The Economic Impact of Barley on the Canadian Economy: 2022

Report for:

Cereals Canada
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Introduction

Cereals Canada commissioned LMC International to undertake research to quantify the benefit of barley to the Canadian economy, in terms of:

1. ***Economic impact***
2. ***Number of people dependent on the sector***
3. ***Wages***

This study provides the results of that independent analysis.

We focus specifically on the production of barley and barley products, spanning several steps in the value chain: from barley cultivation, through malting and feed processing, to the delivery of value-added products to end users or ports of export.

The results capture:

1. The ***direct*** benefit from these stages
2. The ***indirect*** benefit from the associated economic and market activities and industries
3. The ***induced*** benefit from household spending of the income earned from the barley sector.

The data are presented for ***Direct*** benefits and ***Total*** benefits (the sum of the direct, indirect and induced benefits above) for each stage, for the eastern and western regions of Canada and for Canada in aggregate.

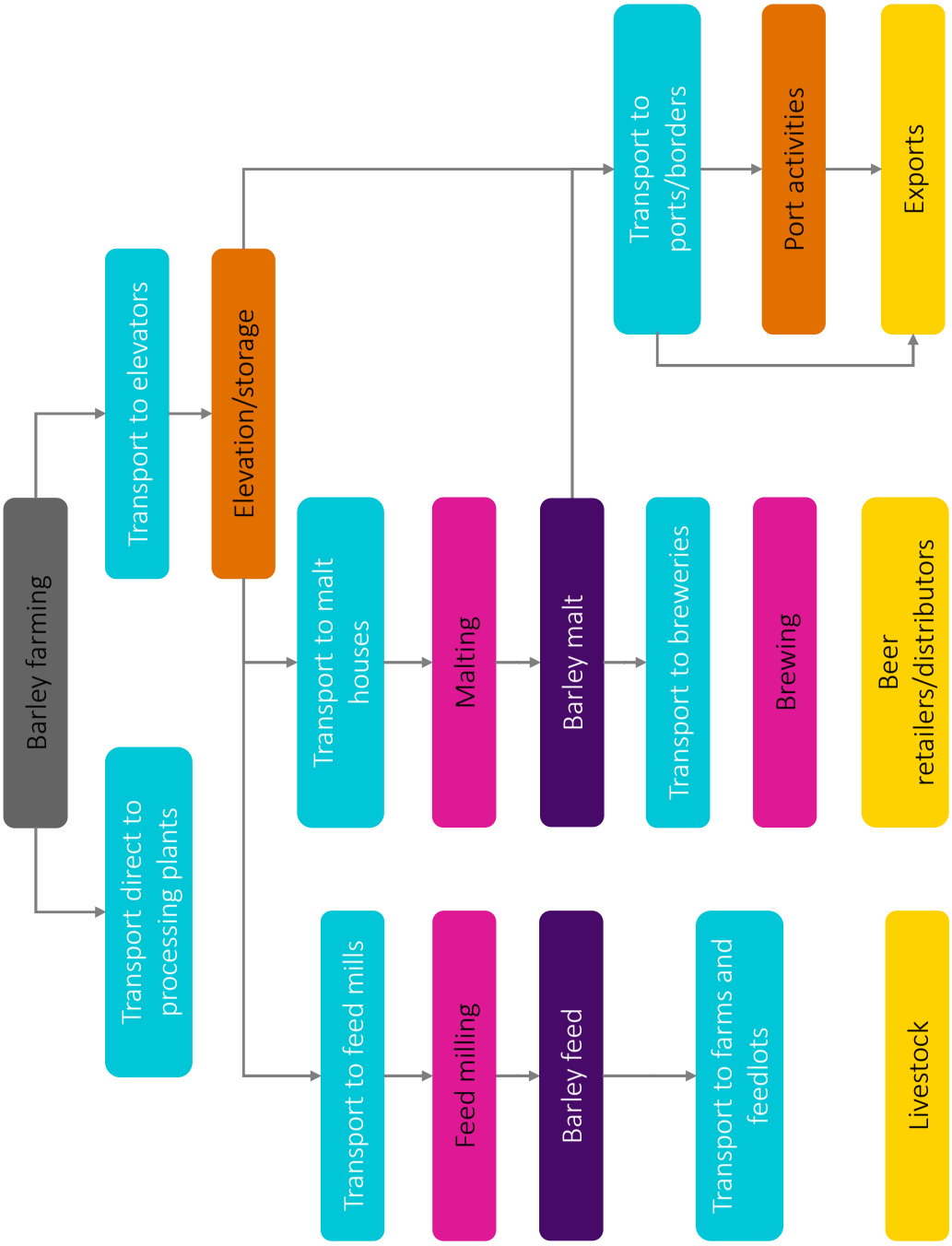
- The ***eastern region*** comprises Ontario, Quebec and the Maritimes.
- The ***western region*** comprises British Colombia, Alberta, Saskatchewan and Manitoba.

The objective was to develop an up-to-date assessment, using:

- Official data as far as possible
- The latest data for 2020/21 and previous years (which are officially revised over time)
- Interviews with industry participants
- Best practice in estimating economic benefits.

The analysis aims to provide the most accurate and independent assessment possible. To this end, we took guidance from industry participants, applied the most recent official data where relevant and used *Statistics Canada* multipliers to arrive at our totals in each category. The total results reflect the government's most recent multipliers for each sector.

*Note: Value throughout the study is presented in **Canadian dollars**, whether noted as dollars, or with the symbols $ or C$, unless otherwise specified.*



Summary of Results

For the average of the past three years, ***2018/19-2020/21***:

- The total ***economic impact*** on the Canadian economy from the barley sector averaged C$14.4 billion per year.
- Over 107,000 ***full time equivalent jobs*** are supported by the barley sector, comprising 101,000 paid jobs and an additional 6,000 family members (beyond the growers themselves) who support and are supported by barley farming operations.
- The total ***wage impact*** of the sector averaged C$6.1 billion.

The economic benefits from barley increase when prices and output are higher. Barley's economic impact today is therefore at historically high levels.

The report is structured as follows:

- In this section of the report (***Part A***), our focus is on the national-level results.
- Three-year averages of regional-level results are presented in ***Part B*** of the report.
- An ***Appendix*** which details the result and methodology for each stage of the value chain in more detail.

Part A. National Results – Overview

This study evaluates the impact along the value chain for barley via three different metrics:

- ***Economic impact:*** quantifies the value added to the Canadian economy by barley
- ***Employment impact:*** estimates the number of full-time equivalent (FTE) jobs contributed by the barley value chain in Canada
- ***Wage impact***: evaluates the total wages for individuals employed in the value chain

We evaluate the Canadian barley value chain at several distinct steps, tracing the impact through the value-added sectors of malted barley, brewing/distilling and livestock feed.

- For ***barley for malting***, our analysis ends at the point where barley is exported, or where malted barley is 1. brewed into beer within Canada (our "brewing" sector) or 2. loaded on a ship for overseas export or 3. crosses from Canada into the United States for overland export.
- ***Barley for feed*** is treated in the same way, either processed into feed in Canada or exported via ports or overland to the US.

The economic indicators for each step of the value chain are presented at two levels: ***Direct effects*** only, and ***Total effects*** (which is the sum of Direct, Indirect and Induced effects).

- ***Direct effects:*** the economic, employment and wage impacts that can be directly attributed to the barley value chain. These results are calculated by LMC based on models driven by publicly and privately available data, industry knowledge, and interviews with industry stakeholders.
- ***Indirect effects:*** the economic, employment and wage impacts created by those industries that supply the barley value chain, or by individuals who work at the periphery of the sector.
- ***Induced effects:*** the economic, employment and wage impacts that stem from household spending of the income earned from the barley sector.

Note: The indirect and induced effects of the barley sector are estimated based on input-output tables developed by Statistics Canada (StatCan). The use of these multipliers is discussed in greater detail later in the study.

The Canada-level results represent an aggregate sum of the results from the eastern and western regional level analysis.

Table 1: Barley economic impact assessment by value chain component

Step number	Value chain component	Description	Economic impact	Employment	Wages	Multiplier used
1a	Barley farming	Production of barley by farmers using land and inputs like seed, fertilizers and crop protection	yes	yes	yes	yes
1b	Farm family members	Unpaid family members who may indirectly support farm operation. Paid family members would be captured under Step 1a	captured in barley farming	yes	captured in barley farming	no
2	Elevation	Primary elevation of barley	yes	yes	yes	yes
3	Crop delivery	Delivery of crop to elevators, malting houses, feed mills or point of export via truck, rail and barge	yes	yes	yes	yes
4	Malting	Malting barley for use as a primary feedstock in the brewing industry	yes	yes	yes	yes
5	Brewing	Using barley malt for brewing beer	yes	yes	yes	yes
6	Feed milling	Milling barley for use as animal feed	yes	yes	yes	yes
7	Product delivery	Delivery of malt and barley feed to end user or point of export	yes	yes	yes	yes
8	Impact at ports	Loading ocean-going vessels for overseas export	yes	yes	yes	yes

The direct effect of barley on the Canadian economy

The ***direct*** impact of barley on the Canadian economy is illustrated in Diagram 1. This presents the aggregate results for the entire value chain according to our three separate measures: *economic impact*, *employment* and *wage impact.* The data for each measure, broken down by each stage in the value chain, are presented in Tables 2-4.

- Between 2018/19 and 2020/21, ***the direct economic impact of barley on the Canadian economy averaged C$5.4 billion*** (Table 2). This value peaked this year, 2020/21, with higher output and higher prices.

- The ***direct employment impact*** across the barley value chain varies less than the economic impact as it is less influenced by prices. Between 2018/19 and 2020/21, the barley sector was *directly accountable* for an average of over 34,000 paying jobs (Table 3). When additional barley farm family members, who contribute to the overall success of the farming enterprise, are included, ***the number of people directly supported by the barley industry over the same period increases to almost 40,000****.*

- Between 2018/19 and 2020/21, ***the direct wage impact of barley on the Canadian economy averaged C$2.0 billion*** (Table 4).

Diagram 1: Direct effects of barley on the Canadian economy

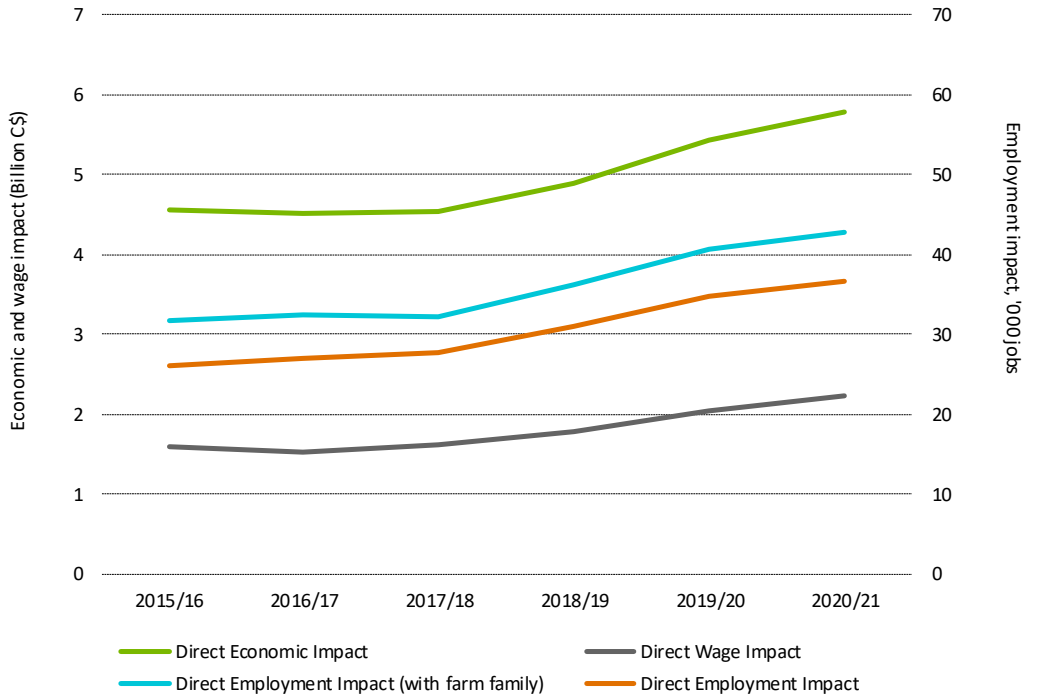


Table 2: Direct economic impact of barley on the Canadian economy (C$ billion)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Average 2018/19 - 20/21
Farming	1.84	1.67	1.62	1.89	2.17	2.59	2.22
Elevation	0.05	0.07	0.08	0.08	0.09	0.12	0.10
Crop delivery	0.23	0.26	0.29	0.31	0.37	0.46	0.38
Malting	0.32	0.32	0.26	0.57	0.54	0.57	0.56
Brewing	1.56	1.63	1.71	1.50	1.59	1.38	1.49
Feed milling	0.47	0.45	0.46	0.41	0.55	0.51	0.49
Product delivery	0.08	0.08	0.08	0.08	0.09	0.10	0.09
Impact at ports	0.02	0.03	0.04	0.04	0.04	0.06	0.05
Direct Economic Impact	**4.57**	**4.51**	**4.54**	**4.89**	**5.44**	**5.78**	**5.37**

Table 3: Direct employment impact of barley on the Canadian economy ('000 jobs)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Average 2018/19 - 20/21
Barley farming	10.95	10.89	9.41	10.57	12.00	12.31	11.63
Elevation	0.23	0.21	0.24	0.25	0.26	0.31	0.27
Crop delivery	0.82	0.85	0.85	0.88	1.08	1.14	1.03
Malting	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Brewing	10.07	10.94	12.99	15.08	17.33	18.60	17.00
Feed milling	3.06	3.06	3.06	3.06	3.06	3.06	3.06
Product delivery	0.32	0.31	0.30	0.29	0.35	0.35	0.33
Impact at ports	0.08	0.11	0.15	0.17	0.16	0.26	0.20
Direct Employment Impact	**26.19**	**27.03**	**27.67**	**30.97**	**34.91**	**36.69**	**34.19**
Additional farm family members	*5.46*	*5.38*	*4.62*	*5.17*	*5.88*	*6.06*	***5.70***
Direct Employment (with farm family)	**31.65**	**32.41**	**32.29**	**36.14**	**40.79**	**42.75**	**39.89**

Table 4: Direct wage impact of barley on the Canadian economy (billion C$)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Average 2018/19 - 20/21
Barley farming	0.81	0.72	0.69	0.79	0.89	0.97	0.88
Elevation	0.02	0.01	0.01	0.02	0.02	0.02	0.02
Crop delivery	0.06	0.07	0.07	0.07	0.09	0.10	0.09
Malting	0.04	0.04	0.04	0.04	0.05	0.04	0.05
Brewing	0.49	0.50	0.62	0.69	0.78	0.87	0.78
Feed milling	0.16	0.15	0.16	0.16	0.17	0.17	0.17
Product delivery	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Impact at ports	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Direct Wage Impact	**1.61**	**1.52**	**1.62**	**1.80**	**2.04**	**2.22**	**2.02**

The total impact of barley on the Canadian economy (direct + indirect + induced effects)

The total effect of barley on the Canadian economy is not limited to the people working directly in the industry. The full impact also accounts for the indirect and induced effects that occur. The results of the total impact (direct + indirect + induced effects) are illustrated in Diagram 2 and in Tables 5-7.

- In 2020/21, the total ***economic impact***, which includes direct, indirect and induced effects, peaked at $15.3 billion. The average economic impact of barley on the Canadian economy over the past three years of full data, 2018/19 to 2020/21, was ***$14.4 billion.***
- The total ***employment effect*** of barley between 2018/19 and 2020/21 averaged over ***107,000***. This includes barley farm family members.
- Over the same period, the ***wage effect*** of barley on the Canadian economy averaged ***$6.1 billion***. When divided by the jobs created, excluding the jobs of barley farm family members, the implied per-capita supported wage was over $50,000.

Table 5: Total economic impact of barley on the Canadian economy (C$ billion)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Average 2018/19 - 20/21
Barley farming	3.67	3.24	3.00	3.88	4.45	5.30	4.54
Elevation	0.09	0.11	0.13	0.14	0.17	0.21	0.17
Crop delivery	0.46	0.51	0.57	0.61	0.71	0.88	0.74
Malting	1.73	1.84	1.50	3.40	3.24	3.40	3.35
Brewing	2.94	2.96	3.14	2.84	3.00	2.60	2.81
Feed milling	2.19	2.13	2.15	2.05	2.72	2.55	2.44
Product delivery	0.18	0.18	0.19	0.20	0.24	0.24	0.23
Impact at ports	0.04	0.05	0.06	0.07	0.07	0.11	0.08
Total Economic Impact	**11.31**	**11.01**	**10.75**	**13.19**	**14.60**	**15.29**	**14.36**

Diagram 2: Total effect of barley on the Canadian economy

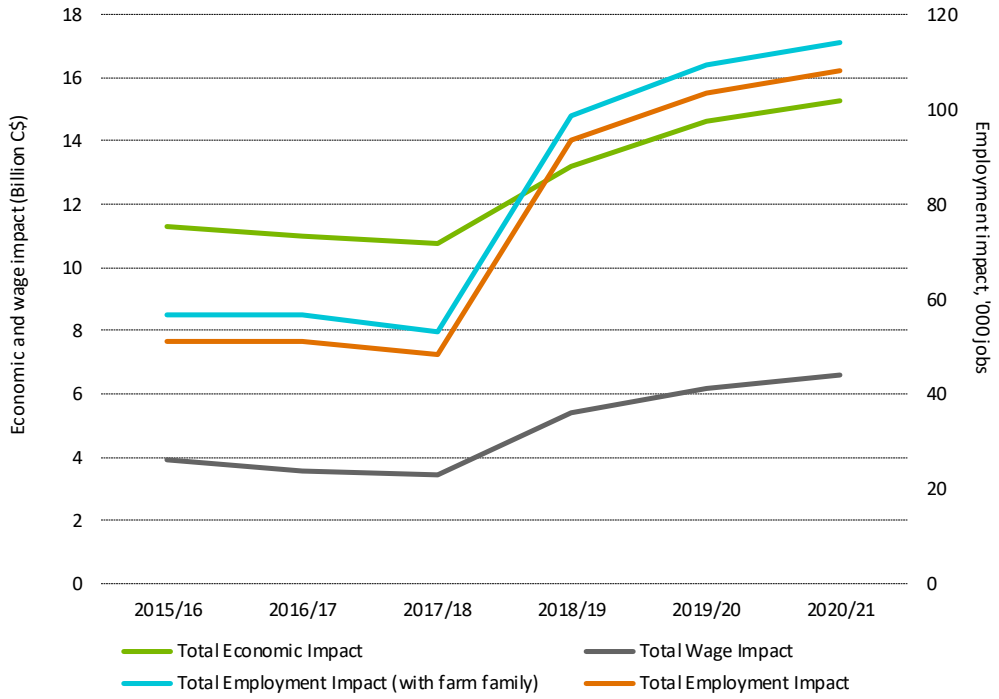


Table 6: Total employment impact of barley on the Canadian economy ('000 jobs)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Average 2018/19 - 20/21
Barley farming	24.10	24.36	20.66	24.77	28.11	28.83	27.24
Elevation	0.34	0.32	0.37	0.38	0.40	0.48	0.42
Crop delivery	2.01	2.12	2.09	2.10	2.57	2.71	2.46
Malting	6.39	6.52	7.24	7.42	7.42	7.42	7.42
Brewing	0.00	0.00	0.00	40.53	46.56	49.99	45.69
Feed milling	17.54	17.01	17.16	17.36	17.36	17.36	17.36
Product delivery	0.76	0.74	0.72	0.68	0.83	0.82	0.78
Impact at ports	0.12	0.17	0.23	0.26	0.25	0.39	0.30
Total Employment Impact	**51.27**	**51.23**	**48.47**	**93.49**	**103.51**	**107.99**	**101.67**
Additional farm family members	*5.46*	*5.38*	*4.62*	*5.17*	*5.88*	*6.06*	*5.70*
Total Employment (with farm family)	**56.73**	**56.61**	**53.09**	**98.66**	**109.39**	**114.05**	**107.37**

Table 7: Total wage impact of barley on the Canadian economy (C$ billion)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Average 2018/19 - 20/21
Barley farming	2.73	2.40	2.24	2.58	2.93	3.18	2.90
Elevation	0.03	0.02	0.02	0.03	0.03	0.03	0.03
Crop delivery	0.13	0.13	0.14	0.14	0.18	0.19	0.17
Malting	0.26	0.25	0.23	0.27	0.34	0.29	0.30
Brewing	0.00	0.00	0.00	1.63	1.84	2.06	1.84
Feed milling	0.75	0.68	0.73	0.72	0.78	0.78	0.76
Product delivery	0.04	0.04	0.04	0.04	0.05	0.05	0.05
Impact at ports	0.01	0.01	0.02	0.02	0.02	0.03	0.02
Total Wage Impact	**3.93**	**3.54**	**3.42**	**5.42**	**6.17**	**6.62**	**6.07**

Methodology: Use of multipliers to evaluate indirect and induced impacts

The direct effects of barley on the Canadian economy are significant. Nonetheless, they ignore the important economic effect that a core industry generates via a ripple effect on supporting industries. This is known as the **indirect** effect. For some steps in the barley value chain, the indirect effect can be significant.

This is especially true for capital-intensive aspects of the sector, such as malting and brewing. Many jobs associated with keeping a facility operational, from white collar jobs in engineering to trade professions like electricians, plumbers and pipefitters, are done on a contractual basis with outside firms, making the true impact of the processing facility much higher.

Similarly, direct effects fail to capture the economic activity stemming from expenditures of households drawing a salary from a given sector. While these "**induced**" effects are typically smaller than indirect effects, they can still constitute a sizeable economic force, particularly in a local area.

These economic and employment spin-offs are known as the ***multiplier effect*** in established economic literature. Multipliers measure the impact on the broader economy from an exogenous shock to a specific sector of the economy.

In this report, we employ different multipliers for the economic, employment, and wage effects, and the size of the multiplier effect also varies geographically and across different subsectors of the barley value chain. Fortunately, ***Canada maintains industry multipliers at a detailed sectoral level.***

How StatCan multipliers have been used in this study

Statistics Canada's Industry Accounts Division has estimated over 250 economic multipliers.

We adopt national-level multipliers throughout when estimating the total impact of barley on the Canadian economy. This ensures a level playing field for the regions in the study.

Canadian multipliers are available for each of our impact measures, i.e. 1) economic impact, 2) employment impact and 3) wage impact, at the direct, the direct+indirect, and the direct+indirect+induced levels.

Multipliers change over time

One challenge associated with using multipliers for sophisticated economies, like Canada, is that multipliers can change over time to reflect not only new economic realities, but also methodological developments. Also, constructing multiplier tables is both data and labor-intensive, resulting in infrequent reporting. As of the writing of this study, the most recent multipliers available were from 2018 (Table 8).

Table 8: National-level multipliers derived from StatCan input-output tables

		Multipliers		
Value-added activity	StatCan Industry Designation	Economic Impact	Employment Impact	Wages Impact
Farming	Crop Production	2.05	2.34	3.28
Elevation	Warehousing and Storage	1.77	1.53	1.51
Rail Transport	Rail Transportation	1.64	2.39	1.84
Truck Transport	Truck Transportation	2.89	2.35	2.41
Barge Transport	Water Transportation	3.31	3.16	2.57
Malting	Grain and Oilseed Milling	6.00	11.25	6.63
Brewing	Breweries	1.89	2.69	2.36
Feed milling	Animal Food Manufacturing	4.96	5.67	4.54
Port Activities	Warehousing and Storage	1.77	1.53	1.51

Part B. Regional Results – Overview

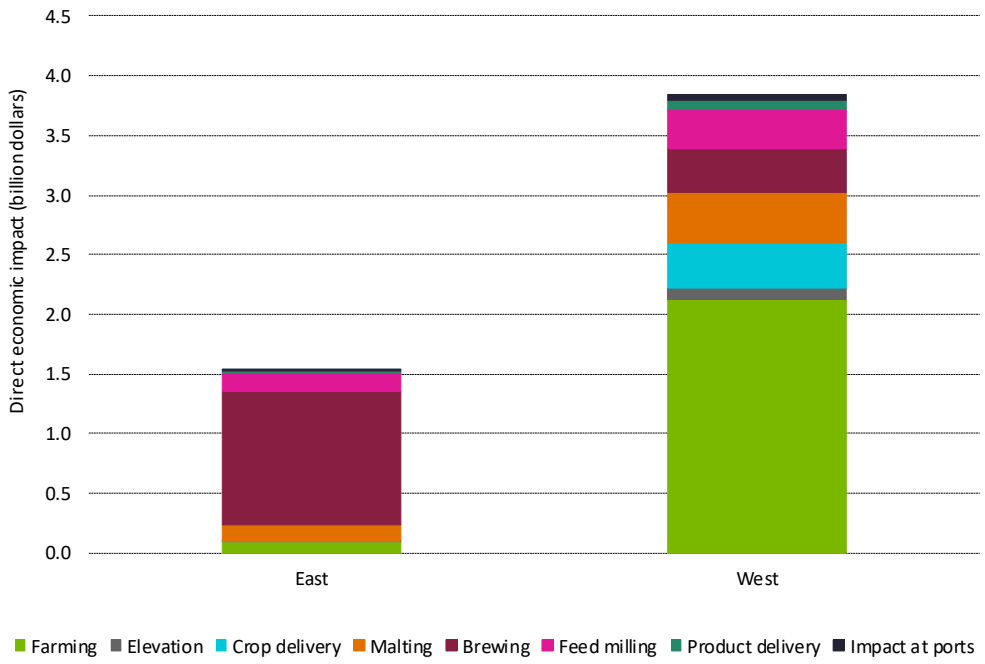
The direct effect of barley on Canadian regional economies

Unsurprisingly, the Western region dominates the ***direct economic impact*** of Canadian-grown barley. It is both the production center of barley — with almost all crop output taking place in Saskatchewan and Alberta —and home to much of the country's barley malting capacity, although the vital brewing sector is located largely in the more populous eastern region.

Table 9: Direct economic impact by region (C$ million), average 2018/19–2020/21

	East	West	Canada
Farming	87.6	2,130.3	2,217.9
Elevation	-	97.3	97.3
Crop delivery	4.8	374.3	379.1
Malting	134.1	424.1	558.2
Brewing	1,122.4	364.9	1,487.2
Feed milling	156.4	335.5	491.9
Product delivery	24.7	66.6	91.4
Impact at ports	0.0	46.8	46.9
Direct Economic Impact	**1,530.0**	**3,839.8**	**5,369.8**

Diagram 3: Direct economic impact by region, average 2018/19–2020/21

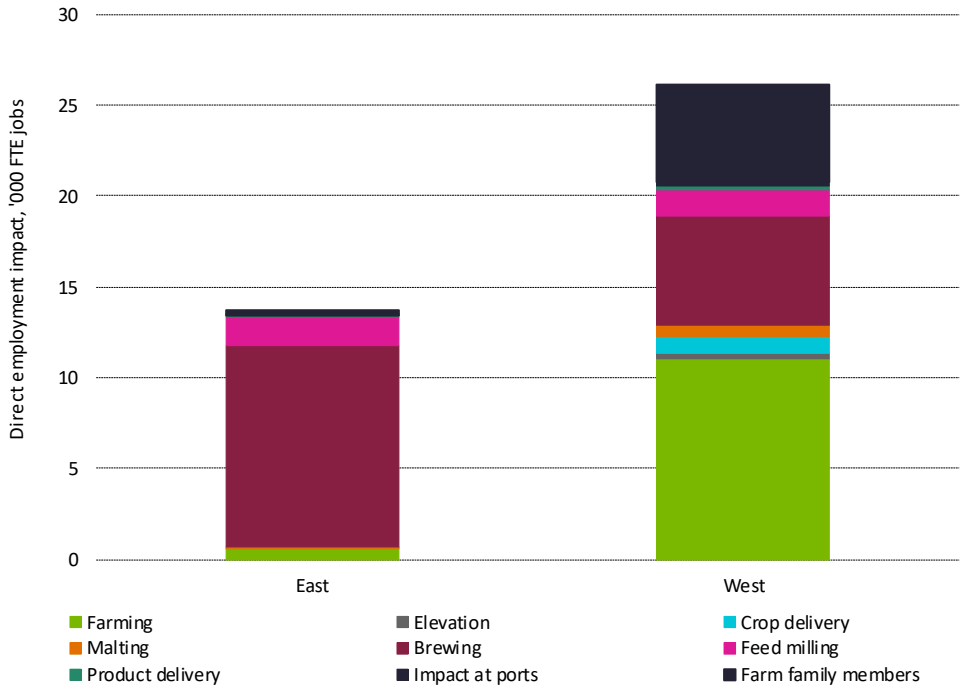


The Prairies also have a higher ***employment impact*** from barley, although the eastern region gains many jobs from the relatively labor-intensive brewing sector. In the Western region, 26,000 people are directly employed in the barley sector when barley farm family members are included.

Table 10: Direct employment impact by region (full time equivalent jobs), average 2018/19–2020/21

	East	West	Canada
Farming	596	11,033	11,629
Elevation	-	274	274
Crop delivery	39	994	1,034
Malting	102	558	660
Brewing	11,000	6,005	17,004
Feed milling	1,607	1,456	3,062
Product delivery	100	229	329
Impact at ports	0	196	197
Direct Employment Impact	**13,444**	**20,745**	**34,189**
Farm family members	*289*	*5,411*	*5,701*
Total Employment (with farm family)	**13,734**	**26,156**	**39,890**

Diagram 4: Direct employment impact by region, average 2018/19–2020/21

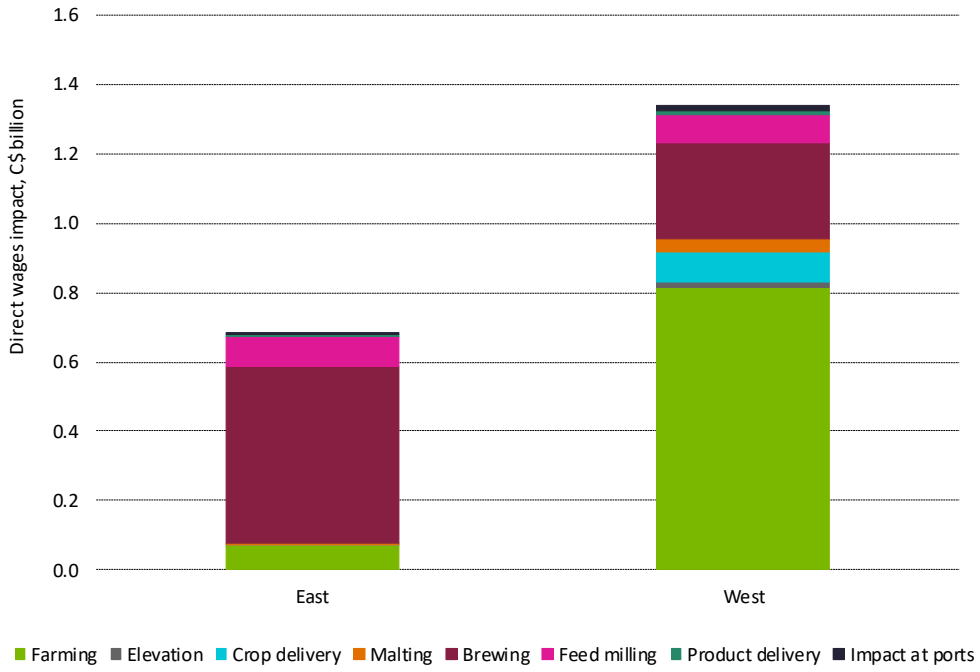


Finally, of the $2.0 billion in ***direct wages*** derived from barley, $1.3 billion are paid in the Western provinces.

Table 11: Direct wage impact by region (C$ million), average 2018/19–2020/21

	East	West	Canada
Farming	71.4	811.9	883.3
Elevation	-	18.9	18.9
Crop delivery	2.2	84.9	87.1
Malting	7.0	38.6	45.6
Brewing	505.5	276.0	781.5
Feed milling	87.7	79.4	167.1
Product delivery	5.8	14.7	20.5
Impact at ports	0.0	16.3	16.4
Direct Wage Impact	**679.6**	**1,340.9**	**2,020.5**

Diagram 5: Direct wage impact by region, average 2018/19–2020/21



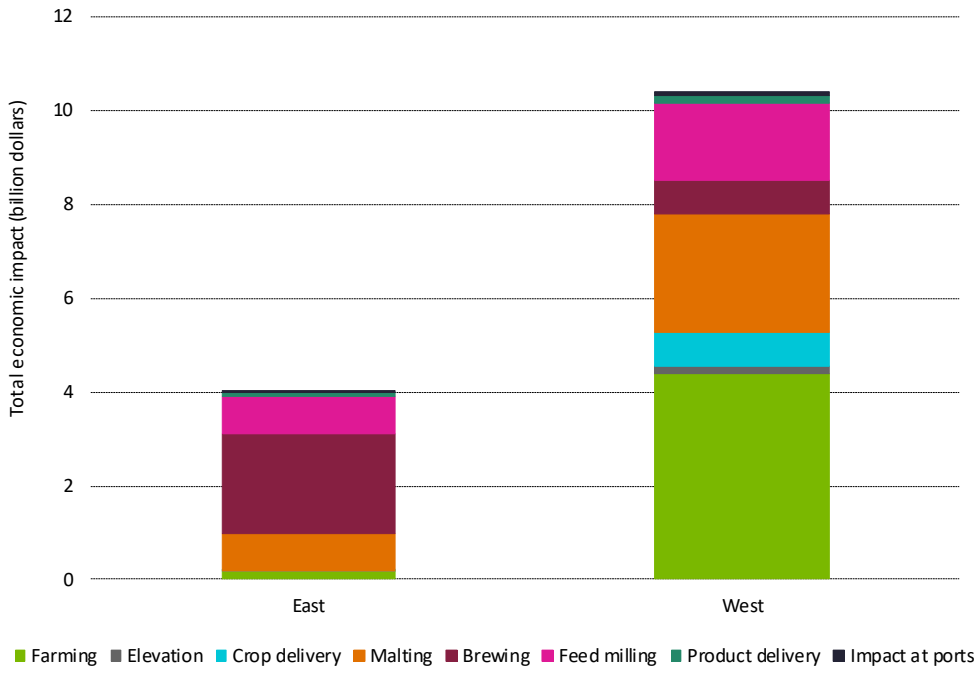
The total effect of barley on Canadian regional economies

Table 12: Total economic impact by region (C$ million), average 2018/19–2020/21

	East	West	Canada
Farming	179.4	4,362.8	4,542.2
Elevation	-	172.6	172.6
Crop delivery	13.9	722.0	735.8
Malting	804.1	2,543.3	3,347.4
Brewing	2,123.5	690.3	2,813.9
Feed milling	776.4	1,665.4	2,441.8
Product delivery	66.9	160.4	227.3
Impact at ports	0.0	83.1	83.1
Total Economic Impact	**3,964.3**	**10,399.9**	**14,364.2**

Applying the indirect and induced multiplier effects does little to change the relative effects of barley on Canada's provinces. Of the $14.4 billion total economic impact of barley on the Canadian economy, $10.4 billion stems from the Western provinces, although brewing, malting and feed milling are significant contributors in the east.

Diagram 6: Total economic impact by region, average 2018/19–2020/21

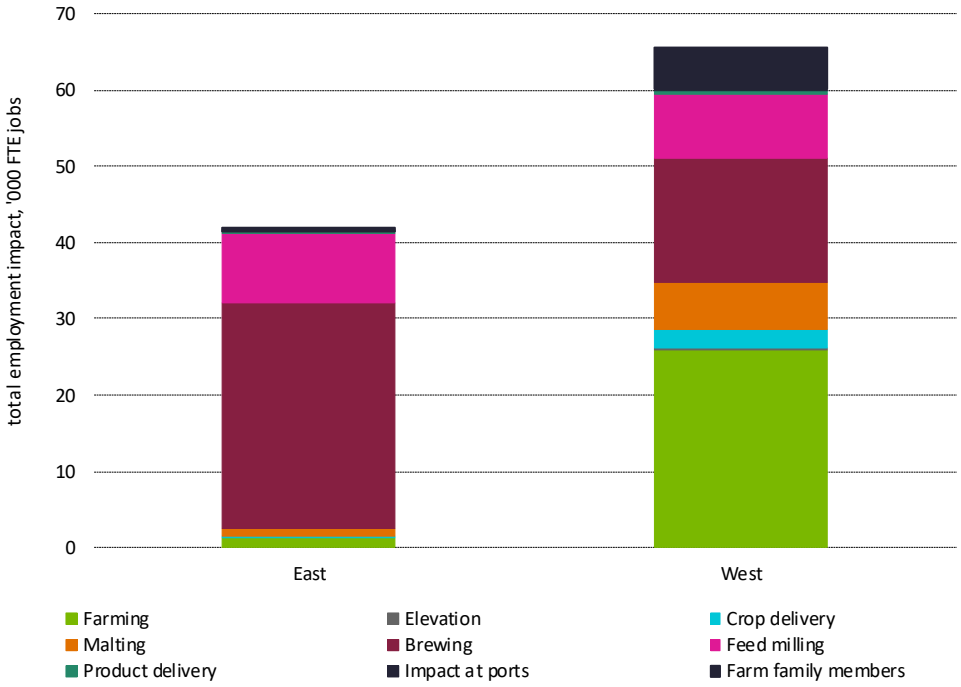


Of the 107,000 Canadian people supported by the barley sector (a figure including farm family members), roughly 65,000 are in the Western Canada region.

Table 13: Total employment impact by region (full time equivalent jobs), average 2018/19–2020/21

	East	West	Canada
Farming	1,397	25,838	27,235
Elevation	-	418	418
Crop delivery	93	2,365	2,458
Malting	1,145	6,279	7,424
Brewing	29,556	16,134	45,690
Feed milling	9,111	8,254	17,365
Product delivery	236	540	776
Impact at ports	0	300	300
Total Employment Impact	**41,538**	**60,128**	**101,666**
Farm family members	*289*	*5,411*	*5,701*
Total Employment (with farm family)	**41,827**	**65,540**	**107,367**

Diagram 7: Total employment impact by region, average 2018/19–2020/21

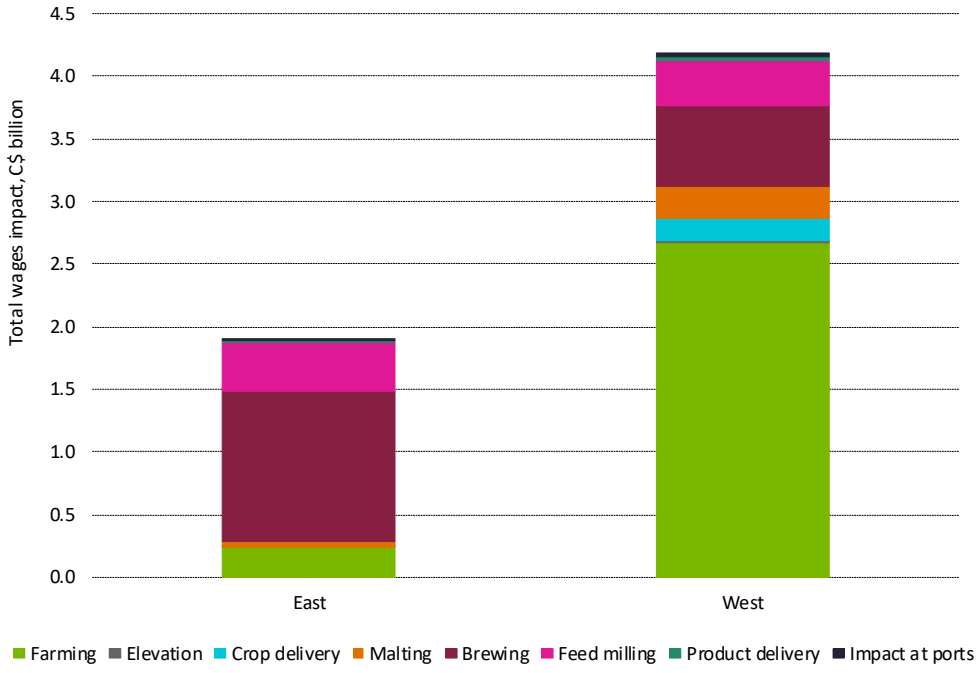


Lastly, of the $6.1 billion in total wages attributable to barley, on average between 2018/19 and 2020/21, $4.1 billion stems from the barley industries of Western Canada, dominated by the prairie provinces.

Table 14: Total wage impact by region (C$ million), average 2018/19–2020/21

	East	West	Canada
Farming	233.9	2,661.6	2,895.5
Elevation	-	28.5	28.5
Crop delivery	5.3	166.4	171.7
Malting	46.7	255.9	302.5
Brewing	1,192.0	650.8	1,842.7
Feed milling	398.0	360.6	758.6
Product delivery	13.8	33.0	46.7
Impact at ports	0.0	24.6	24.6
Total Wage Impact	**1,889.6**	**4,181.2**	**6,070.8**

Diagram 8: Total wage impact by region (C$ billion), average 2018/19–2020/21



Appendix: Detailed Results by Step in the Barley Value Chain and Methodology

Below, we present our provincial-level results in further detail and discuss the methodology employed in accounting for direct economic, employment and wage impacts across the distinct steps in the barley value chain.

Barley farming

Barley farming is the foundation of the barley value chain in Canada and accounts for the largest share of the economic impact and, because much of the crop is exported before processing, the majority of barley employment in Canada.

Impact

- The direct economic impact of barley farming averages $2.2 billion over the last three years, with the total economic impact estimated at $4.5 billion. This impact is concentrated in the prairie provinces of our Western region.
- Barley farming directly employs over 11,500 paid individuals. This figure does not include barley farm family members (see next section). When the indirect and induced multipliers are applied, the total employment impact of barley farming is estimated at over 27,000.
- $0.9 billion in wages are directly attributable to barley farming. For growers, this includes profits from the barley share of their farm, while for hired labor it comprises wages paid out by growers. Including indirect and induced effects, the total wage impact of barley farming is $2.9 billion.

Table 15: Impact of Canadian barley farming and production, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	87.6	2,130.3	2,217.9
Total economic impact (C$ million)	179.4	4,362.8	4,542.2
Direct employment (FTE jobs)	596	11,033	11,629
Total employment (FTE jobs)	1,397	25,838	27,235
Direct wages (C$ million)	71.4	811.9	883.3
Total wages (C$ million)	233.9	2,661.6	2,895.5

Methodology

We determine the economic impact of barley farming by considering the ***barley revenues*** earned by farmers; i.e. volumes produced multiplied by prices received.

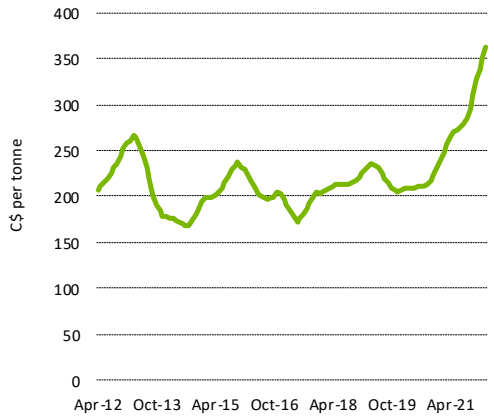
Unlike the other sectors in our analysis, *this calculation does not estimate the value added by the sector*: to do this, we would have to subtract barley farming *costs* from barley farming revenues. However, if we did that, we would fail to capture the economic impact of the wide array of inputs used in barley farming, such as seed, fertilizers and crop protection. To include these would necessitate a multitude of value-added calculations for each input into barley farming.

The best way to view the barley ***farming impact*** in this report, therefore, is to view this as ***a summation of all the value added by all the sectors up to and including the barley farming stage***.

The value of barley farming is determined by two main factors:

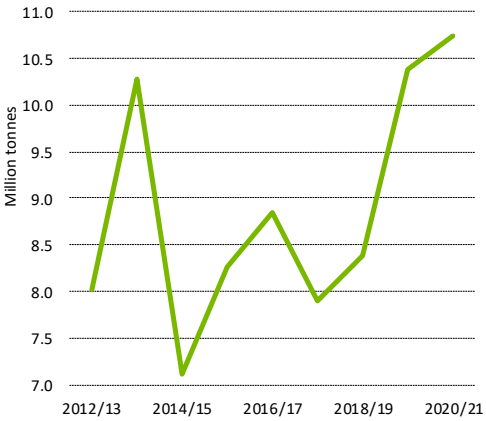
- ***Barley prices:*** The trajectory of Canadian barley prices demonstrates the current pricing peak. We use farmgate barley price series from Statistics Canada, which are weighted for feed and food grades according to production volumes of each across the different regions.
- ***Barley output:*** Canadian barley production shows the upturn in the last couple of years.

Diagram 9: Canadian farmgate barley prices



Source: StatCan.

Diagram 10: Canadian barley output



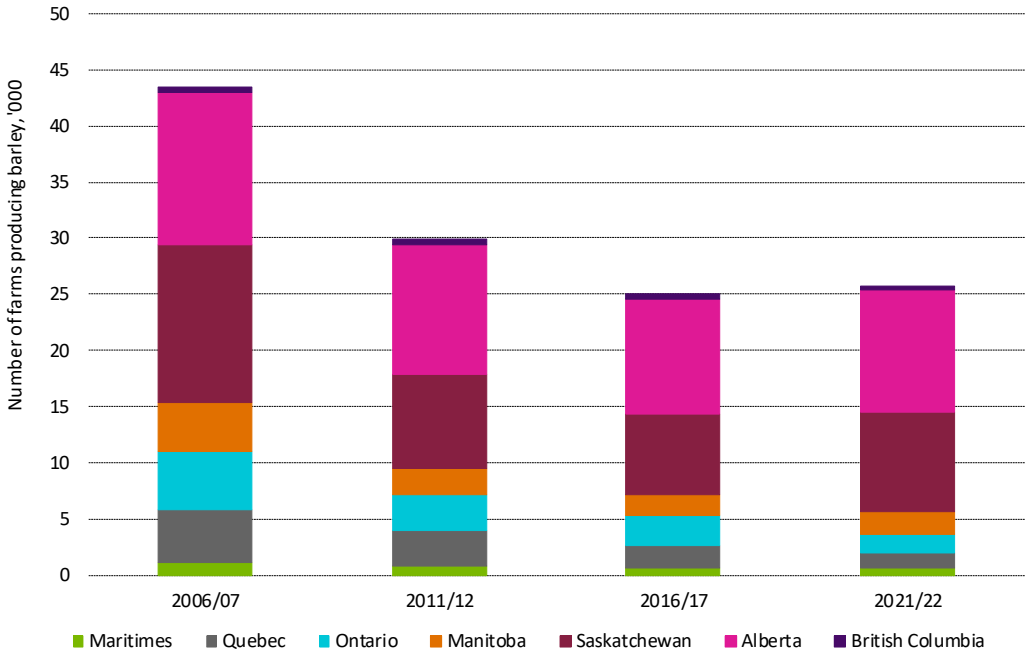
Source: StatCan.

For this study, we took paid barley farm employment to be a combination of growers and paid labor. While many growers may hire an immediate family member (such as a son or daughter), we assumed that *hired* labor was primarily found outside the immediate family. The employment effect on unpaid immediate family members is captured in the next section.

Estimating ***grower employment*** in barley farming was done on the basis of the barley area as a proportion of the total field crop area in Canada. This percentage was then applied to the total number of field crop farms in Canada, assuming that there is one full time farmer per farm. This data series is constructed every five years, with the last data from 2021/22.

Barley's share of farm earnings was used to represent a grower's ***barley wage***. Barley earnings were based on the average farm earnings for grain and oilseed farmers, from a data series available from StatCan. To account for the barley share of those earnings, we divided average barley acreage per farm by the average farm size.

Diagram 11: Number of farms growing barley in Canada



Source: StatCan.

Estimates for ***hired labor*** were based on crop budgets developed by agricultural ministry extension specialists from across the Prairie Provinces. While there was some variability in these budgets in terms of labor requirements, the data was fairly tightly clustered at around 1.6 man-hours per acre of barley. By multiplying the number of barley acres by 1.6 and dividing by 2,000 (50 weeks x 40 hours/week), we arrived at the number of hired hands working on barley farms on a full-time basis annually.

Wages for hired labor were also taken from StatCan, with total wages paid being the product of the number of hired workers and the prevailing wage.

Table 16: Number of hired workers dedicated to barley

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Maritimes	78	65	63	66	58	70	53	56
Quebec	141	110	101	103	105	108	98	101
Ontario	96	88	92	83	64	72	81	72
Manitoba	408	256	360	333	212	259	269	332
Saskatchewan	2,024	1,616	1,872	1,980	1,860	2,154	2,520	2,500
Alberta	2,960	2,600	2,800	2,731	2,280	2,491	2,850	2,929
British Columbia	52	43	48	46	34	40	50	59
Canada	**5,759**	**4,778**	**5,336**	**5,341**	**4,613**	**5,195**	**5,922**	**6,049**

Barley farm family members

Estimating the employment impact of an agricultural commodity presents the added challenge of how to account for farm family members other than the growers themselves. In some families, spouses and children may provide just a supporting role in farm operations, be it through keeping the books, buying supplies, or providing labor on an occasional basis. For other families, however, spouses and grown children may work on a nearly full-time basis, supported by farm revenues and, in the case of grown children, possibly working as a means ultimately to acquire the farm from their parents.

Impact and methodology

To account for this impact, we have included a sub-category in our employment estimates for ***barley farm family members***. As labor that is unpaid in the traditional sense, this category is differentiated from the rest of our employment estimates across the barley value chain, which represent workers who draw a cash wage from working in the barley sector. Consequently, the total employment effect in this study is presented with and without this number. Note that the figure provides an estimate of the additional farm family members supported by barley production: *it is not intended as an estimate of the family members employed by barley activities on the farm*.

A number of data sets detail the average size of Canadian families over time, maintained by StatCan. One series suggests an average Canadian farm family size of 3.1 resident persons. Using this series would, therefore, imply that for every grower, there are just over two additional farm family members. These family members are supported by *all* crops grown on the farm, and therefore we assume just over one farm family member is supported by each full time (FTE) barley farmer. Because these family members are assumed to be uncompensated through wages, ***no indirect or induced multiplier has been applied to this group and totals are the same whether looking at direct or total impacts***.

Lastly, we note that the economic impact associated with these workers has been captured under the previous heading “barley farming.”

Table 17: Impact of barley farm family members, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	n.a.	n.a.	n.a.
Total economic impact (C$ million)	n.a.	n.a.	n.a.
Direct employment (FTE jobs)	289	5,411	5,701
Total employment (FTE jobs)	289	5,411	5,701
Direct wages (C$ million)	n.a.	n.a.	n.a.
Total wages (C$ million)	n.a.	n.a.	n.a.

Primary elevation

According to Canadian Grain Commission data, most of the barley moved off-farm in Canada is delivered to primary elevators, with the balance being delivered directly to processors. At the elevators, barley (and other grains) are stored until needed 1) by domestic malting or feed mills, 2) for overland export to the US or Mexico, or 3) for delivery to Canadian ports for overseas export.

Impact

- The direct economic impact of barley elevation in Canada averaged over $97 million between 2018/19 and 2020/21. The total economic impact, meanwhile, is estimated at $172 million.
- An estimated 270+ people are directly employed in primary barley elevation. When indirect and induced effects are included, the total effect is estimated at over 400 jobs.
- Lastly, wages directly attributable to primary barley elevation are calculated around $19 million over the observed time frame, with the total wage effect estimated at over $28 million.

Table 18: Impact of primary barley elevation, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	0.0	97.3	97.3
Total economic impact (C$ million)	0.0	172.6	172.6
Direct employment (FTE jobs)	0	274	274
Total employment (FTE jobs)	0	418	418
Direct wages (C$ million)	0.0	18.9	18.9
Total wages (C$ million)	0.0	28.5	28.5

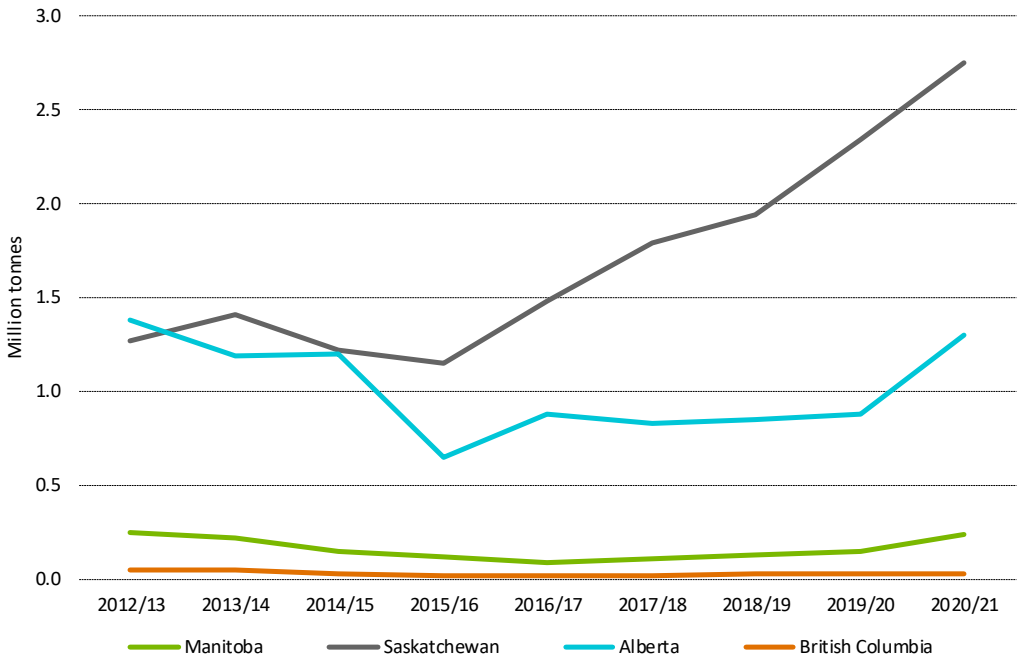
Methodology

The economic impact of barley elevation was determined by the product of volumes of barley being elevated and fees incurred for primary elevation. For the Prairie Provinces, elevated barley volumes were determined by data available through the *Canadian Grain Commission*, with the numbers modified slightly to reconcile with information on internal barley trade flows within the country. Elsewhere, the volumes of barley passing through elevators (versus being delivered directly to processing facilities) were derived based on conversations with industry stakeholders. We estimate very small volumes of elevation outside of the Prairies.

- We estimate approximately four million tonnes of barley now passes through primary elevation facilities in Canada, rising over the past few years. Note that much of this is subsequently exported rather than being processed domestically.
- Primary elevation fees were also obtained from the *Canadian Grain Commission* based on annual surveys they conduct on the costs of moving grain to point of export. Total fees, for receiving, removal of dockage and storage, typically range from $20-$25 per tonne over the period.

To understand the employment impact of primary barley elevation, we began with a *"Working in Canada"* report developed by the Canadian government. This identifies 6,250 individuals employed in the elevation of all agricultural commodities in Canada. The barley share of this total was calculated by multiplying the total jobs figure by the ratio of barley in commercial positions over all grains in commercial positions. Salaries for these positions were based on a *StatCan* series for jobs in grain processing and handling.

Diagram 12: Estimated producer deliveries of Canadian barley to elevators



Source: Canadian Grain Commission.

Barley and barley product delivery

Barley transport comprises delivery of:

- ***Crop delivery:*** transporting the barley crop to elevators, to food (malting and distilling) and feed processors, and transporting the crop to overseas export ports and overland to the US.
- ***Malted barley delivery:*** transporting malted barley to domestic breweries and distilleries, and exporting malted barley.
- ***Barley feed delivery:*** transporting barley feed (after the feed mill) to domestic users and potentially to overseas export ports and overland to the US.

Within Canada we assume that:

- The barley crop and its products are transported between provinces (i.e. inter provincial transfers) predominantly by rail.
- The barley crop delivered directly to processing facilities is transported by truck.
- We assume a negligible volume of the crop is delivered by barge/laker vessels.

Impact – crop delivery

The majority of the barley crop is delivered to elevators for rail shipment to 1) Canadian ports, 2) the US border, or 3) processing facilities within Canada, while a portion is also delivered by farmers directly to facilities within Canada.

The economic impact of barley deliveries is presented separately for rail and truck. For domestic transport, because transport networks are nationwide rather than being fixed at a single point (unlike malting, for example), ***transportation effects are presented on the basis of where the barley originates***, rather than being allocated across the path in which the barley travels or where it might be delivered. In effect, this means the west captures the crop delivery benefits as negligible barley production occurs in the eastern region.

Table 19: Impact of barley crop transportation, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	4.8	374.3	379.1
by rail	0.0	288.2	288.3
by truck	4.8	86.0	90.8
Total economic impact (C$ million)	13.9	722.0	735.8
by rail	0.1	473.6	473.6
by truck	13.8	248.4	262.2
Direct employment (FTE jobs)	39	994	1,034
by rail	0	668	668
by truck	39	327	366
Total employment (FTE jobs)	93	2,365	2,458
by rail	0	1,596	1,596
by truck	93	769	862
Direct wages (C$ million)	2.2	84.9	87.1
by rail	0.0	66.7	66.7
by truck	2.2	18.2	20.4
Total wages (C$ million)	5.3	166.4	171.7
by rail	0.0	122.4	122.4
by truck	5.3	44.0	49.3

- ***Rail:*** The direct economic impact of rail transportation of the barley crop in Canada averages almost $290 million between 2018/19 and 2020/21, while the total rail impact, including indirect and induced impacts, is estimated at $470 million.
- ***Rail:*** Over 660 individuals are employed directly in the rail transportation of barley, with a total employment impact of close to 1,600 jobs.
- ***Rail:*** Wages directly attributable to rail transportation of the barley crop amount to $67 million, with the total wage impact estimated at over $120 million.
- ***Truck:*** The direct economic impact of barley transportation by truck, which includes trucking to elevators in addition to trucking directly to processing facilities, averaged over $90 million annually between 2018/19-2020/21. The total impact, meanwhile, is estimated at over $260 million.

- ***Truck:*** The direct employment impact of barley transportation by truck averaged nearly 370 jobs over the observed timeframe. When indirect and induced multipliers are applied, we calculate the total impact to exceed 860 jobs supported.

- ***Truck:*** More than $20 million in annual wages were earned directly through barley trucking over the observed three-year time frame. At the same time, the total wage impact from trucking the barley crop was calculated to be almost $50 million.

Impact – product delivery

For barley product transportation, we cover transport of malted barley (after the maltster) and feed barley (after the feed mill) by rail and truck for domestic use and for export. As with transport of the barley crop, for domestic transport the ***transportation effects are allocated to where the barley originates rather than the destination.*** Barley livestock feed (post feed milling) is assumed to have negligible exports.

We also assume negligible quantities of malted barley and processed barley feed are transported by laker, and therefore exclude lakers from this category: *note that this makes no difference to the total, as if we did allocate some malted barley to laker transport, we would have to simultaneously reduce the figure for rail or trucks.*

Table 20: Impact of malted barley and barley feed product transportation, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	24.7	66.6	91.4
malted barley by rail	3.6	25.7	29.3
malted barley by truck	2.4	0.7	3.1
barley feed by truck	18.8	40.2	59.0
Total economic impact (C$ million)	66.9	160.4	227.3
malted barley by rail	6.0	42.2	48.2
malted barley by truck	6.8	2.1	8.9
barley feed by truck	54.1	116.1	170.3
Direct employment (FTE jobs)	100	229	329
malted barley by rail	5	44	49
malted barley by truck	11	3	14
barley feed by truck	85	182	266
Total employment (FTE jobs)	236	540	776
malted barley by rail	12	105	117
malted barley by truck	25	8	33
barley feed by truck	199	427	626
Direct wages (C$ million)	5.8	14.7	20.5
malted barley by rail	0.5	4.4	4.9
malted barley by truck	0.6	0.2	0.8
barley feed by truck	4.7	10.1	14.9
Total wages (C$ million)	13.8	33.0	46.7
malted barley by rail	0.9	8.1	9.0
malted barley by truck	1.4	0.4	1.9
barley feed by truck	11.4	24.5	35.9

- The economic impact of transportation of malted barley and barley feed products in Canada is limited by the size of the domestic market compared with international exports. Nonetheless, the direct economic impact in Canada averages $91 million in 2018/19-2020/21, while the total impact, including indirect and induced impacts, is estimated at almost $230 million.
- Around 330 individuals are employed directly in the transportation of barley products, with a total employment impact of 770 jobs.
- Wages directly attributable to transportation of barley products amount to $20 million, with the total wage impact approaching $50 million.

Transport methodology

With near-infinite combinations of farm origins and end-use destinations, determining the economic impact of transportation of barley and its products is the most complicated aspect of our economic impact model.

For rail and trucking transport:

- The first step is to determine the inter-provincial trade flows of each product. To do this, we estimated provincial-level processing for malted barley and feed (see the sections on Malting and Feed Milling), and for brewing, and an average distance feed is transported to livestock units (which we assume is always within province).
- The next step is to compile a distance matrix between the centers of barley production, barley processing and points of export (port facilities).

Note: Overseas exports are assigned to a province only if the barley left from a port located in that province. Hence, the overseas exports category is zero for Alberta and Saskatchewan where no port facilities exist.

Trucking

Trucking barley and its products was dealt with as follows:

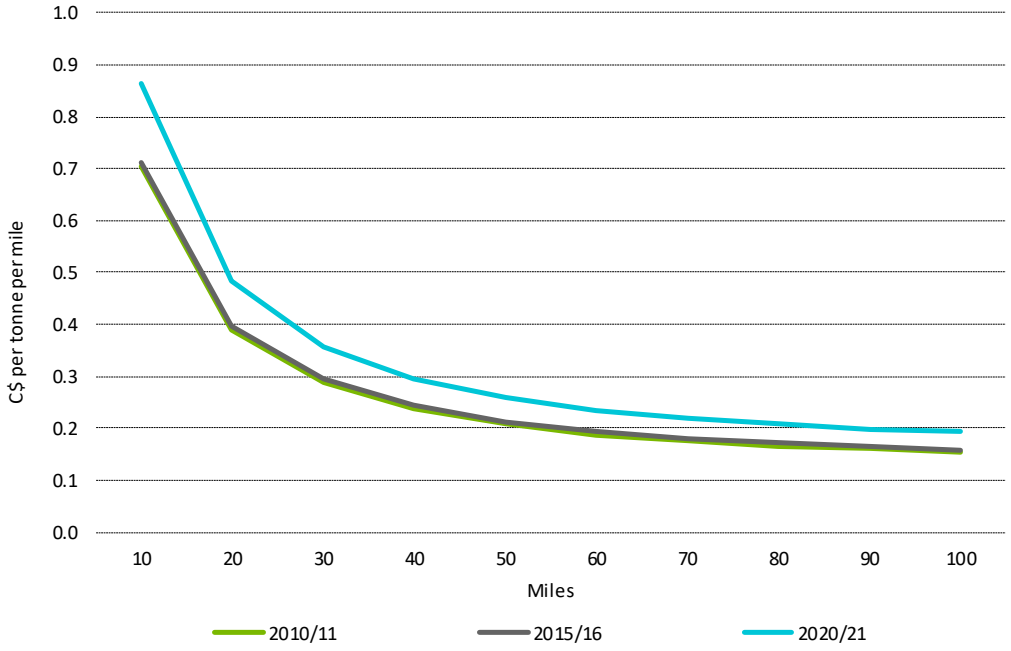
- ***Barley volumes trucked from farm to elevator*** were based on the volumes of barley passing through elevators (see previous section). These data were obtained in part from the Canadian Grain Commission.
- Barley that does not pass through a primary elevator was accounted for in ***volumes trucked directly to malting and commercial feed facilities***.
- All barley livestock feed volumes were assumed to be trucked *within* a province over an average distance derived from industry interviews.

For the Prairie Provinces, the average distance trucked from farm to elevator was determined by dividing the number of square miles of barley planted by the volume of barley harvested. For Quebec, Ontario and British Columbia, where barley production is smaller and more isolated, the average distance to elevators was determined in conversations with individuals with local expertise.

Distances for barley trucked directly from farm to processing facilities and from maltsters to brewing facilities were determined using the average distance between the geographic centers of production in a province and processing facilities situated within that province.

Volumes were multiplied by distances to arrive at a figure in tonne-miles. This, in turn, was multiplied by a tonne-mile trucking rate sourced from StatCan to derive a final trucking expenditures number.

Diagram 13: Estimated Canadian trucking rates



The direct ***employment*** impact of barley and barley product trucking was calculated from the tonne-miles of barley delivered by truck. This was converted to a full-time employment impact by assuming that a typical truck (with one driver):

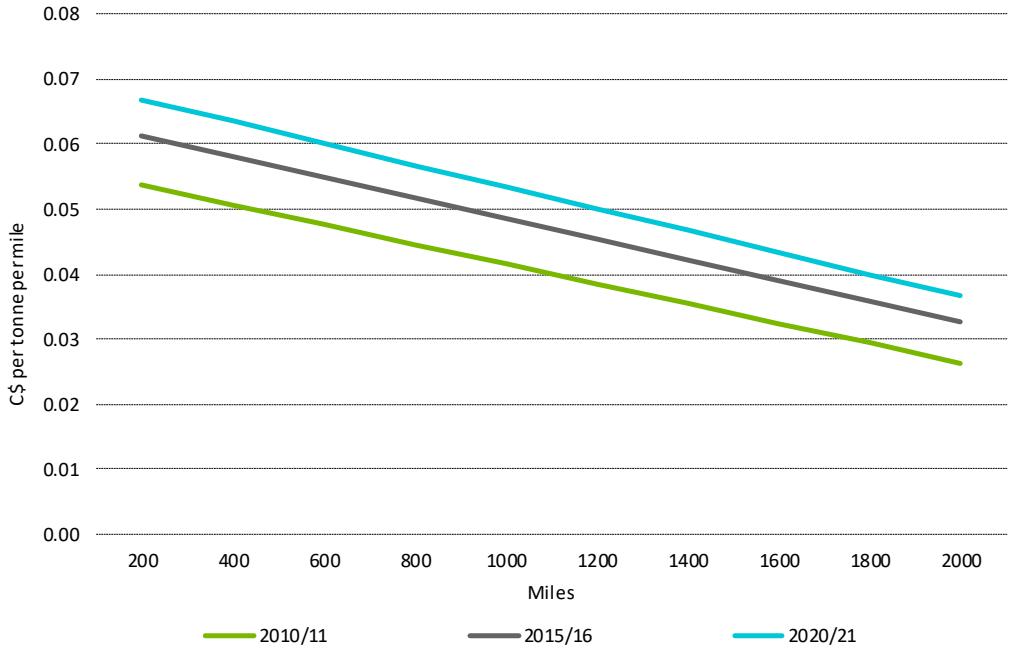
- Transports 18 tonnes of cargo
- Averages 40 miles per hour
- A full-time trucker drives 2,000 hours per year
- Trucking wages were obtained from StatCan data

Rail

Our calculations on rail expenditures also begin with estimates of provincial barley trade flows with the US and net inter-provincial rail trade.

The inter-provincial trade estimates provide us with an estimate for tonne-miles of barley products transported. The tonne-mile figure is then multiplied by a range of rail freight rates (which tend to be higher for shorter distances and lower for longer distances, as Diagram 12 illustrates) to arrive at an estimate of rail freight expenditures.

Diagram 14: Trended range in Canadian rail rates



For ***employment***, according to the *Railway Association of Canada*, roughly 33,000 individuals are employed in freight rail in Canada, a number that has fallen slightly over the last decade. Using the *Association* estimate of tonne-miles of cargo transported in Canada annually, to estimate the number of individuals directly employed in the rail transportation of barley, we *multiplied total freight rail employment by the ratio of* barley *tonne-miles to total freight tonne-miles*.

Rail ***wages*** were also obtained from the *Railway Association of Canada* and multiplied by jobs to determine the direct wage impact.

Food milling: adding value to barley in malting

Impact

- The direct economic impact of malting on the Canadian economy is $558 million. The total economic impact, including indirect and induced impacts, is much higher because of the high multiplier applied in processing sectors, at $3.3 billion.
- 660 individuals are directly employed in malting. However, as a capital-intensive sector that relies heavily on contracted workers, the total employment impact of malting is also much higher, supporting over 7,400 jobs.
- $45 million in wages are paid out to individuals directly employed in malting. Like the employment impact, however, the total wage impact of malting is much higher, in excess of $300 million.

Table 21: Impact of malting of barley, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	134.1	424.1	558.2
Total economic impact (C$ million)	804.1	2,543.3	3,347.4
Direct employment (FTE jobs)	102	558	660
Total employment (FTE jobs)	1,145	6,279	7,424
Direct wages (C$ million)	7.0	38.6	45.6
Total wages (C$ million)	46.7	255.9	302.5

Methodology

The economic impact of the malting sector is determined based on the value it adds from processing barley into malt. This is done on a regional level by estimating the volume processed at each processing facility in Canada.

Once malting volumes are estimated, we have to choose representative barley and malted barley prices in order to derive the processing value added. We used import unit values (EUVs) for both prices in order to provide a common basis for the gross margin. The ***total economic impact*** of malting was then taken to be the product of volumes of barley malted and the EUVs of value added.

The ***employment*** impact of malting was determined via discussions with employees of the major mills in Canada as well as through press releases citing the number of individuals employed in a given facility.

The average ***wages*** for employees of processing facilities was obtained from StatCan data.

Diagram 15: Canadian malting, total output volume

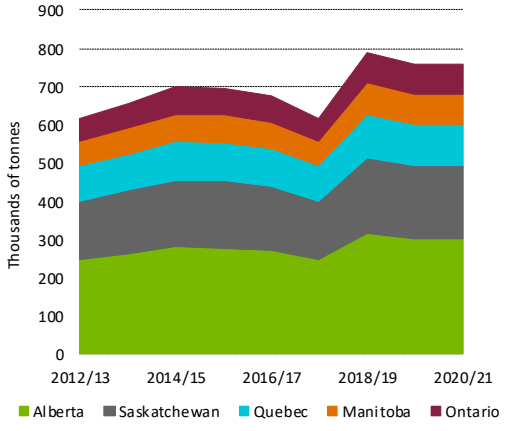
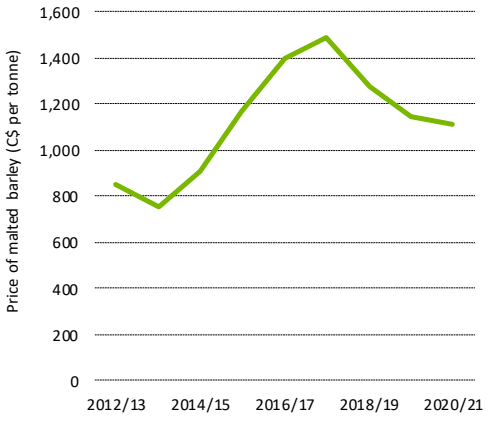


Diagram 16: Price of malted barley, Canada



Source: StatCan.

Further processing: adding value to malted barley in brewing and distilling

Canadian malt production is usually around 750,000-800,000 tonnes, of which between 250,000 and 300,000 tonnes is generally used for brewing and distilling domestically, with the remainder, as much as 500,000-600,000 tonnes, being exported. According to StatCan industrial use data, the volumes of Canadian malt going to domestic brewing have increased in recent years. Distilling use is much smaller, at an estimated 50,000 tonnes per year on average.

For this report, we have included an analysis of the "brewing" sector for additional domestic value-addition and job creation in the barley value chain. For the purposes of analysis, this "brewing" sector includes the volumes of malted barely used in both the brewing *and* distilling sectors. This ensures that the volumes and economic impact of barley going to each process are captured, but, given the relatively small volume that goes to distilling, this avoids the unnecessary complication of tracking the distilling volumes separately to the brewing volumes.

This is the most difficult sector of the value chain to quantify accurately. The further processing of malted barley into beer and whisky is difficult to quantify because:

- Ingredient use and product formulations of processed goods are sensitive information from the perspective of beverage manufacturers.
- Branding and marketing add significant value to consumer products. This is the difference between consumer products at this stage of the chain and the commodity products at earlier stages. Branding and marketing make it difficult to quantify the value that barley adds in the further processing chain. The difficulty lies in stripping out the part of the large value-added in consumer and wholesale beer prices that is attributable to barley rather than branding and marketing.

We attribute a significant proportion of the value added from brewing to the barley sector as malt comprises by far the largest ingredient in brewing. The brewing sector is also a significant employer, being relatively labor intensive compared with more capital-intensive primary processing sectors, such as malting. This is partly due to the abundance of small-scale and micro-breweries in Canada. This also helps explain the lower multiplier used for brewing.

Impact

- We estimate that the direct economic impact on the Canadian economy from brewing averaged close to $1.5 billion annually between 2018/19 and 2020/21. The total economic impact, meanwhile, is estimated at over $2.8 billion annually.
- Approximately 17,000 people are directly employed by brewing in Canada. With the multiplier effect, the total employment impact is estimated at 45,700 jobs.
- Almost $800 million in wages are directly attributable to brewing while the total wage impact is $1.8 billion.

Table 22: Impact of brewing, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	1,122.4	364.9	1,487.2
Total economic impact (C$ million)	2,123.5	690.3	2,813.9
Direct employment (FTE jobs)	11,000	6,005	17,004
Total employment (FTE jobs)	29,556	16,134	45,690
Direct wages (C$ million)	505.5	276.0	781.5
Total wages (C$ million)	1,192.0	650.8	1,842.7

Methodology

The value added to the Canadian economy by brewing is calculated by estimating the volumes produced multiplied by the value added per tonne of beer manufactured. This is in turn estimated using StatCan's brewery sales revenue estimates, minus an estimate of input costs, with malt estimated to account for close to 90% of the returns to brewing.

This total was then allocated across Canada's breweries based on estimated capacities.

Diagram 17: Estimated malted barley for brewing, by province

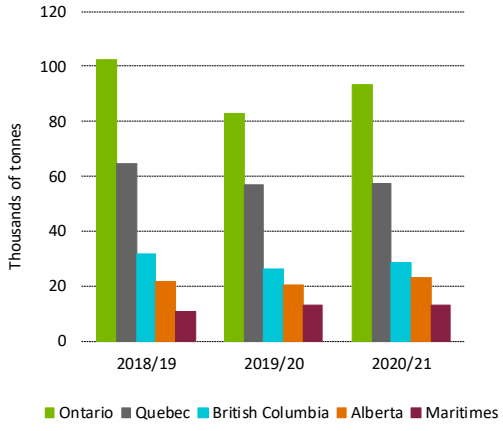
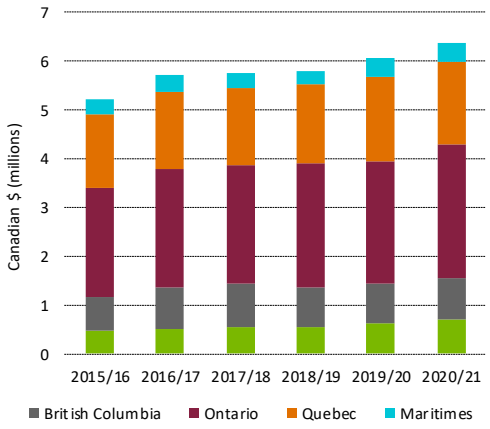


Diagram 18: Canadian brewery sales revenue



Source: StatCan.

The total number of people employed in brewing was based on industry interview estimates. We assume that close to 90% of these jobs are attributable to malted barley as this is by far the largest ingredient in the brewing process. Regional level employment was then taken to be a function of regional brewery capacity, again based on industry interviews.

One problem with including this analysis in the main value-added calculations is that the quantification methodology employed here is necessarily less robust than in the rest of the analysis in this study, because we cannot obtain firm data from the brewery sector, which regards such information as proprietary, and because several ingredients other than malted barley are used in the brewing process. Taking these caveats into consideration, the analysis presented here should be taken as indicative.

Feed milling: adding value to barley in feed mills

A significant part of the annual barley crop does not meet food grade requirements and is diverted to the livestock feed sector. In this section, we estimate the value added and employment created in the Canadian feed processing sector that is attributable to Canadian barley.

ANAC data gives the number of commercial feed mills in Canada at 471 mills, producing an aggregated 18.9 million metric tonnes of prepared feed in 2020. Furthermore, ANAC estimates feed use by province based on provincial livestock populations. Major feed mill clusters are found as destination millers for poultry, dairy and hogs around the urban conglomerations of Toronto, Montreal and Edmonton respectively.

In addition, there are large concentrations of on-farm feed production, accounting for perhaps nine million tonnes of feed annually from as many as 25,000 on-farm mills. Although the number of these mills that process barley is unknown, barley is the most common grain processed in on-farm feed mills. We estimate the volume of barley processed on-farm and then adjust this in terms of jobs created per tonne of feed processed to account for the lower intensity of output compared with commercial feed mills.

On average, a feedlot mill will require less than one full-time worker to run the mill — typically, they would simply temper the barley and roll it into flakes or run it through a hammer mill in order to increase the digestibility and nutritional value of the raw grain.

The largest concentration is "*Feedlot Alley*" in southern Alberta, where much of the large-scale beef cattle production is located. The dairy industry also has some on-farm feed production. These operations are included in our estimates of value added, employment and wages as the on-farm feed and feed lot operations would otherwise have to purchase feed from feed millers. However, in terms of jobs, we assume that on-farm feed mills generate fewer jobs than commercial feed mills per tonne of feed processed.

Impact

- The direct economic impact of feed milling using barley on the Canadian economy is estimated at almost $500 million. The total economic impact, including indirect and induced impacts is $2.4 billion.
- We estimate that barley's share of direct feed milling employment is around 3,000 individuals, including on-farm job creation. As a capital-intensive sector that relies heavily on contracted workers, the total employment impact of feed milling attributable to barley is estimated to be much higher, supporting over 17,000 jobs.
- Nearly $170 million in wages are paid out to individuals directly employed in feed milling as a result of using barley. Like the employment impact, however, the total wage impact of feed processing is much higher, in excess of $750 million.

Table 23: Impact of animal feed milling, average 2018/19–2020/21

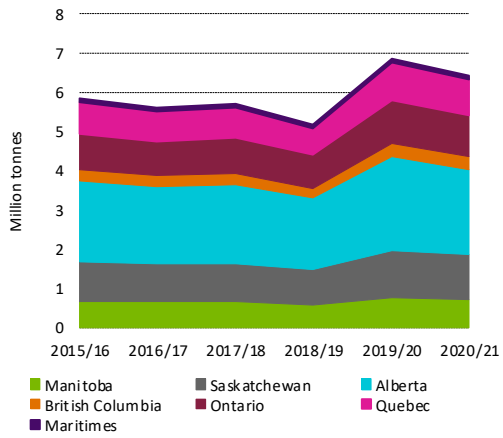
	East	West	Canada
Direct economic impact (C$ million)	156.4	335.5	491.9
Total economic impact (C$ million)	776.4	1,665.4	2,441.8
Direct employment (FTE jobs)	1,607	1,456	3,062
Total employment (FTE jobs)	9,111	8,254	17,365
Direct wages (C$ million)	87.7	79.4	167.1
Total wages (C$ million)	398.0	360.6	758.6

Methodology

The economic impact of the feed milling sector is determined based on the value it adds from processing feed grade barley into processed feed. This is done on a regional level by a similar method to the one used by ANAC: we estimate regional barley milling according to the distribution of livestock species weighted by each species' consumption of feed barley. As it is extremely difficult to ascertain how much of each crop is processed in each feed mill individually, we calculate the barley share simply as a proportion of the total feed processed by each region.

This processed barley feed volume is then multiplied by the gross margin per tonne of raw material, which was itself estimated (at $80 per tonne of barley) in conjunction with industry participants in interviews.

Diagram 19: Canadian commercial feed milling of barley



Similarly for jobs created, we estimate the total jobs at all feed mills combined, and then apportioned jobs to barley by barley's quantity as a proportion of total feed crops in that region. The average jobs per mill was estimated via discussions with employees of the major feed mills in Canada.

The average ***wages*** for employees of feed processing facilities was obtained from StatCan data. The data in the diagram show a rise in feed barley usage in our featured period of 2018/19-2020/21.

Impact at ports

Barley exports take place overland to the US and Mexico, which is captured in our trucking section, but barley and, in smaller volumes, malted barley also leave Canada via its international ports. These overseas shipments leave Canada via ports in British Columbia and via Ontario and Quebec ports.

Impact

In our model, we calculated the economic impact at Canadian ports for barley and malted barley:

- The total effects of exports on Canadian ports are an economic impact of over $80 milliosn, an employment impact of 300 jobs, and a wage impact of $25 million.

Table 24: Impact of barley at Canadian ports, average 2018/19–2020/21

	East	West	Canada
Direct economic impact (C$ million)	0.0	46.8	46.9
ports - barley	*0.0*	*42.8*	*42.8*
ports - malted barley	*0.0*	*4.1*	*4.1*
Total economic impact (C$ million)	0.0	83.1	83.1
ports - barley	*0.0*	*75.9*	*75.9*
ports - malted barley	*0.0*	*7.2*	*7.3*
Direct employment (FTE jobs)	0	196	197
ports - barley	*0*	*182*	*182*
ports - malted barley	*0*	*15*	*15*
Total employment (FTE jobs)	0	300	300
ports - barley	*0*	*277*	*277*
ports - malted barley	*0*	*22*	*22*
Direct wages (C$ million)	0.0	16.3	16.4
ports - barley	*0.0*	*15.1*	*15.1*
ports - malted barley	*0.0*	*1.2*	*1.2*
Total wages (C$ million)	0.0	24.6	24.6
ports - barley	*0.0*	*22.8*	*22.8*
ports - malted barley	*0.0*	*1.8*	*1.8*

Methodology

The ***economic impact*** of barley at Canadian ports is calculated as the product of volumes multiplied by port fees.

- Canadian barley volumes by port and direct prairie exports (overland) were obtained from data provided by the Canadian Grain Commission.
- Export volumes by port for malted barley were obtained from Canadian trade data.

Port fees were also obtained from the Canadian Grain Commission and are illustrated below.

The ***employment impact*** at the ports was based on barley's share of total port movements, combined with an understanding of the total number of individuals, gleaned from interviews, employed at Canadian ports.

Wages, meanwhile, were based on a study detailing the economic impact of Vancouver ports and indexed against other wage changes over time: ***www.portmetrovancouver.com***

Diagram 20: Grain charges at Canadian ports