3	3	3	3	3
Manufacturing and production	3	3	3	3	3	3	3	3	3
Quality control and assurance	3	3	3	3	3	3	3	3	3
Management, finance and administration	2	3	3	3	3	3	3	3	3
Marketing, business development and sales	3	3	3	3	3	N/A	3	3	3
Information technology	1	N/A	3	N/A	N/A	N/A	N/A	3	N/A
Legal and regulatory	3	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A
Other	3	3	3	3	3	3	3	3	3
Overall	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Source: BioTalent Canada Modeling and Projections (2020)

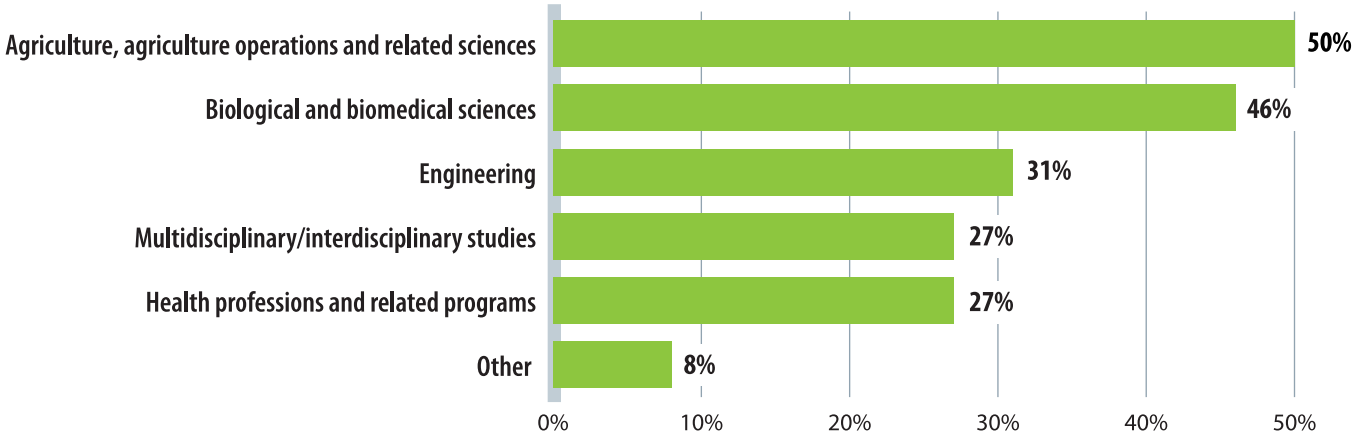
Education and the talent supply

Bio-economy employers in the Prairies seek a wide range of educational backgrounds. **Half of employers (50%) recruit from agriculture, agriculture operations and related sciences**, and almost as many (46%) recruit from biological and biomedical science programs. Many also look for workers with backgrounds in engineering, health programs and multi- or interdisciplinary studies, indicating the need for staff with specialized technical skills who also understand the broader business context.

Although only eight universities in the Prairies offer programs related to the bio-economy, these programs cover the full spectrum, including physical and life sciences, health and related sciences, engineering and related technologies, and agriculture and related sciences. At the college level, more than one-quarter (27%) of Canada's college programs in health and related sciences are offered in the Prairies. The region's share of enrolment in university-level programs related to the bio-economy is in line with its share of those programs.

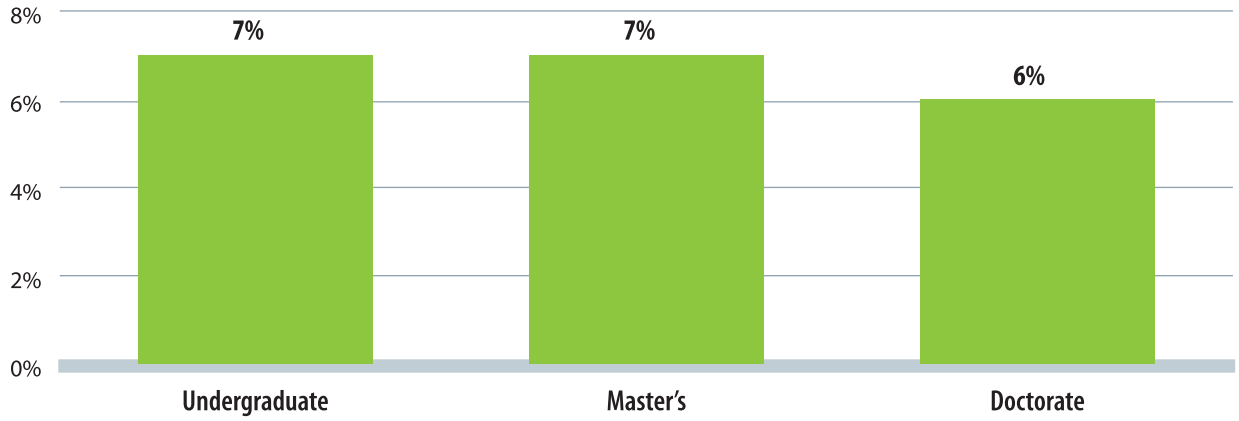
More than one-quarter of Canada's college programs in health and related sciences are offered in the Prairies.

FIGURE 8. Top fields of study sought by bio-economy employers, Prairies



Source: BioTalent Canada, Survey of Employers 2020

FIGURE 9. Prairies' share of total enrolment in bio-economy-related university programs in Canada

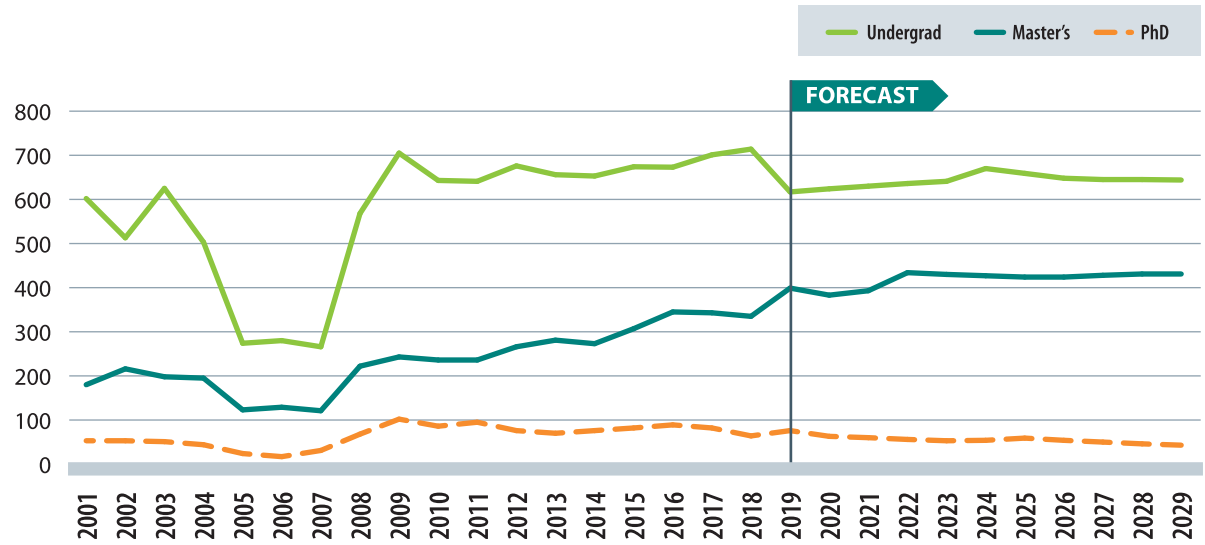


Source: Customized PSIS data, Statistics Canada 2019

Domestic university degree completions overall are expected to remain relatively stable between 2020 and 2029, with undergraduate and doctorate completions declining slightly and master's completions increasing slightly.

As in the rest of Canada, international students make up a large and growing share of post-secondary enrolments in the Prairies, particularly in engineering and related technology programs, as well as physical and life sciences. Some of them are likely to remain in the Prairies as immigrants, particularly following changes to federal immigration rules in 2005 that made it easier for students to work and convert to "landed" status.

FIGURE 10. Domestic degree completions by study level, Prairies



Source: BioTalent Canada Modeling and Projections (2020)

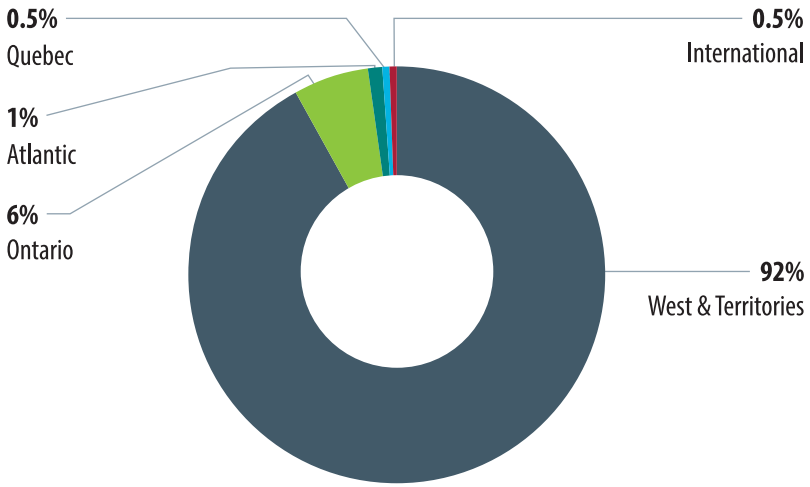
Student immigration programs in the Prairies

In Saskatchewan, international students can apply for permanent residency through the **Provincial Nominee Program** if they have graduated from a Canadian post-secondary institution, have worked in the province for at least six months and have an offer of permanent full-time employment.

In Manitoba, the **International Education Stream** prioritizes STEM graduates. Graduate students who have participated in Mitacs internships may also be eligible for the **Provincial Nominee Program** without work experience. Manitoba is also piloting an **International Student Entrepreneur Stream** for graduates who are majority owners of businesses that have operated in the province for at least six months before students' graduation.

Like they do in the rest of the country, graduates in the Western and Prairie provinces and territories tend to stay and work in the region where they studied. **More than 90% of the 2015 graduates from Western or Prairie universities in bio-economy related fields of study were working in the same region in 2018.** Ontario work opportunities attracted approximately 6% of Western Prairie 2015 graduates.

FIGURE 11. Work regions for Western and Prairie university graduates in bio-economy related fields of study



Source: Statistics Canada, National Graduate Survey 2018

Skills and training needs

As in the rest of Canada, bio-economy companies in the Prairies sometimes have **challenges finding candidates with not only strong technical skills but also "soft skills"** and niche skill sets. Agri-bio companies have particular challenges, as they require a highly specific combination of traditional agriculture skills and digital or technical skills. Quality control skills and regulatory knowledge are also areas where bio-economy companies in the Prairies report significant gaps. The vast majority (83%) of Prairie bio-economy companies offer some form of in-house training to ensure employees receive the required learning, which often takes the form of onboarding training and job shadowing/rotations. About half (50%) actively support continuing education.

Despite efforts to align post-secondary programs and industry needs, the **specialized requirements of many positions in the bio-economy are not being fully met** through existing educational streams.

However, many Prairie institutions continue to innovate to be competitive and improve alignment. Some examples include:

- *Technical programs* that emphasize job-readiness, requiring students to complete assignments the same way they would in a professional setting, including lab work, paperwork and other technical tasks
- *Programs designed to address region-specific needs,* such as the lack of quality control/quality assurance personnel that often force companies in the Prairies to outsource these roles

HR challenges in the Prairies

Bio-economy employers in the Prairies rank HR among their top five obstacles to company development. Around two-thirds report skills and labour shortages in research and technical areas (67%) and limited access to capital (66%). Among their HR-specific difficulties, **almost half (45%) of bio-economy employers in the Prairies list lack of qualified candidates with required specialized skills sets or experience as a top challenge**.

Main issues

45%
Lack of qualified candidates with required specialized skill sets or experience

36%
Lack of qualified candidates with practical/non-academic skills

29%
Insufficient capital or resources to pay competitive wages to attract and retain qualified candidates

17%
Loss of candidates and employees to large, well-known organizations

10%
Lack of applicants

Source: BioTalent Canada, Survey of Employers 2020

What are the skills gaps?

- **Soft skills:** The most critical skills gaps among candidates and new employers are problem-solving, communication, research skills, and the ability to understand and follow standard operating procedures.
- **Programming skills:** As digitalization expands — particularly in the agri-bio sub-sector — bio-economy companies need to find ways to attract candidates with strong programming skills.

How are companies recruiting?

Bio-economy employers in the Prairies rely on similar methods for hiring as employers across the country: more than three-quarters (79%) rely primarily on personal contacts and employee referrals, and more than half (58%) use job banks and other online resources. Like the bio-economy overall, employers in the Prairies could connect with a larger, more diverse talent pool if they expanded their approaches to include strategies with broader reach.

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Conclusion

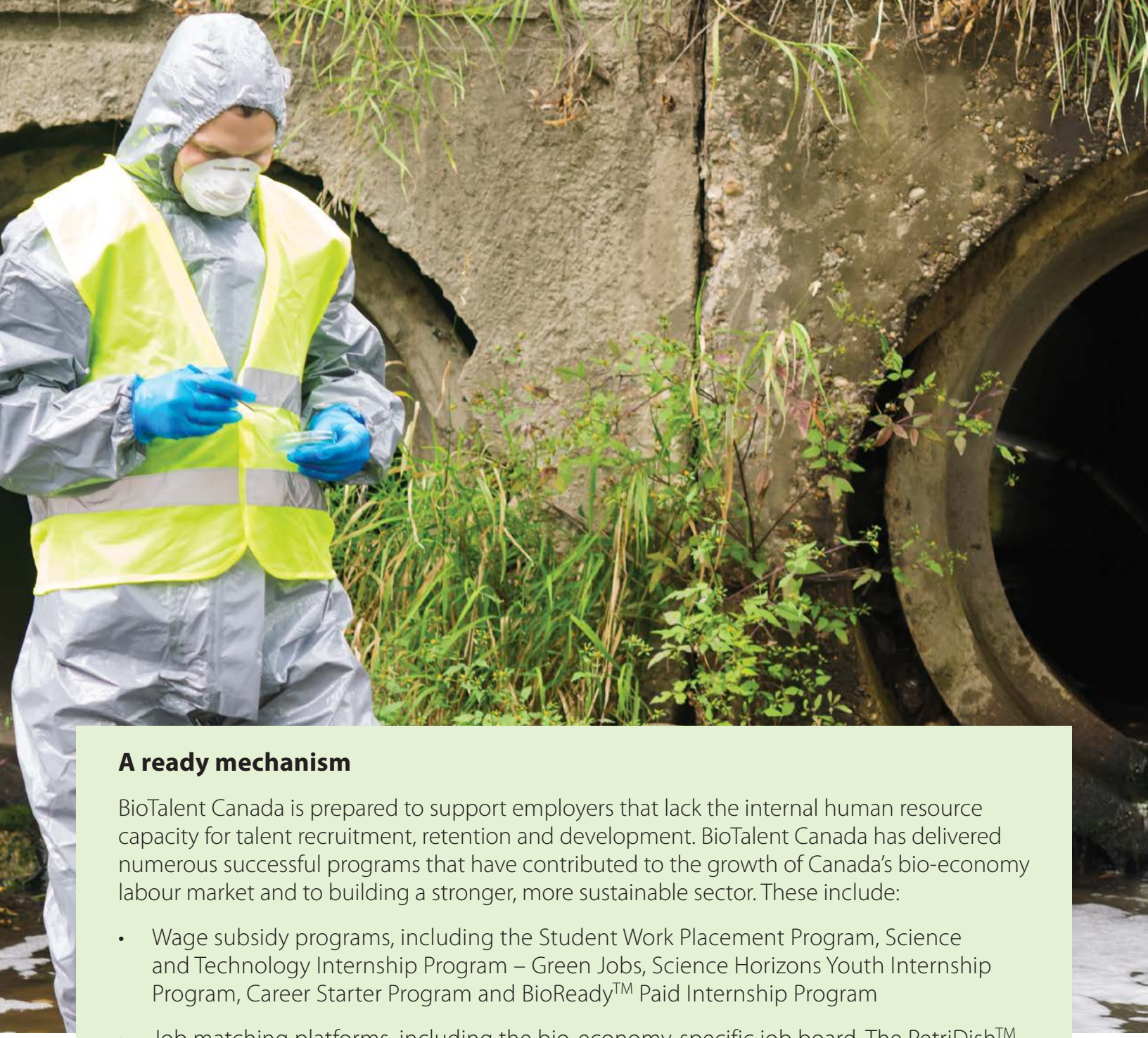
The evolution of agricultural practices presents a particular challenge in the agriculture-heavy Prairie provinces, where many agri-bio companies struggle to find the right mix of agricultural and technical or digital skills. Post-secondary institutions in the Prairies are working to enhance programming and offer targeted streams to better meet the sector's needs.

More work-integrated learning programs could improve alignment and better prepare students for the reality of work in the agri-bio sub-sector.

Companies in most sub-sectors of the growing Prairie bio-economy are already struggling to fill R&D, manufacturing and management roles. Their challenges are expected to worsen throughout the decade due to an aging population, a highly competitive labour market and difficulty finding candidates with the right skill sets.

Employers in the Prairies could mitigate some of their hiring challenges and improve organizational diversity by **adjusting their recruitment strategies to reach more immigrants to Canada** who settle in the Prairies and other under-represented groups.

See our **national LMI report** for more information on labour market conditions for Canada's bio-economy, including recommended actions employers can take to address the labour shortages expected over the next decade. Our **demand and supply outlook** takes a closer look at anticipated hiring needs along with the supply available to bio-economy employers, while additional regional spotlights provide more details on the labour market outlooks for Western Canada, Ontario, Quebec and Atlantic Canada. For these and other reports, visit biotalent.ca/LMIStudy.



A ready mechanism

BioTalent Canada is prepared to support employers that lack the internal human resource capacity for talent recruitment, retention and development. BioTalent Canada has delivered numerous successful programs that have contributed to the growth of Canada's bio-economy labour market and to building a stronger, more sustainable sector. These include:

- Wage subsidy programs, including the Student Work Placement Program, Science and Technology Internship Program – Green Jobs, Science Horizons Youth Internship Program, Career Starter Program and BioReady™ Paid Internship Program
- Job matching platforms, including the bio-economy-specific job board, The PetriDish™
- Programs for internationally educated professionals, including the BioSkills Recognition Program and BioReady™ designation
- Skills courses, including the Essential and Technical Skills Fundamentals courses
- National Occupational Standards, a set of profiles documenting the skills, education and credentials required for specific bio-economy roles, to help employers recruit and retain the right talent, even with limited in-house human resource capacity

Acknowledgements

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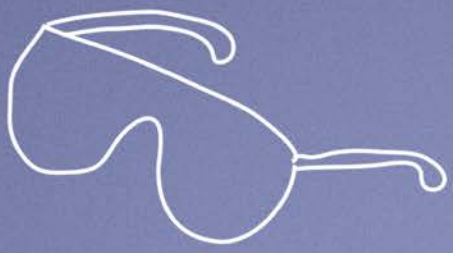

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