

Economic Impact of Alberta's Sugar Beet Industry



OCTOBER 2020

Alberta

Alberta Agriculture and Forestry, Government of Alberta
October 2020
Economic Impact of Alberta's Sugar Beet Industry
ISBN 978-1-4601-4910-2

Prepared For:
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ACKNOWLEDGEMENTS

We acknowledge and appreciate the contribution and support provided by Melody Garner-Skiba, Executive Director, Alberta Sugar Beet Growers (ASBG), the Board of Directors of ASBG and Adam James, Western Operations Director, Lantic Inc. towards the completion of this report. Without their contribution and support, the publication of this report would not have been possible.

BACKGROUND

Sugar beet production is well suited for the irrigated land in southern Alberta. The industry is comprised of growers, collectively represented by the Alberta Sugar Beet Growers (ASBG), and one processor, Lantic Inc., which operates the processing plant located in Taber, Alberta. Currently, all sugar beets are grown only under contract with Lantic. The production of sugar beets is subject to Alberta's *Marketing of Agricultural Products Act* (MAPA) with ASBG having been established under the Act in 1983. Lantic Taber plant is the only sugar beet processing facility in Canada and therefore the only producer of Canadian origin sugar.

METHOD OF ANALYSIS

This study provides an estimate of the economic importance of the sugar beet industry in Alberta. It provides information on the farm gate value of sugar beet produced, value added revenue from sugar beet processing, wages paid and number of people employed in each sector of the sugar beet industry (i.e., sugar beet farming and sugar beet processing).

Scope of Study

The scope is from sugar beet production or farming to the processing of sugar beets into refined beet sugar products at the Taber plant. The value-added revenue generated from processing is estimated by subtracting the value of sugar beet produced at the farm from the total value of beet sugar produced.

Methodology for Estimating Impacts

Economic impacts from a project, program, or policy can be categorized into primary or direct impacts and secondary impacts which is the combination of indirect and induced impacts. Direct impacts are the first level impacts to the affected industry or those changes in output, employment, or income that represent the initial or first-round effects of the project. Indirect impacts result from linkages between an affected industry and other businesses that supplies and services it (e.g., supplies production inputs, transportation, etc.). Induced impacts are impacts associated with purchases made by employees in the sector.

Revenues, wages paid and total number of people employed in each sector were first estimated. These represented the direct economic impacts. Subsequently, Alberta economic multipliers based on a 2013 input-output (I/O) model were applied to these direct impacts to estimate the secondary impacts on the provincial economy in terms of Gross Domestic Product (GDP), labor income, and employment.

Both open (Type I) and closed multipliers (Type II) were used for estimating the secondary impacts. The Type I multipliers account for only direct and indirect impacts while the Type II

multipliers in addition to the direct and indirect account for the induced impacts. To use the Type I/II multipliers, one must first determine the direct increase in GDP at basic prices, labour income and the direct number of jobs for which the economic impacts are being analyzed. Table 1 presents the Type I/II multipliers that were used.

Table 1: Alberta Economic Multipliers by Industry (2013)

	Economic Multipliers by Industry at Basic Prices	
	Type I Multipliers Open Model, Table 2	Type II Multipliers Closed Model, Table 6
Crop and animal production		
GDP	1.800	2.124
Labor	3.584	4.458
Employment	2.015	2.300
Sugar and confectionery product manufacturing		
GDP	1.356	1.576
Labor	1.473	1.683
Employment	1.530	1.764

Source: Alberta Treasury Board and Finance

Data measured at basic prices reflect the price received directly by the producer of the commodity. The following sections details the direct and secondary (indirect and induced) economic impacts estimated in each sector of the sugar beet industry.

DIRECT IMPACTS

The direct economic impacts from the sugar beet industry in Alberta were estimated with data from ASBG and Lantic Inc.'s annual reports. The estimated revenues, total wages and benefits paid and total number of people employed in each sector represented the direct economic impacts of Alberta's sugar beet industry.

Sugar Beet Farming

Table 2 shows historical data on sugar beet production in Alberta from 2010 to 2019. The data reported include acres contracted, acres planted, acres harvested, average yield per acre, total tonnage harvested, price per tonne received by beet producers and value of sugar beet production.

Table 2: Historical Data on Sugar Beet Production and Value in Alberta, 2010-2019

Year	Acres Contracted	Acres Planted	Acres Harvested	Average Yield per Acre	Tonnage Harvested (Tonnes)	Price per Tonne (\$)	Value of Sugar Beet Production (\$ million)
2010	30,379	31,109	30,360	18.90	573,640	\$53.12	\$30.47
2011	33,598	33,672	33,307	19.35	784,500	\$53.52	\$41.99
2012	30,528	30,527	30,306	27.30	827,434	\$55.10	\$45.59
2013	23,948	24,358	24,128	27.69	668,087	\$50.74	\$33.90
2014	22,053	22,404	22,385	28.51	638,099	\$52.69	\$33.62
2015	21,675	21,836	21,836	26.77	584,560	\$58.14	\$33.99
2016	28,308	28,694	28,644	28.68	821,459	\$55.49	\$45.58
2017	26,906	27,005	26,940	32.55	876,929	\$52.47	\$46.01
2018	27,973	28,450	28,407	29.87	848,525	\$54.23	\$46.02
2019	28,119	28,502	15,676	29.80	465,018	\$50.13	\$23.31*
10-Year Average	27,349	27,656	26,199	26.94	708,825	\$53.56	\$38.05

* The dramatic drop in the value of sugar beet produced in 2019 is because only 56 per cent of the crop was harvested.

Source: ASBG

As shown by the 10-year average in Table 2, about 27,349 acres were contracted annually in the last 10 years but actual area planted to beets was estimated at 27,656 acres. Of the acres planted to beets, Alberta growers harvested approximately 26,200 acres annually and this translated to an annual production of 708,825 tonnes. Cold temperatures, untimely snow and excess moisture accounted for the low harvested acres in 2019. In total, about 12,547 acres (44 per cent of the crop) were left unharvested in 2019.

Figures 1 to 3 shows trends in beet harvested acres, total tonnage produced and average yields per acre from 2010 to 2019.

Figure 1: Sugar Beet Acres Harvested in Alberta, 2010-2019

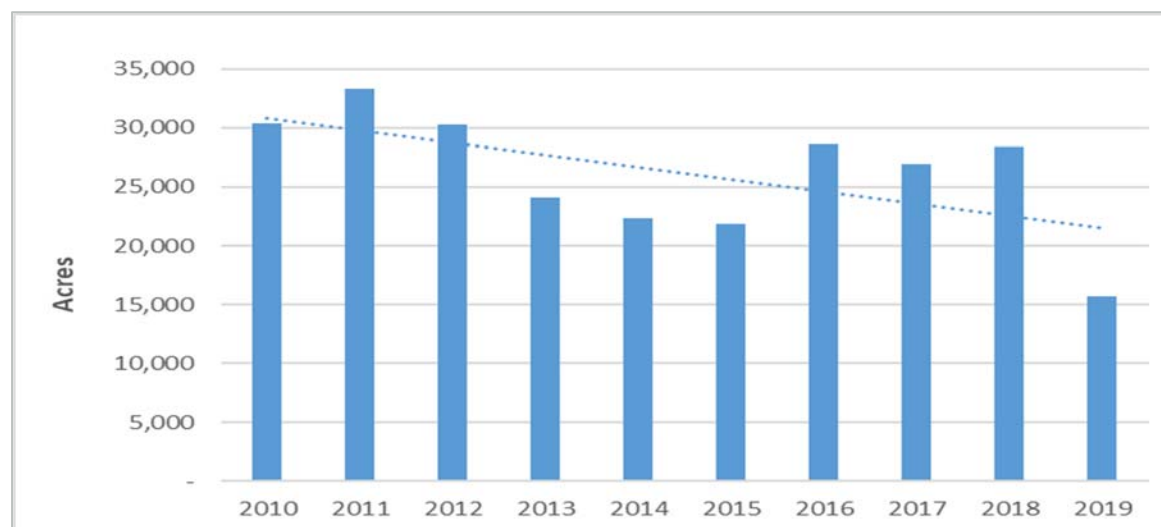


Figure 2: Sugar Beet Total Tonnage Produced in Alberta, 2010-2019

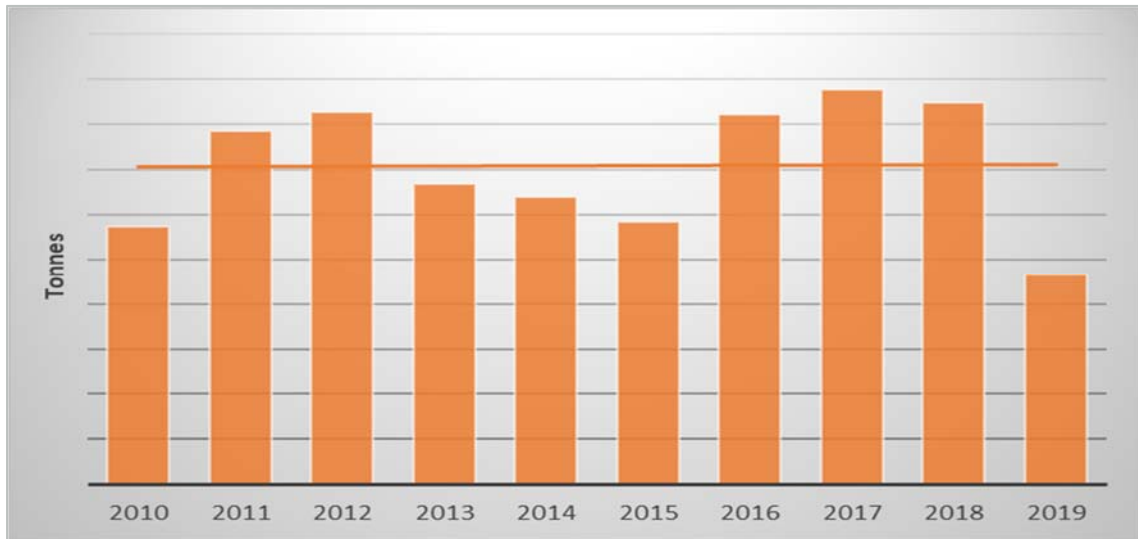


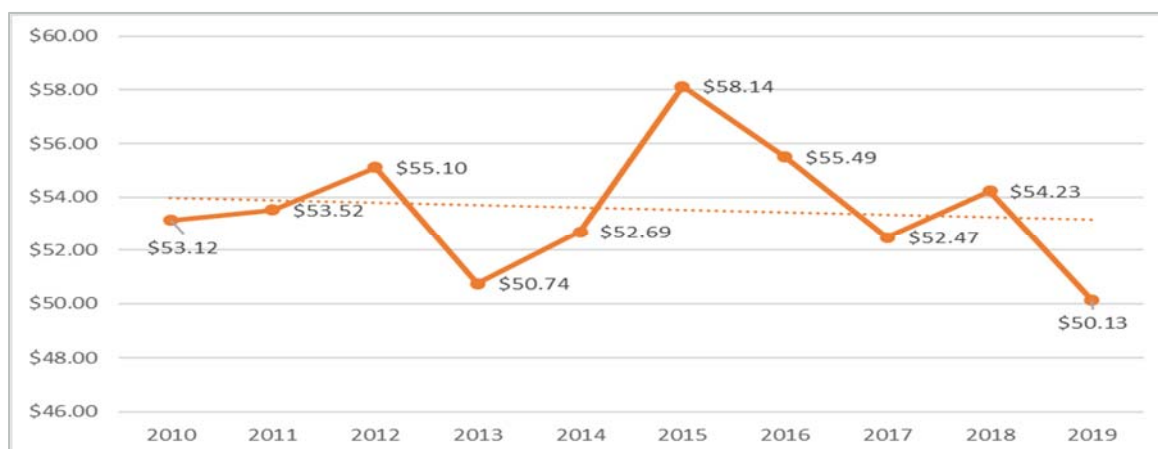
Figure 3: Sugar Beet Average Yield per Acre in Alberta (Tonnes), 2010-2019



While acres harvested experienced an overall downward trend in the last 10 years (Figure 1), average yield per acre (Figure 3) increased approximately 58 per cent (from 18.90 tonnes in 2010 to 29.80 tonnes in 2019). The increase in yield since 2010 is due to the switch by growers to round-up ready sugar beet seed, a genetically modified (GMO) seed. The trend in total tonnage produced (Figure 2) however have remained stable or flat in the last 10 years despite the considerable variation year by year.

In the last 10 years, the price per tonne of beets has shown considerable variation. Lantic Inc. purchase sugar beets from Alberta growers under a fixed price formula plus a scale incentive which is triggered when raw sugar values exceed a certain price level. Table 2 shows that, Alberta growers received \$53.56 per tonne of beets delivered to the factory annually in the last 10 years. Figure 4 shows trends in sugar beet prices from 2010 to 2019.

Figure 4: Sugar Beet Price per Tonne in Alberta, 2010-2019



Based on the 10-year average price of approximately \$54 per tonne and total tonnage of approximately 708,825 tonnes, the direct economic impact of sugar beet farming on Alberta's economy is estimated at approximately \$38 million annually (Table 2).

Sugar Beet Farming Employment and Wages

Alberta's sugar beet industry contributes to the provincial economy through employment and its substantial requirements for goods and services. According to information from ASBG, the sugar beet industry in Alberta is comprised of about 191 registered contract growers. Table 3 shows the number of employees associated with sugar beet farming in Alberta.

Table 3: Number of Employees Associated with Sugar Beet Farming in Alberta

	Full Time	Part Time	Seasonal	Contract	Total
Farm Employees	335	39	152	267	793

Source: ASBG

Based on Table 3, the direct total employment impact associated with sugar beet farming is estimated at 793 jobs. Table 4 shows labour cost associated with sugar beet farming in Alberta.

Table 4: Labour Costs Associated with Sugar Beet Farming in Alberta, 2016-2018 Average

ASBG Labour Cost Data	\$ Per Harvested Acre	\$ Per Tonne of Beets Produced
Paid Labour and Benefits	\$145.83	\$5.56

Source: ASBG

As shown in Table 4, labour costs from 2016 to 2018 averaged \$145.83 per harvested acre or \$5.56 per tonne of beets produced. Based on 2016-2018 average harvested area of 27,997 acres or sugar beet tonnage produced of 848,971 tonnes, the direct impact of wage or labour income associated with sugar beet farming is estimated at approximately \$4.08 million.

In summary, the direct impact associated with sugar beet farming comprise of over \$38 million in farm gate revenue, a wage or labour income impact of approximately \$4 million and a total employment impact of 793 jobs (335 full-time and 458 temporary).

Sugar Beet Processing

The sugar industry in Canada has two manufacturers (Lantic Inc. and Redpath Sugar Ltd.), three cane sugar refineries and one beet processing plant. About 90 per cent of Canada's refined sugar is produced from raw cane sugar, imported mainly from South and Central America and the remaining from sugar beets grown exclusively in southern Alberta. Refining is necessary to render the sugar fit for human consumption by separating the pure sugar crystals from molasses, plant residue and impurities.

Lantic operates two cane refineries, one in Vancouver and one in Montreal as well as the beet plant in Taber. Redpath Sugar Ltd. operates the refinery in Toronto. Both Lantic and Redpath also own and operate value-added blending and packaging facilities to produce sugar-containing food products such as crystal drink mixes, iced tea mixes, cocoa-based mixes and sugar gelatin blends for the Canadian and export markets.

Lantic's sugar beet plant in Taber has the capacity to slice 6,000 tonnes of sugar beets per day. Annually, the plant has the capacity to manufacture 150,000 tonnes of sugar products. Table 5 shows historical data on beet sugar production and the estimated value added from sugar beet processing in Alberta from 2010 to 2019. The estimated value added from sugar beet processing are based on information gleaned from Lantic Inc. annual reports (Columns B and D).

Table 5: Historical Data on Beet Sugar Production and Value Added by Lantic, 2010 to 2019

Year	Total Beet Sugar Produced (Tonnes) A	Total Cane and Beet Sugar Produced (Tonnes) B	Beet Sugar as per cent of Total Sugar Produced C	Total Revenue from Cane and Beet Sugar \$ million D	Total Revenue from Beet Sugar Exports \$ million E	Estimated Domestic Revenue from Cane and Beet Sugar \$ million F	Estimated Domestic Revenue from Beet Sugar \$ million G	Total Revenue from Beet Sugar (Nominal) \$ million H	Value Added from Sugar Beet Processing \$ million I
2010	86,133	682,149	12.63%	\$606.87	\$14.58	\$592.29	\$74.79	\$89.37	\$58.90
2011	119,824	649,078	18.46%	\$612.61	\$39.83	\$572.79	\$105.74	\$145.57	\$103.58
2012	121,948	641,573	19.01%	\$618.09	\$34.11	\$583.99	\$111.00	\$145.11	\$99.51
2013	98,690	649,274	15.20%	\$558.44	\$17.83	\$540.61	\$82.17	\$100.00	\$66.10
2014	88,214	646,376	13.65%	\$532.30	\$10.71	\$521.59	\$71.18	\$81.89	\$48.27
2015	92,744	658,812	14.08%	\$541.55	\$17.70	\$523.85	\$73.74	\$91.44	\$57.46
2016	126,274	675,224	18.70%	\$564.41	\$16.02	\$548.39	\$102.56	\$118.57	\$72.99
2017	129,198	694,465	18.60%	\$655.85	\$21.33	\$634.52	\$118.05	\$139.38	\$93.37
2018	131,737	719,875	18.30%	\$601.96	\$25.17	\$576.79	\$105.55	\$130.72	\$84.71
2019	67,175	741,144	9.06%	\$595.88	\$20.99	\$574.89	\$52.11	\$73.09	\$49.78
10-Year Average	106,194	675,797	15.77%	\$588.80	\$21.83	\$566.97	\$89.69	\$111.51	\$73.47

Source: ASBG, Lantic Inc. Annual Reports and Alberta Agriculture and Forestry.

As shown in Table 5, 106,194 tonnes of refined sugar was produced from beets annually by Lantic in the last 10 years (A). Based on the 10-year average, Lantic's annual total sugar production from both cane and beets (B) was estimated at 675,797 tonnes. Beet sugar therefore accounted for approximately 15.8 per cent of Lantic's total volume of refined sugar produced from both cane and beets (C).

Of the 10-year average of 106,194 tonnes of refined sugar produced from beets, approximately 28,417 tonnes or 22 per cent worth \$21.83 million (E) was exported annually to the United States and Mexico with the remaining 78 percent assumed to be sold domestically. Products exported include refined sugar in solid form, molasses, sugar candy, sugar confectionery, etc.

Based on the 10-year average, estimated revenue from Lantic’s domestic sales of cane and beet sugar amounted to \$566.97 million annually (i.e., total revenue from cane and beet sugar - total revenue from beet sugar exports or D-E). Given this value, the total value of beet sugar sold domestically was estimated at approximately \$89.69 million (i.e. \$566. 97 million * 15.8 per cent).

Given the above export and domestic revenues, Lantic’s combined annual revenue from sugar beet processing on average is estimated at approximately \$111.51 million. When the value of sugar beets paid to growers is subtracted from this amount, the value added from sugar beet processing or the direct economic impact of sugar beet processing on Alberta’s economy is estimated at approximately \$73.47 million annually.

It is important to note that the impact of the Canada United States Mexico Agreement (CUSMA) which came into force on July 1, 2020 is not included in this value. As a result of this traded agreement, Canadian origin sugar will benefit from an additional 9,600 metric tonnes of access to U.S. markets. This additional refined sugar access which has to be originated from sugar beets grown in Alberta translates into an extra direct economic benefit of \$7.3 million annually.

Sugar Beet Processing Employment and Wages

According to Lantic’s 2019 annual report (page 125), the total amount spent on wages, salaries and employee benefits during the 2018 and 2019 fiscal years amounted to \$83.69 million and \$86.81 million respectively. Table 6 shows the three-year average (2016-2018) of permanent and temporary workers associated with sugar beet processing at Taber plant.

Table 6: Employees Associated with Sugar Beet Processing, 2016-2018 Average

	Permanent	Temporary	Total
Beet Factory Employees	90	92	182

Source: Lantic Inc.

According to page nine of Lantic’s 2019 report, the company employs a total of 800 employees. On page 123 of the same report, wages, salaries and employee benefits paid in 2019 and 2018 were estimated at \$86.81 million and \$83.69 million respectively. Using the share of beet factory workers to the total number of workers Lantic employs, the direct labour income associated with sugar beet processing was estimated at \$20.39 million dollars.

It is worth noting that the estimates developed above were confirmed by Lantic Inc. to be within the normal averages. Due to confidentiality reasons, Lantic does not share specific information on sites as this has a level of shareholder and customer sensitivity.

Importance of Sugar Beets to Alberta's Economy

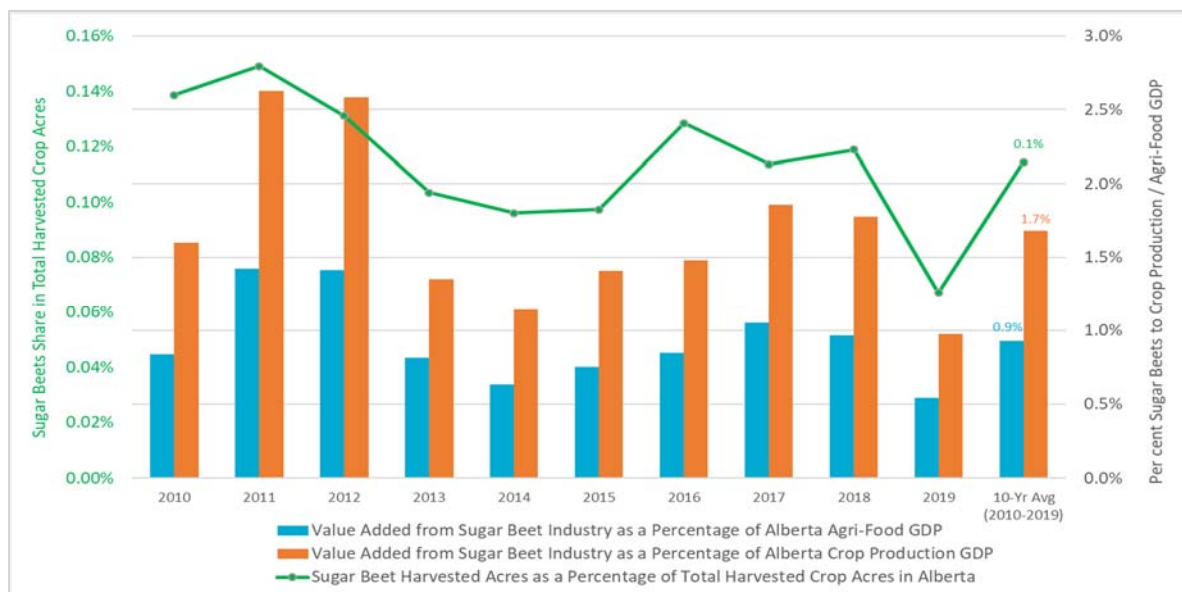
As presented in the last column of Table 5, sugar beet is a high value crop. The value-added revenue from the beet industry contributes significantly to both crop production and agri-food GDP in Alberta. In the last 10 years (2010-2019), Alberta's real GDP for agri-food industries averaged approximately \$8.0 billion. It ranged from \$7.04 billion in 2012 to a record of \$9.2 billion in 2019.

Of the \$9.2 billion in 2019, agriculture industries accounted for approximately \$5.7 billion, while food and beverage industries accounted for the remaining \$3.5 billion. Of the \$5.7 billion for agriculture industries in 2019, crop production GDP amounted to \$5.1 billion, animal production GDP amounted to \$0.44 billion and remaining \$0.12 billion was for support activities for both crop and animal production.

In the last 10 years (2010-2019), Alberta growers on average harvested approximately 26,200 acres of sugar beets. During the same period, sugar beets share of total harvested crop acres in Alberta averaged 0.11 per cent. It ranged from 0.07 per cent in 2019 to 0.15 per cent in 2011. The record low share in 2019 was due to cold temperatures, untimely snow and excess moisture in the field which led to about 12,547 acres of sugar beets left unharvested (i.e., 44 per cent of the crop).

Figure 5 shows that even though the sugar beets share of total harvested crop acres is small, it contributes significantly to both crop production and agri-food GDP in Alberta.

Figure 5: Sugar Beets Share in Total Harvested Crop Acres vs. Contribution to Agri-Food and Crop Production GDP in Alberta, 2010-2019



Source: Statistics Canada

As shown in Figure 5, even though sugar beets share of total harvested crop acres averaged 0.1 per cent in the last ten years (2010-2019), it accounted for approximately 1.0 per cent of Alberta's agri-food GDP and approximately 2.0 per cent of crop production GDP.

SECONDARY IMPACTS

As indicated in the methodology section, both open (Type I) and closed multipliers (Type II) from an I/O model were used for estimating the secondary impacts. The Type I multipliers account for only direct and indirect impacts while the Type II multipliers in addition to the direct and indirect account for the induced impacts.

The direct impacts represent the estimated revenues, wages and salaries paid and the total number of people employed in each sector. Indirect impacts result from the linkages between each sector and other businesses that supplies and services it (e.g., supplies production inputs, transportation, etc.). Induced impacts are impacts associated with purchases made by employees in each sector.

Since the I/O model describes the Alberta economy in 2013, the estimated revenues received by the growers and processors were adjusted to 2013 values with Farm Product Price Index (FPPI) and Consumer Price Index (CPI) for food respectively in order to better capture the actual volumes of commodities associated with the impacts.

The FPPI measures the change through time in prices received by sugar beet and other specialty crops farmers in Alberta. The CPI on the other hand measures the change through time in revenues received from the sale of refined sugar products. Table 7 shows the direct and secondary impacts or multiplier effects associated with Alberta's sugar beet industry based on Type I and Type II Multipliers.

Table 7: Direct and Secondary Impacts based on Type I and Type II Economic Multipliers

	Direct Impacts	Secondary Impacts		Total
		Indirect	Induced	
Impact on GDP at basic prices - \$ Million				
Sugar Beet Farming	\$38.05	\$34.64	\$13.08	\$85.78
Sugar Beet Processing	\$73.47	\$23.33	\$15.70	\$112.50
Total GDP Impact	\$111.51	\$57.97	\$28.79	\$198.28
Impact on Wage or Labour Income - \$ Million				
Sugar Beet Farming	\$4.08	\$10.54	\$3.57	\$18.19
Sugar Beet Processing	\$20.39	\$7.75	\$4.01	\$32.15
Total Wage Impact	\$24.47	\$18.29	\$7.58	\$50.33
Impact on Employment - Jobs or Persons				
Sugar Beet Farming	793	805	226	1,824
Sugar Beet Processing	182	101	43	326
Total Employment Impact	975	906	269	2,150
TOTAL INDUSTRY IMPACT (Direct, Indirect and Induced or Closed Model) - \$ Million				\$248.61
TOTAL INDUSTRY IMPACT (Direct and Indirect or Open Model) - \$ Million				\$212.24

As shown in Table 7, the total direct impact on GDP and labour income associated with Alberta's sugar beet industry is estimated at \$135.98 million. This comprise of \$42.13 million from sugar

beet farming and \$93.86 million from sugar beet processing. In total, the industry generated approximately 975 jobs, including 793 jobs from sugar beet farming (335 full-time and 458 temporary) and 182 jobs from the processing sector (90 permanent and 92 temporary).

It is important to note that employees associated with sugar beet farming invariably spend some time within the year to work on other crops. The factory provides employment after the traditional agricultural harvest employment has finished. The time spent on other activities were not adjusted for in the model. All temporary employment measured in terms of part time, seasonal or contract jobs were not converted to full-time equivalents in order to demonstrate the timing of employment offered by each sector of the industry.

Combined Secondary Impacts by Industry Sector

When Type I and II economic multipliers were applied to the direct impacts estimated, the total secondary impacts (indirect and induced) associated with the sugar beet industry was estimated at approximately \$112.63 million annually. This comprised of a total GDP impact of \$86.76 million and a wage or labour income impact of approximately \$25.86 million. The total secondary employment generated by the industry was estimated at approximately 1,175 jobs.

The combined secondary economic impact (indirect and induced) from sugar beet farming was estimated at approximately \$61.83 million. This comprises of a total GDP impact of \$47.73 million and a wage or labour income impact of approximately \$14.11 million. The sugar beet farming sector generated a total of 1,031 secondary jobs.

The corresponding secondary impacts (indirect and induced) from sugar beet processing was estimated at approximately \$50.79 million. This comprises of a total GDP impact of approximately \$39.03 million and a wage or labour income impact of approximately \$11.76 million. The sugar beet processing sector generated a total of 144 secondary jobs.

Based on the above, the economic impact of Alberta's sugar beet industry totaled \$248.61 million, including a GDP impact of approximately \$198 million and a wage or labour income impact of approximately \$50 million. The total employment impact generated by the sugar beet industry in Alberta was estimated at approximately 2,150 jobs.

CONCLUSION

Although the sugar beet industry in Alberta is not large in terms of harvested acres, it contributes significantly to the provincial economy. This study demonstrates that even though the sugar beet share of total harvested provincial crop acres averaged 0.1 per cent in the last ten years (2010-2019), it accounted for approximately one per cent of Alberta's agri-food GDP and approximately two per cent of crop production GDP annually.

The total economic impact of Alberta's sugar beet industry (direct, indirect and induced) was estimated at approximately \$248.61 million. This comprise of a total GDP impact of over \$198

million and a wage or labour income impact of approximately \$50 million. The total employment impact generated by industry was estimated at approximately 2,150 jobs.

By sector, the economic impact from sugar beet farming totaled \$103.96 million. This comprise of a GDP impact of \$85.78 million and a wage or labour income impact of approximately \$18.19 million. The sugar beet farming sector generated a total of 1,824 jobs.

The corresponding economic impact from sugar beet processing was estimated at approximately \$144.65 million. This comprise of a total GDP impact of approximately \$112.50 million and a wage or labour income impact of approximately \$32.15 million. The sugar beet processing sector generated a total of 326 jobs.