Economic Impact of Agriculture in Lethbridge County

Prepared For

Lethbridge County

Prepared By

Serecon Inc.

Edmonton, Alberta

March 2023

March 16, 2023

Larry Randle
Interim Chief Administrative Officer
Lethbridge County

Dear Mr. Randle:

RE: ECONOMIC IMPACT OF AGRICULTURE IN LETHBRIDGE COUNTY

Please find attached our report outlining our findings on the impact of agriculture in Lethbridge County. It has been a pleasure conducting this interesting study on behalf of the County.

Yours truly,
Serecon SERVICES INC.

Markus Weber

Enclosure

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Executive Summary / Briefing

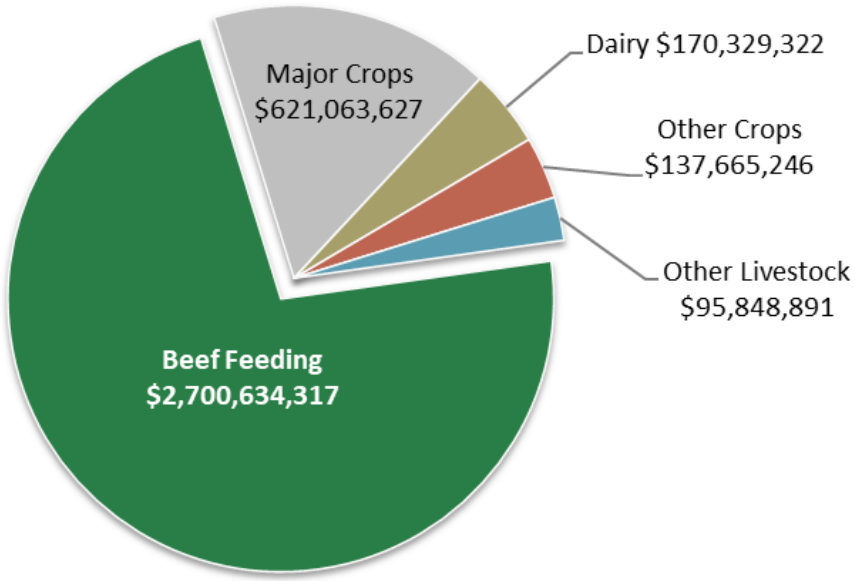
Lethbridge County is the only County in Alberta that generates over $1 billion in gross farm receipts at over $4.1 billion in farm operating revenue. It is in a unique situation given its extensive agriculture production, including both the continued improvement of crop production due to central irrigation, as well as the largest concentration of intensive livestock operations in the province. Compared to 2016, farm cash receipts increased over 100% by 2021. Not only is it by far the largest agricultural revenue-producing County in Alberta, but it also grew faster than any other in those 5 years. This illustrates the large and growing significance of the agricultural sector in Lethbridge County.

This report presents the methodology and results of an updated analysis to estimate the contribution that various agriculture industry sectors in Lethbridge County make to the Alberta economy. The overall impacts include the direct, indirect and induced expenditures by business and people that occur in subsequent rounds of spending. The primary data source for livestock inventories as well as crop and animal prices was the 2021 national Census of Agriculture delivered by Statistics Canada. The primary source of data for crop acreages being the Annual Crop Inventory developed for 2021 by Agriculture and Agrifood Canada.

The largest agricultural sectors were examined in this study, including the major field crops and several livestock sectors. Overall, it is estimated that in 2021 the agriculture sector in Lethbridge County made a contribution of $3.7 billion to the economy, for an impact of $727 million on Gross Domestic Product.

It is clear from the analyses in this report that in Lethbridge County several agricultural subsectors are considerably larger than all the others. The beef sector and the major field crops represent the largest impact on the Alberta economy. Livestock made the larger contribution at 78% of the total, or $2.9 billion of which $2.7 billion was from beef feeding. In addition, the Lethbridge County crop sector has an economic impact of $820 million.

Figure 1: Economic Impact Breakdown for Lethbridge County



Project & County Overview

Background

Lethbridge County is in a unique situation given its extensive agriculture production, comprising of both the acceleration of production due to central irrigation as well as intensive livestock operation. The area boasts the largest concentration of intensive livestock operations in the province and has considerable irrigation through both private irrigation systems and two irrigation districts.

Intensive livestock operations in Lethbridge County are a value-creating industry that is continually growing. With this high level of activity comes a large tonnage of grain being moved through the county plus a large amount of manure. This large demand for cattle finishing grains has supported a sub-sector industry of central irrigation which supplies these grains.

Within Lethbridge County there are some 4,465 employed labourers, with 1,475 (nearly one third) of them being employed in agriculture, fishing and hunting.[1] There are a further 1,010 labourers in agriculture living in the City of Lethbridge as well, fueled by crop and livestock production in the County. It is evident the effect that farming has on the local economy. Both the intensive livestock operations and irrigated farmland contribute to this employment and therefore contribute to the economic value of the County. The indirect value of these positions created through agriculture is far stretching, as their salaries contribute to the GDP through spending, taxes, investing and a variety of other avenues.

This report presents the methodology and results of an analysis to estimate the contribution that various agriculture industry sectors in Lethbridge County make to the Alberta economy. The overall impacts include the indirect and induced expenditures by business and people that occur in subsequent rounds of spending.

This section of the report provides an overview of agriculture in the County and outlines the methodologies and datasets used, including a discussion on the multipliers employed. The next section will then examine in detail the outcomes of our analyses and estimates of economic impact.

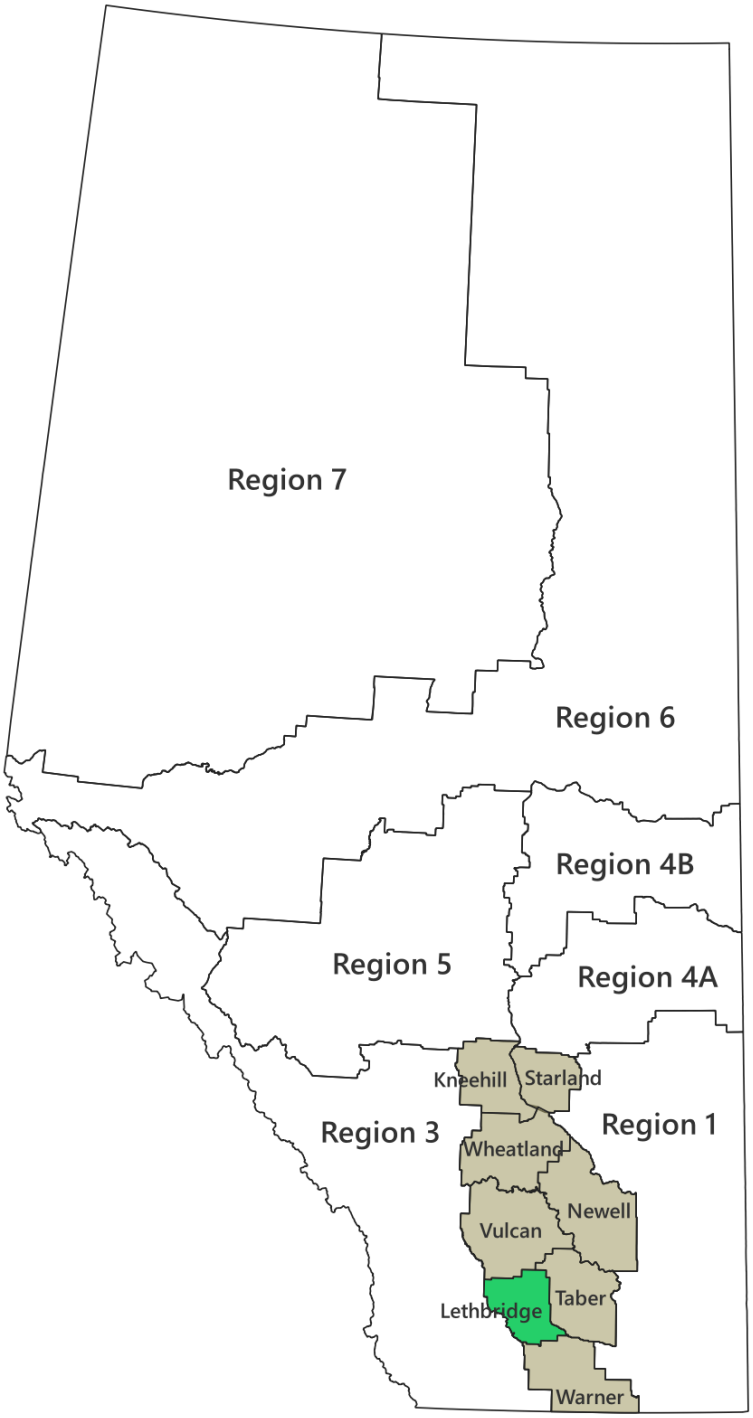
Lethbridge County Agriculture Overview

Lethbridge County is perceived as a hotbed especially for feedlot operations, but more generally for intensive livestock operations. This is borne out by the statistics compiled by Statistics Canada.

[1] Source: Statistics Canada Table 98-10-0456-01

Lethbridge County is located in Canadian Agricultural Census Region 2, which is composed of eight separate rural municipalities all of which have a broad set of similarities in regard to land-use. Figure 2 below shows the land-use regions and the Counties in Region 2 for geographic context.

Figure 2: Alberta Census Agricultural Regions & Region 2 Counties



CAR Region 2 and notably Lethbridge County stand out as having stronger agricultural economic activity in a number of core activities. Lethbridge County is by far the largest municipality in terms of economic activity, in a region that is also very actively agriculturally.

Cattle Numbers

With regard to cattle, Census Agricultural Region 2 has many more animals than any other region in the province. Of the total 12.6 million cattle reported in the province, over 1.6 million or 13% of them were reported in the region. Of those, by far the largest proportion was in Lethbridge County. The second closest municipality in the region has less than half as many cattle as Lethbridge County does. The following figures indicate cattle numbers by Land-use Region, followed by a breakdown of that region by municipality.

Figure 3: Cattle and Calves, by Census Agricultural Region

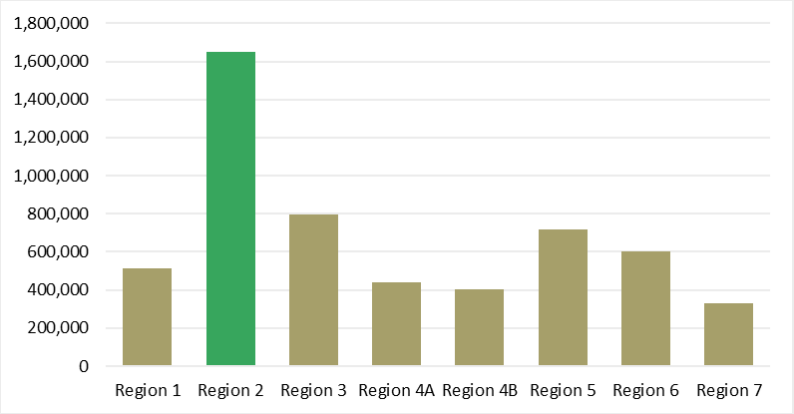
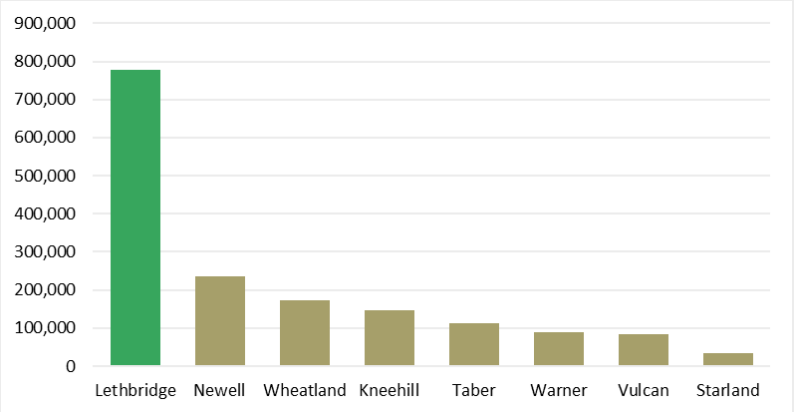


Figure 4: Cattle and Calves in Region 2, by County



The Census of Agriculture provides an estimate of Gross Farm Receipts. While this number cannot simply be used with input-output multipliers, it does provide a general estimate of overall economic impact, allowing one to readily compare between all of the relevant Alberta counties due to this statistic having been compiled for all Census subdivisions.

Table 1 on the next page gives an overview of the Counties having the largest overall Gross Farm Receipts in Alberta. Lethbridge County is the only County in Alberta that generates over $2 billion in gross farm receipts, with Taber being the next largest at only $1 billion. Furthermore, among municipalities with significant farm cash receipts, Lethbridge County has exhibited the third highest percentage increase (tied with Cardston County) in gross farm receipts after Foothills County and Cypress County (2011 to 2016).

In terms of absolute dollar value increases in gross farm receipts, Lethbridge growth far exceeds any of the other municipalities in the province with growth over five years of over $950 million. The figures below show how not only the region, but Lethbridge County itself produce much larger revenues – and ultimate economic impact – than other counties in Alberta.

Figure 5: Operating Farm Revenues 2021, by Census Agricultural Region

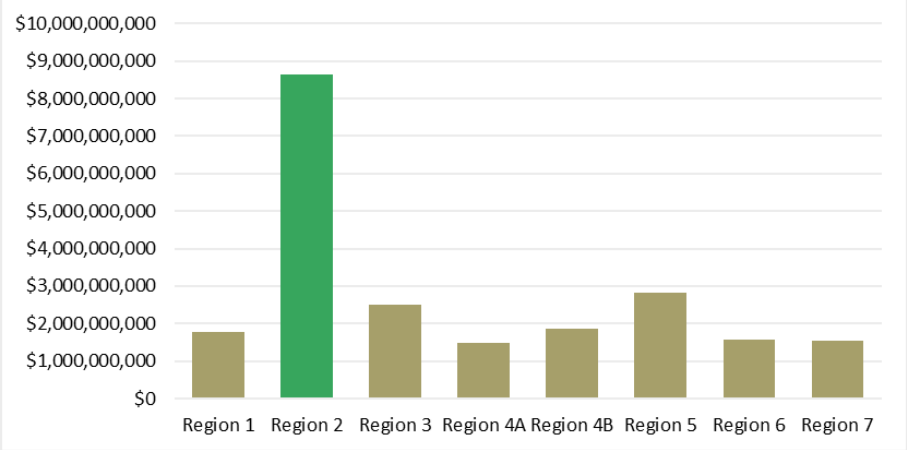


Figure 6: Operating Farm Revenues 2021, Region 2 by County

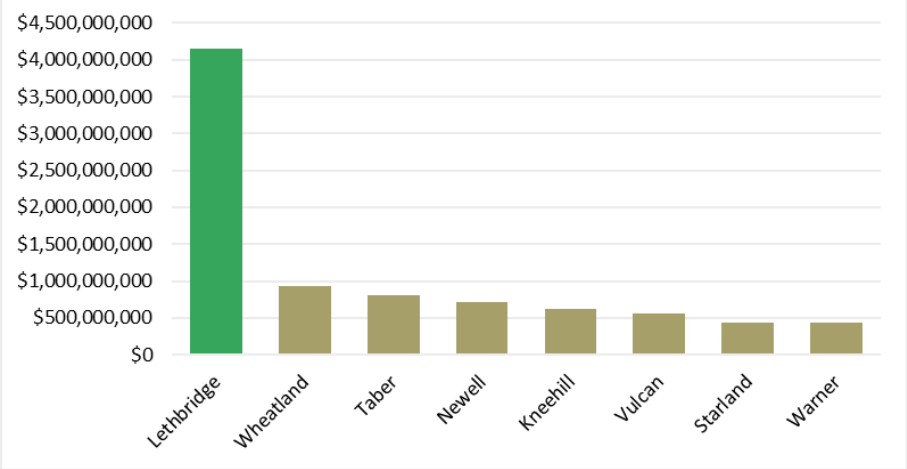


Table 1: Alberta Counties with Highest Farm Operating Revenues[2]

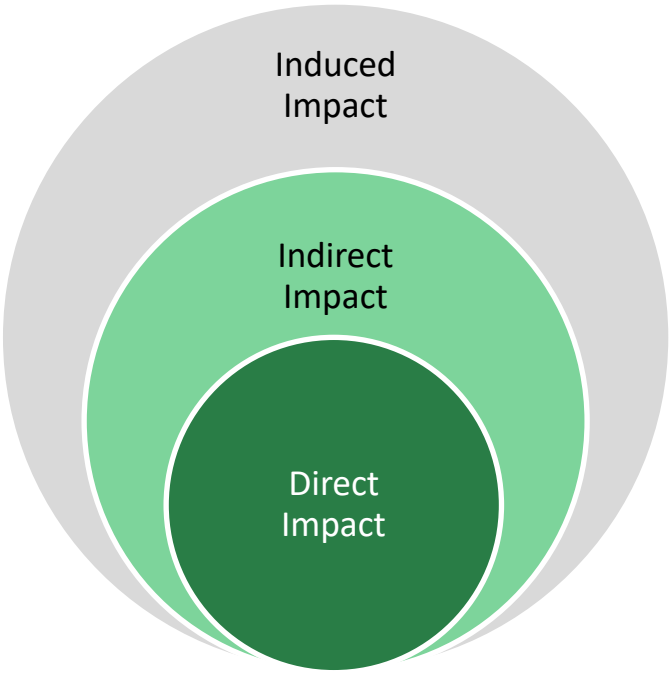
County	Farm Operating Revenue (2016)	Farm Operating Revenue (2021)	Operating Revenue - Increase/Decrease	
			$	%
Lethbridge County	$2,014,276,406	$4,145,626,106	$2,131,349,700	106%
Wheatland County	$716,532,737	$933,264,363	$216,731,626	30%
Taber	$979,079,480	$805,639,482	-$173,439,998	-18%
Newell County	$523,056,397	$712,944,631	$189,888,234	36%
Vermilion River County	$405,991,767	$655,168,180	$249,176,413	61%
Lacombe County	$377,167,017	$640,742,317	$263,575,300	70%
Kneehill County	$468,464,985	$627,350,075	$158,885,090	34%
Willow Creek	$411,030,700	$583,088,119	$172,057,419	42%
Vulcan County	$864,818,487	$560,140,160	-$304,678,327	-35%
Cypress County	$454,408,183	$517,967,727	$63,559,544	14%
Forty Mile County	$431,457,264	$505,115,612	$73,658,348	17%
Rocky View County	$388,187,370	$485,391,296	$97,203,926	25%
Foothills County	$580,276,130	$457,521,422	-$122,754,708	-21%
Starland County	$305,648,951	$435,582,464	$129,933,513	43%
Warner County	$369,928,082	$435,322,904	$65,394,822	18%
Red Deer County	$414,855,319	$425,202,922	$10,347,603	2%
Ponoka County	$360,543,675	$424,754,682	$64,211,007	18%
Sturgeon County	$290,728,550	$421,970,687	$131,242,137	45%
Flagstaff County	$230,939,515	$415,949,124	$185,009,609	80%
Mountain View County	$305,648,951	$402,928,239	$97,279,288	32%
Camrose County	$341,719,000	$387,085,350	$45,366,350	13%
Westlock County	$317,389,229	$364,339,269	$46,950,040	15%
Stettler County	$281,002,754	$361,038,085	$80,035,331	28%
Special Area No. 2	$249,749,546	$357,548,252	$107,798,706	43%
Cardston County	$309,365,673	$334,846,013	$25,480,340	8%

2 Source: 2021 Census of Agriculture, Statistics Canada

Methodology

Economic multipliers are used to measure the economic activity that is generated when purchases and investments are made by a business, including the resulting spin-off activities. Economic impacts measured for the various agriculture sectors in Lethbridge County consist of the following categories:

Figure 7: Types of Economic Impact



- **Direct Impacts**
  the effects occurring to spending of the firm where the new economic activity takes place (e.g. the livestock operation must add employees and buy feed, etc.)
- **Indirect Impacts**
  the effects occurring to the backward-linked industries that supply the firm creating the new economic activity (e.g. feed producers must increase production)
- **Induced Impacts**
  some of the additional income of employees is spent on goods and services (by employees of the feeding operation and its upstream industries)

Categories of Impact

The direct, indirect and induced impacts of the agricultural industry can be quantified in a number of different ways. The categories of impact that were calculated for the various sectors include the following:

- **Gross Output:** is a measure of all sales by producing companies in the province or region. This includes intermediate goods and services consumed in the production process.
- **GDP:** Gross Domestic Product can be defined as gross output with all intermediate goods and services subtracted.
- **Labour Income:** the gross income earned by employees in the region.
- **Employment:** the number of people employed in the region.

Each of these categories will have direct, indirect and induced effects. For example, the employment impact would include the following types of impact:

- **Direct employment impact**: the employees working in the agriculture industry
- **Indirect employment impact**: the employees working in the agriculture and agribusiness supply industries
- **Induced employment impact**: the additional employment that results from the increased consumer spending flowing from direct and indirect impacts

There are several different methods of quantifying economic impact depending on the information available. Generally speaking, the economic multipliers used in an input-output model are meant primarily to model the change in output generated by an individual enterprise or change in scope of an enterprise, not of the entire industry. In fact, the Alberta Finance document Alberta Economic Multipliers 2017 states: "*Due to the limitations of the I/O model, it is unlikely that many of the assumptions and caveats associated with the multipliers would hold fully in the real world. It is important to understand the limitations and apply the multipliers in a reasonable way.*"

However, a practice of using the multipliers has developed in order to compare the relative impact of various industry sectors. The results should be treated as general estimates only and not as absolute values. The reader of the current report is reminded that this is appropriate use of the estimates generated through the economic impact modelling methodology.

Economic Multipliers

Given that the datasets available lend themselves to estimation of gross output much more readily than expenditures, we have chosen to use the "simple multipliers" based on commodity supply ratios from in the Alberta Economic Multipliers 2017. Unlike in previous studies of economic impact for this County, we were also able to rely on commodity-specific multipliers for this study – at least for several crop commodities where separate multipliers have been developed. In practice, this meant that we relied on "Table 4: Alberta Simple Multipliers- 2017 (Commodities), Open Model-Direct and Indirect" and on "Table 5: Alberta Total Multipliers- 2017 (Commodities), Closed Model-

Direct, Indirect and Induced" as retrieved from the Alberta Government open data portal in January 2023.[3]

An estimate of gross output for each of the agricultural sectors was created using data from a large variety of sources, depending on the availability of price and production data, largely from federal census and provincial government statistics sources.

Caution must be exercised in interpreting the results, whether they be for GDP, Total Contribution, or Employment/Income. The input-output modelling and resulting multipliers are exactly that … a model, designed to allow for comparison of the approximate and relative size of economic elements. This is particularly the case for labour income.

Capital Costs

Initial construction of the large feedlot operations in the County would have had significant economic impact, especially in terms of increased employment, at the time of initial construction. The economic impact of initial construction is not included in the economic impact estimates. However, the economic impact does include the cost of capital replacement, as it includes depreciation costs and building repair in the direct expenditures of the sectors. However, the economic impact does not include the initial investments made in constructing the infrastructure.

Data Sources

Data was sought out and drawn from a number of different sources to arrive at an estimate of economic impact. Fortunately, for this analysis we were able to locate 2021 data for almost all data requirements. The most comprehensive and accurate data source for most was the recently released data from the 2021 Census of Agriculture.

- Livestock inventories were drawn from the 2021 Census of Agriculture. Given the nature of livestock production and the variability that can occur over time, the economic impact would be expected to vary along with the total inventory. Using this one consistent dataset allows for the most reliable comparison between the various sectors.

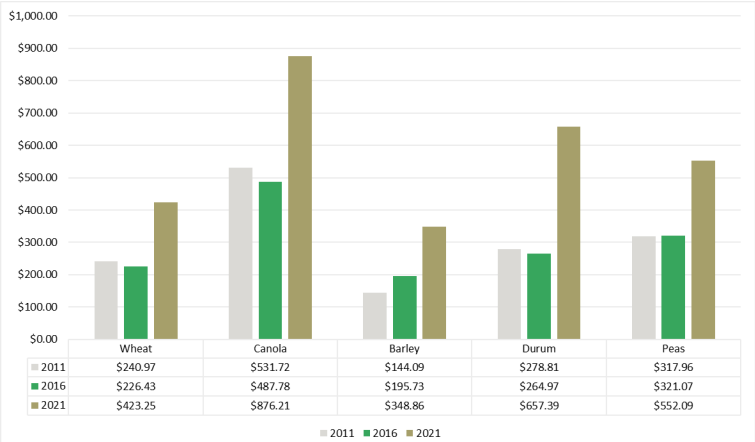
- Crop acreages for the province of Alberta are available on an annual basis, but that does not include acreages to the County or census subdivision level. However, Agriculture and Agrifood Canada produces an Annual Crop Survey using remote sensing and other modelling techniques which is very reliable in determining crop type. The 2021 version of that dataset was used for crop acreages.

- The most current economic multipliers published by Alberta Finance were issued on August 2017, so those multipliers were used to model GDP and employment income outcomes, in additional to the total outputs based on gross revenue projections.

3 https://open.alberta.ca/opendata/alberta-economic-multipliers-by-industry-and-commodity.

- Over the last three census periods, there have been significant variations in the prices of major crops. That was especially the case in recent years, with record-high prices for some crops increasing the modelled economic impact for the 2021 year especially. Changes in crop prices impact their overall contribution to the economy.

Figure 9: Comparison of $/MT for Major Crops (2011-2021)



	Wheat	Canola	Barley	Durum	Peas
2011	$240.97	$531.72	$144.09	$278.81	$317.96
2016	$226.43	$487.78	$195.73	$264.97	$321.07
2021	$423.25	$876.21	$348.86	$657.39	$552.09

Source: Statistics Canada, Table: 32-10-0077-01

- Over the last three census periods, the prices of all three major meat-producing livestock species increased as well, with pork seeing the largest increases. This increase in output prices undoubtedly amplifies the effect that the livestock sector has on the overall economy.

Figure 10: Comparison of $/MT for Major Livestock (2011-2021)

	Cattle	Hogs	Lambs
2011	$97.30	$165.70	$75.09
2016	$142.04	$178.15	$71.72
2021	$144.07	$231.50	$101.57

Source: Statistics Canada, Table: 32-10-0077-01

Feed

The economic impact analysis methodology used is based on the gross output of a sector. In the case of crops, this includes the estimated market value of the crops and the average crop prices for the 2021 crop year. The total direct, indirect and induced effects of that output are already captured in the estimates of crop sectors, so they should not also be captured in the livestock sector. Of course, substantial volumes of feed will come from outside Lethbridge County, but most will still come from Alberta which is the geographic scope for the GDP impact modelling.

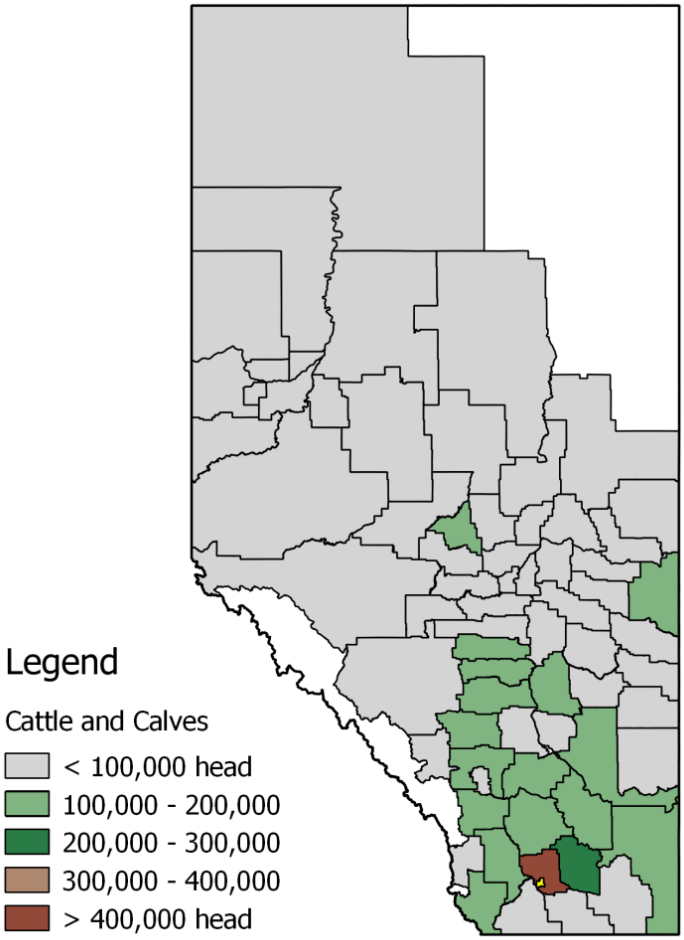
We have therefore estimated the ratio of feed costs to gross output for all of the relevant livestock sectors and discounted the total output accordingly. Wherever possible, only the purchased primary feeds are removed, while all feed supplements, minerals, and pasture costs remain included in the calculation of economic impacts.

Economic Impact

Livestock Sectors

Lethbridge County is a hotbed of the cattle industry, with heavy emphasis on confined feedlot feeding. The map below shows the distribution of cattle numbers across Alberta's counties with strong centralization of distribution in southern Alberta, particularly Lethbridge County.

Figure 8: Distribution of Cattle and Calves across Alberta Counties



The total contribution to the economy from the feedlot sector was estimated using the 2016 Census estimate of 731,743 head[4]. As the census statistics do not differentiate directly between background feeder cattle and those in finishing feedlots, we have assumed that all feeders will be finished within the County. The gross output was then estimated using an average turnover of 2.25 cycles per year, and an average price of $139.91/cwt for finished

4 We used as an estimate of the number of feeder cattle in May 2021 the number of heifers for slaughter for feeding, steers one year or over, and the total calves under one year old. We subtracted from this 26,109 calves (to match the number of beef cows), as these are included in the impact estimate for the cow-calf sector that follows.

cattle. In order to not double count the impact of feed grown within the County or count the contributions of feed grown elsewhere, the cost of feed is removed from the impact estimates.

Using this methodology, we estimate a contribution of $270 million toward Gross Domestic Product from beef feeding operations in Lethbridge County, with a total contribution to the economy (including direct, indirect, and induced impacts) of $2.7 billion.

Table 2: Impact of Beef Feeding in Lethbridge County

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$258,065,643	$12,450,535	**$270,516,178**
Total Output	$2,569,337,762	$131,296,555	**$2,700,634,317**
Labour Income	$204,669,829	$10,384,873	**$215,054,703**

While feedlots are the largest part of the beef sector in the County, there is also a significant cow-calf sector, which is estimated to contribute $25.7 million to the economy, for a contribution of $2.6 million to GDP. This is based on an inventory of over 26,000 cows and includes the value of culls.

As is the case for the other livestock sectors, the cost of purchased feed has been excluded. The cost of pasture, however, is included as this this is not otherwise accounted for in the economic impact estimates.

Table 3: Impact of Cow-Calf Operations in Lethbridge County

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$2,452,992	$118,346	**$2,571,338**
Total Output	$24,422,330	$1,248,013	**$25,670,343**
Labour Income	$1,945,448	$98,711	**$2,044,160**

There is also a significant dairy sector in Lethbridge County, as compared to most other counties in Alberta. Lethbridge County had an inventory of 9,272 dairy cows in the 2016 Census. We estimate that the total contribution to the economy from the dairy sector in Lethbridge County is just over $132 million, with a contribution of $13.2 million to Gross Domestic Product. This estimate is based on 9,929 dairy cows and a 2021 average annual gross milk income of $9,159 per cow.

Table 4: Impact of Dairy Operations in Lethbridge County

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$12,649,897	$610,302	**$13,260,199**
Total Output	$125,944,146	$6,435,912	**$132,380,058**
Labour Income	$10,032,533	$509,047	**$10,541,580**

While beef and dairy operations represent by far the largest livestock sectors in the County, the poultry, pork, and sheep sectors also make significant contributions to the economy, as outlined below in Table 5 to Table 7.

Table 5: Impact of Broiler Chicken Production in Lethbridge County

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$1,319,006	$63,636	**$1,382,642**
Total Output	$13,132,207	$671,073	**$13,803,280**
Labour Income	$1,046,093	$53,078	**$1,099,171**

Table 6: Impact of Pork Operations in Lethbridge County

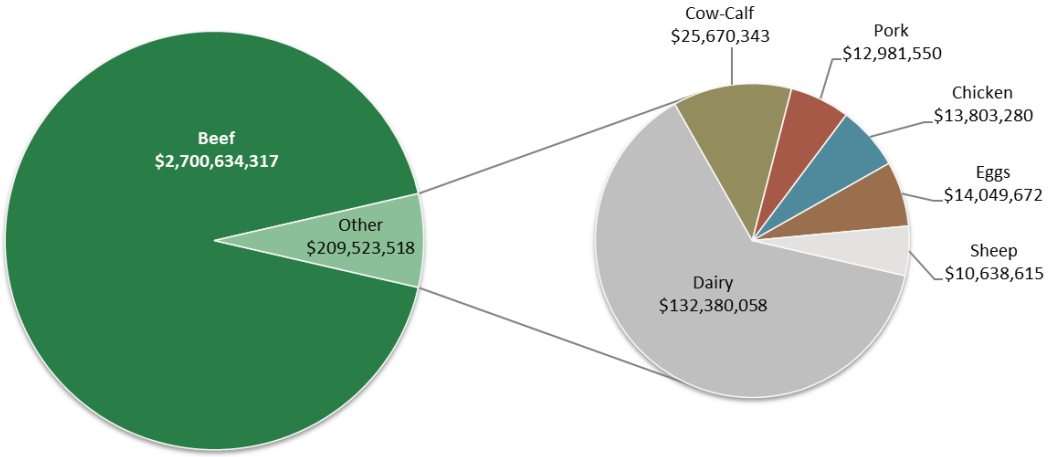
	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$1,240,483	$59,848	**$1,300,331**
Total Output	$12,350,427	$631,123	**$12,981,550**
Labour Income	$983,818	$49,919	**$1,033,736**

Table 7: Impact of Sheep Production in Lethbridge County

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$1,016,599	$49,046	**$1,065,645**
Total Output	$10,121,398	$517,217	**$10,638,615**
Labour Income	$806,256	$40,909	**$847,166**

The diagram below illustrates the relative contributions of all of the livestock sectors analyzed in this study. Beef makes by far the largest contribution, representing 92.8% of the livestock sector and 80.5% of the total agricultural contributions of the County.

Figure 9: Lethbridge County Livestock Sectors – Total Contribution to Economy



Crop Sectors

The 2021 Census of Agriculture was used to determine the most common crops in Lethbridge County and their estimated acreage. The crops with more than 1,000 acres are outlined Table 8 below.

Table 8: Lethbridge County Crop Acreages[5]

Crop	2016 Acres	2021 Acres
Wheat	206,799	204,054
Grassland	125,385	107,806
Canola	92,855	102,468
Barley	76,642	94,730
Corn	42,556	33,126
Peas	51,675	32,076
Pasture / Forages	17,535	23,327
Potatoes	6,449	12,843
Rye	1,351	11,496
Lentils	8,801	9,208
Beans	6,668	7,883
Flaxseed	2,977	7,082
Sugarbeets	6,361	5,064
Hemp	2,790	1,746

All other crops had acreages significantly below 1,000 acres each and were therefore not included in the overall analysis of the crop sector's economic impact.

In addition, as the purpose for calculating the impact of individual crops is merely for comparison relative to the other crops, only those crops with relatively complete and accurate data sources are included in the impact results outlined below. The impact of some crops would require considerably more investigation – alfalfa, for example, may have been grown as feed for

5 Source: Annual Crop Inventory, Agriculture and Agrifood Canada (data extracted by Serecon using QGIS software).

livestock within the County, in which case care would need to be taken to not include its impact, as it is already counted as an input to livestock production. The prices or yields for some crops are also not readily available specifically for the County given the relatively small geography.

Pricing data was gathered primarily from Statistics Canada, though some other industry sources were required for eggs, poultry, and dairy.[6] Yield data was obtained from Alberta Financial Services Corporation's "Yield Alberta 2021" because Statistics Canada only had data by Census Agricultural Region (not the county alone), which would have underestimated the actual yields on Lethbridge County's largely irrigated acres.[7] Several crops were not available through those sources, so we have relied on the Alberta Agriculture Statistics Yearbook for 2020 in those cases.

The acres produced of each crop have not yet been made available from the 2021 census, but we were able to rely on the remote sensing data used to create Agriculture and Agrifood Canada's Annual Crop Inventory. Estimates of total crop output value for Lethbridge County are outlined in the table below.

Unfortunately, greenhouse revenue estimates for Alberta are only available from a 2017 cost of production study by Alberta Agriculture. We have averaged the revenue estimates for cucumber, tomato, pepper, bedding plants/ornamentals, and tree seedlings to arrive at an estimate of revenue per square metre.

Table 9: Estimated Output of Key Field Crops, Lethbridge County 2021

Crop	2021 Acres	Price ($/tonne)	2021 Yield		Crop Output	
			bu/ac	tonne/ac	$/ac	County 2021
Canola	102,468	$876.21	49	1.1	$966.44	**$99,029,190**
Wheat	144,054	$423.25	61	1.7	$706.75	**$101,810,712**
Barley	94,730	$348.86	98	2.1	$745.66	**$70,637,175**
Durum wheat	60,000	$657.39	75	2.0	$1,336.51	**$80,190,414**
Sugar beets	5,064	$49.48		34.0	$1,682.32	**$8,519,268**
Greenhouses	257,867 m^2 x $101.82/$m^2$					**$26,256,018**
Dry field peas	32,076	$552.09	56	1.5	$838.61	**$26,899,483**
Potatoes	12,843	$13.53/cwt	404 cwt		$5,466.12	**$70,201,707**
Flaxseed	7,082	$1,158.32	18	0.5	$541.38	**$3,834,137**
Lentils	9,208	$897.54	12	0.3	$297.63	**$2,740,679**
						$490,118,782

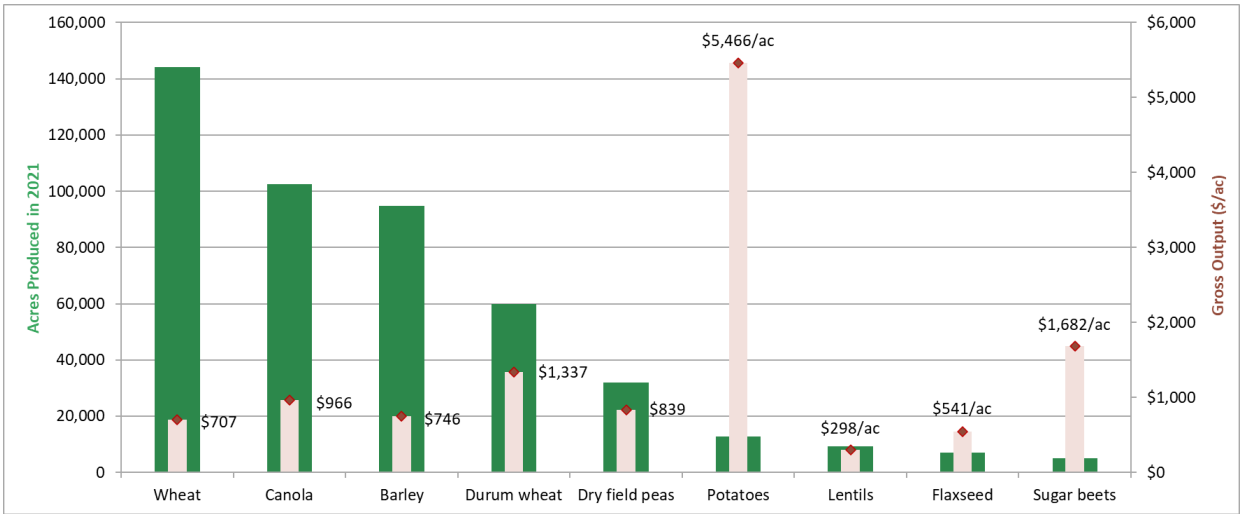
6 Statistics Canada. Table 32-10-0077-01 (formerly CANSIM 002-0043). Monthly prices were averaged for Sept 2021 to June 2022 to represent the primary sales months for the 2021 field crops.

7 Statistics Canada. Table 32-10-0002-01 Estimated areas, yield and production of principal field crops by Small Area Data Regions, in metric and imperial units.

Potatoes and sugar beets in particular produced an estimated per-acre return of over $5,400 and $1,600 respectively, while most other field crops produced in the range of $500-$800 per acre. The greenhouse sector has also grown substantially since five years ago, generating an estimated output of over $26 million in the county.

The three largest crops by acreage were wheat, canola and barley which had gross revenue of $707, $966 and $745 per acre respectively. The acreage and gross output of the various crops is shown below in Figure 12.

Figure 10: Lethbridge County Acreage & Gross Output, by Crop in 2021



Between the four most impactful crops in the county (wheat, canola, barley and potatoes), the value of the crop output is almost $422 million. The impact of those crops, based on the Alberta Finance economic multipliers, is as outlined in the tables below.

Table 10: Impact of Wheat Production[8]

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$138,684,858	$22,932,142	**$161,617,000**
Total Output	$261,171,616	$43,316,268	**$304,487,884**
Labour Income	$67,808,122	$11,180,366	**$78,988,489**

Table 11: Impact of Canola Production

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$75,460,243	$12,477,678	**$87,937,920**
Total Output	$142,106,887	$23,568,947	**$165,675,834**
Labour Income	$36,886,478	$6,092,191	**$42,978,668**

8 Includes spring and durum wheat

Table 12: Impact of Barley Production

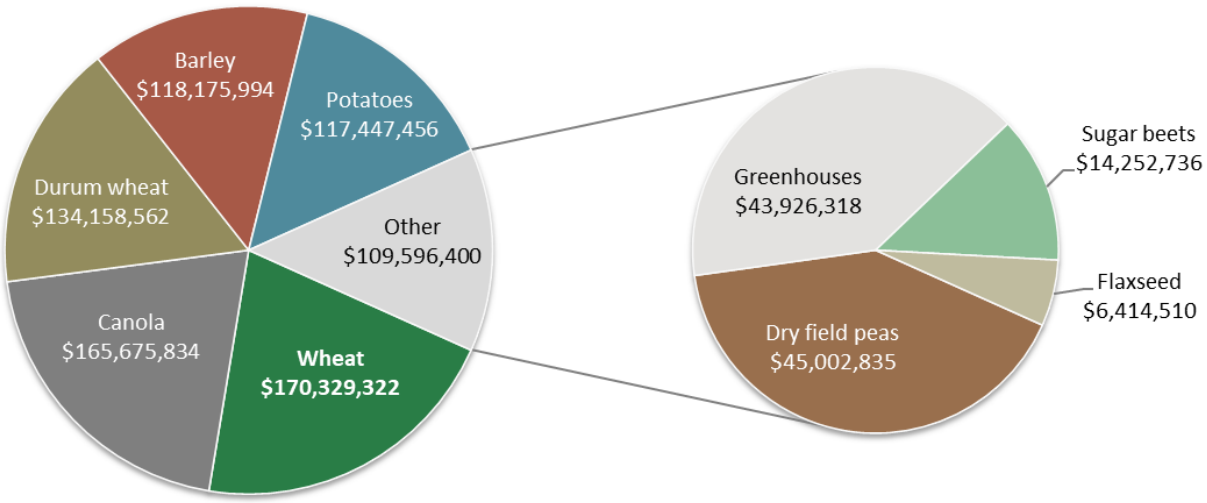
	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$53,825,528	$8,900,284	**$62,725,812**
Total Output	$101,364,346	$16,811,648	**$118,175,994**
Labour Income	$26,317,278	$4,339,256	**$30,656,534**

Table 13: Impact of Potato Production

	Direct & Indirect Impact	Induced Impacts	Total Impact
GDP	$53,493,701	$8,845,415	**$62,339,116**
Total Output	$100,739,450	$16,708,006	**$117,447,456**
Labour Income	$26,155,036	$4,312,505	**$30,467,541**

Wheat (including durum) and canola together make up over 57% of the total crop impact in the county, but there are quite a number of other crops that also make significant contributions in the millions of dollars annually. The relative impact of the various crop sectors in Lethbridge County is outlined in Figure 13 below.

Figure 11: Lethbridge County Crop Sectors – Total Contribution to Economy



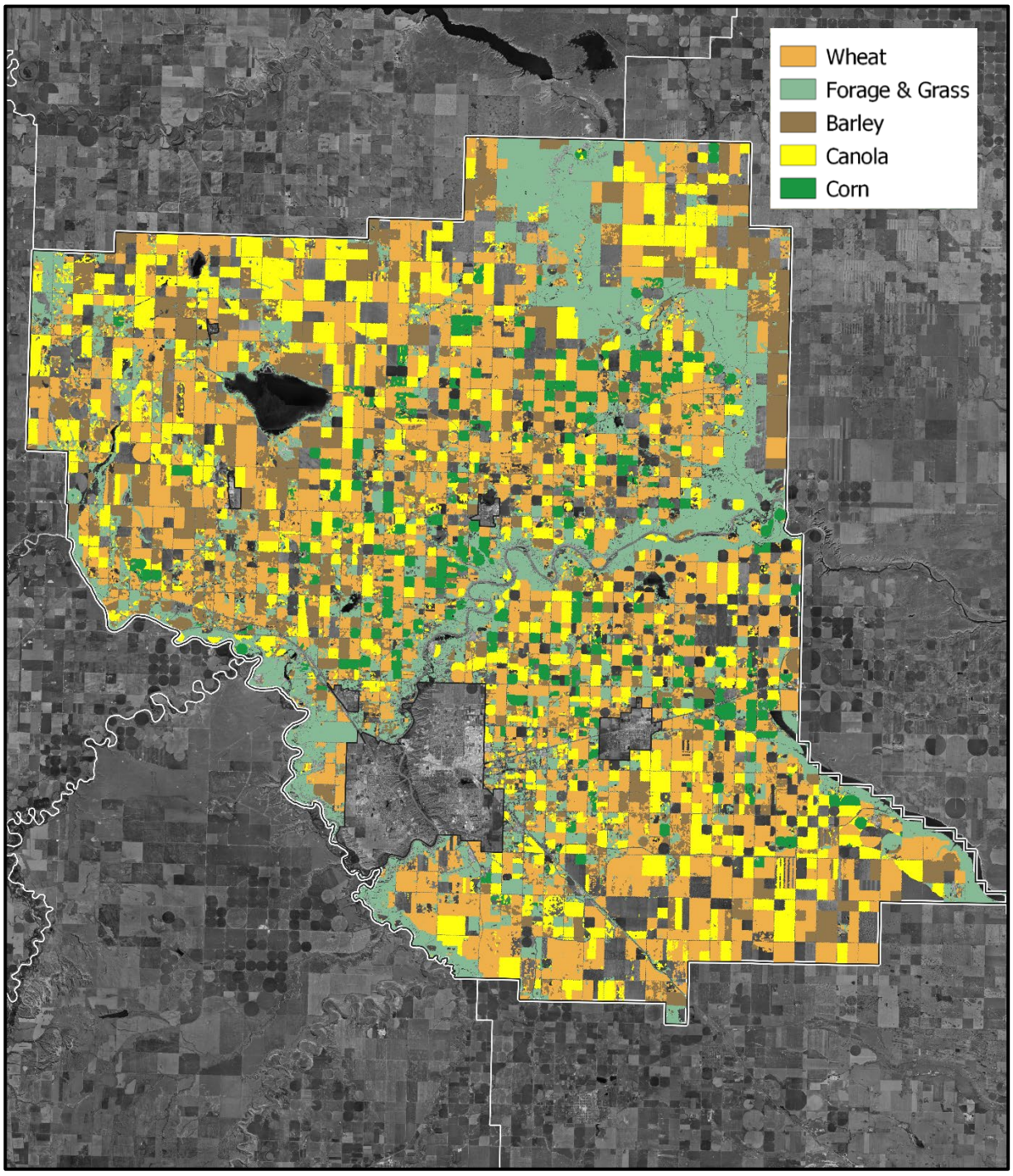
Crop Locations & Acreages

Our economic impact analysis throughout is based largely on census data at the County level. Our methodology uses this approach to make the overall impact most comparable between crop and livestock sectors, for uniformity of approach. One significant limitation of that data is that it is collected only every five years and there is a time lag in presenting the data.

We have therefore used an annual data source to examine trends in crop production using remote sensing data compiled by Agriculture and Agrifood Canada, the Annual Crop Inventory. This data uses a combination of satellite imagery, radar data, and algorithms relating to crop growth to develop an inventory of crops at 25 metre scale.

It is also informative to look at where in the County the various crops are being grown. The map on the next page shows the location of the crops with the largest acreage in Lethbridge County in 2021.

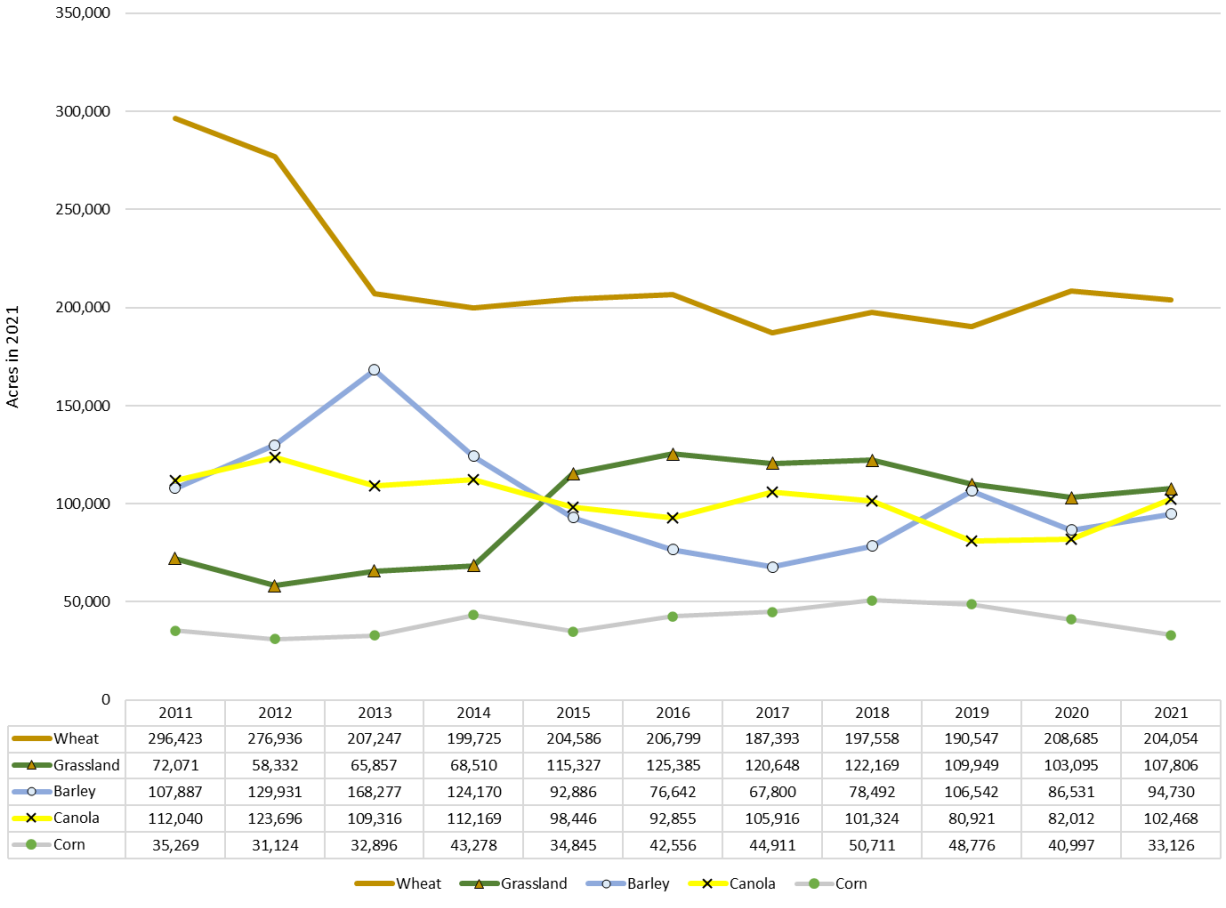
Figure 12: Top Five Crops - Lethbridge County 2021



Map produced based on Annual Crop Inventory produced by Agriculture & Agrifood Canada, 2021 crop year.

Most of the largest-acreage crops have remained relatively stable over the years, thought wheat and barley acreage decreased over the years 2011 to 2017, while grassland surprisingly increased starting in 2015. Potato acreage also doubled, but its acreage is relatively low compared to the other crops, so it would not show well on the chart below. It is very significant in terms of economic impact, however, because its gross revenue is over $5,000 per acre. We have included a chart on potato acreage growth in the analysis later in this report..

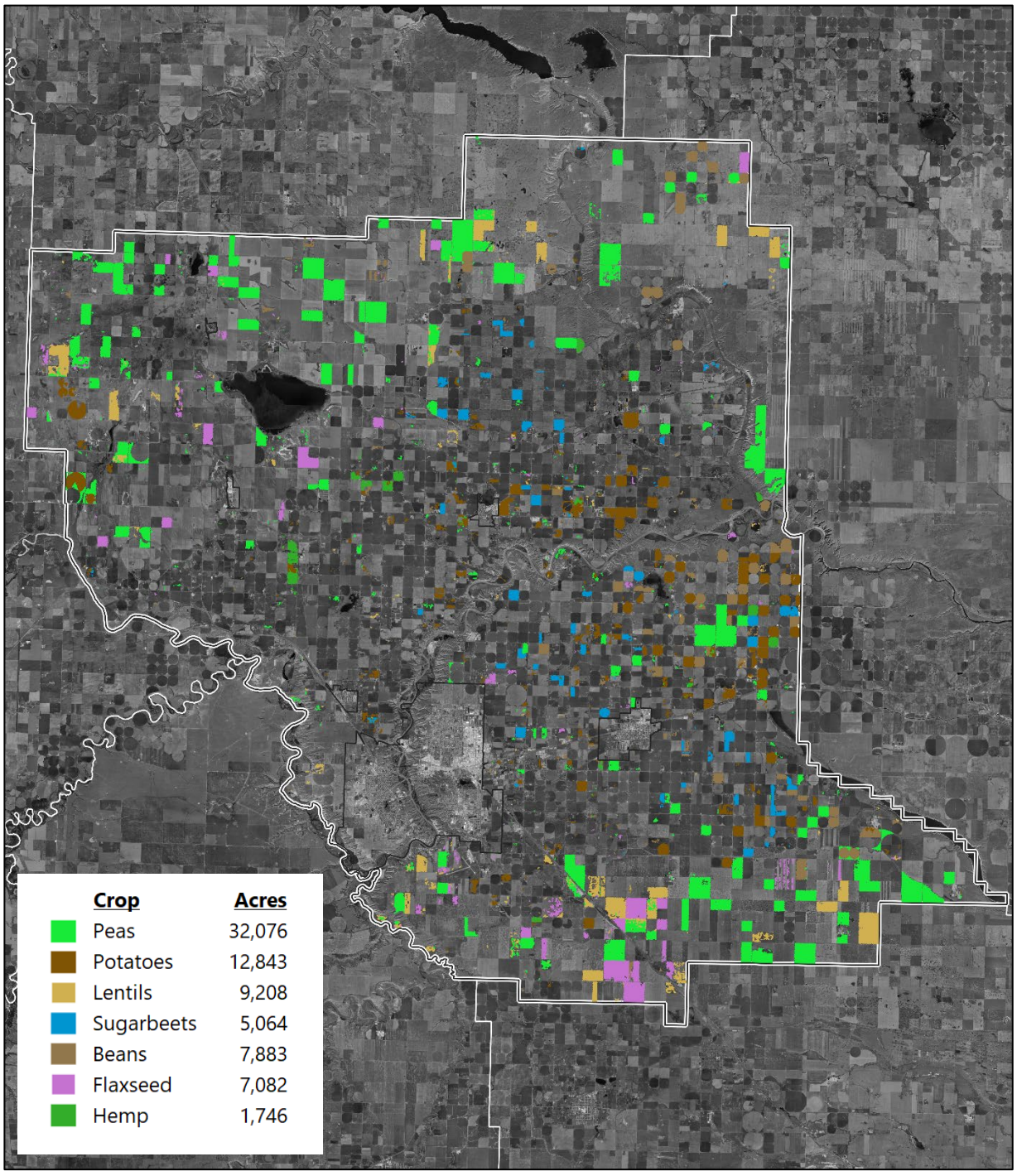
Figure 13: Acreage of Top 5 Crops, Lethbridge County 2011-2021



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Wheat	296,423	276,936	207,247	199,725	204,586	206,799	187,393	197,558	190,547	208,685	204,054
Grassland	72,071	58,332	65,857	68,510	115,327	125,385	120,648	122,169	109,949	103,095	107,806
Barley	107,887	129,931	168,277	124,170	92,886	76,642	67,800	78,492	106,542	86,531	94,730
Canola	112,040	123,696	109,316	112,169	98,446	92,855	105,916	101,324	80,921	82,012	102,468
Corn	35,269	31,124	32,896	43,278	34,845	42,556	44,911	50,711	48,776	40,997	33,126

It should not be forgotten, however, that there numerous other specialty crops grown in the County as well. The map below shows the locations of several of the more noteworthy and unique crops grown in Lethbridge County. As seen below, potatoes have an especially high impact both on a per-acre basis and overall in the County.

Figure 14: Larger-Acreage Specialty Crops, Lethbridge County 2021



Map produced based on Annual Crop Inventory produced by Agriculture & Agrifood Canada, 2021 crop year.

2016-2021 Comparison

There has been considerable growth in the agriculture sector as illustrated by the 2021 Census of Agriculture, with Lethbridge County already having the largest agricultural output of any Alberta county in the 2016 census. And then it grew its agricultural revenues faster than any of the other

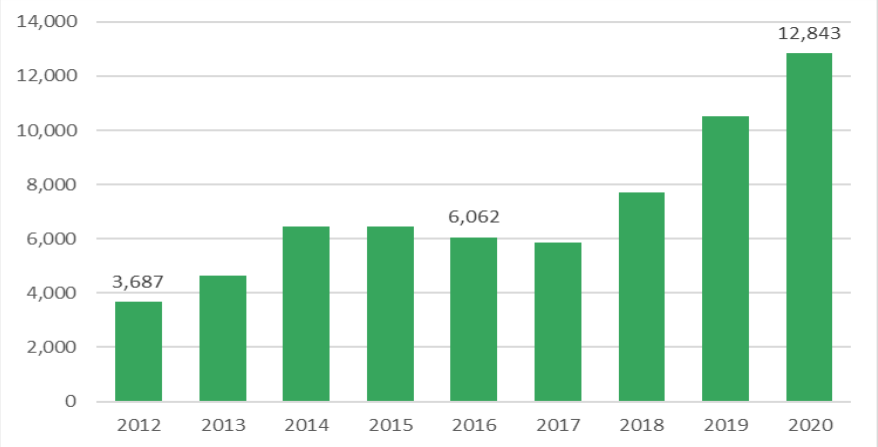
counties over that five year period again. The table below displays the magnitude of these changes.[9]

Table 14: Changes in Total Output by Sub-Sector (2016-2021)

	Total Impact (2016)	Total Impact (2021)	% change
Beef	$1,629,300,000	$2,700,634,317	65.8%
Dairy	$95,600,000	$132,380,058	38.5%
Potatoes	$25,000,000	$117,447,456	369.8%
Wheat	$92,644,437	$170,329,322	83.9%
Canola	$105,000,000	$165,675,834	57.8%
Durum wheat	$51,340,146	$134,158,562	161.3%
Greenhouses	$14,000,000	$43,926,318	213.8%
Barley	$61,200,000	$118,175,994	93.1%
Cow-Calf	$19,500,000	$25,670,343	31.6%
Dry field peas	$57,500,000	$45,002,835	-21.7%
Chicken	$4,700,000	$13,803,280	193.7%
Sugar beets	$18,700,000	$13,561,059	-27.5%
Pork	$16,100,000	$12,981,550	-19.4%
Sheep	$4,000,000	$10,638,615	166.0%
Flaxseed	$5,300,000	$6,414,510	21.0%

The largest percentage gains in terms of overall impact are potatoes and greenhouses, with the overall impact at least doubling in the county over the last five years. The notable increase in total impact attributed to potatoes is largely due to the significant increase in potato acreage in Lethbridge County which has doubled since 2016. The chart below shows this increase in potato acreage over the past decade. While 6,000 acres would be negligible growth for other crops which gross in the range of $700/acre, it is quite significant when the crop grosses $5,400 per acre like potatoes.

Figure 15: Growth in Potato Acreage in Lethbridge County (2012-2021)



9 Note that some of the 2016 impact numbers for field crops may be lower due to the average yields including the dryland yields in a regional average used for the 2016 report.

Sector Comparison

It is clear from the analyses above that in Lethbridge County, that several agricultural subsectors are considerably larger than all the others. Beef and dairy sectors and the major field crops represent the largest contribution to the Alberta economy.

In total, for all of the livestock sectors reviewed in the the course of this project, we estimate a contribution of roughly $2.9 billion by Lethbridge County to the Alberta economy annually. For beef feeding alone, we estimate a total contribution of approximately $2.7 billion annually, or roughly 80% of the total agricultural impact for the county.

Likewise, wheat and canola alone make up over 57% of the total estimated Lethbridge County crop-sector impact of $820 million.

Table 15 and the chart below show the relative size of these key livestock and crop elements in Lethbridge County.

In total, we estimate that the agricultural sector in Lethbridge County contributed approximately $3.7 billion to the Alberta economy in 2021, with its contribution to Gross Domestic Product being approximately $727 million.

Of the total contribution of Lethbridge County agriculture to the economy, 78% comes from livestock sectors, with 72% being from beef feeding operations alone. 22% of the total agricultural contribution comes from crops, with wheat, canola, barley and potato making the largest contributions.

Figure 16: Economic Impact Breakdown for Lethbridge County

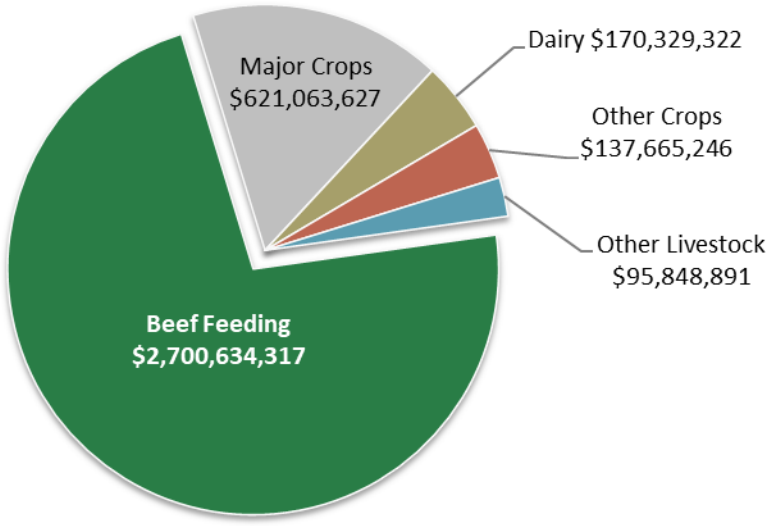


Table 15: Lethbridge County Agricultural Subsector Contributions to Alberta Economy & GDP Impact

	Total Contribution to Economy	GDP Impact
Livestock		
Beef	$2,700,634,317	$270,516,178
Dairy	$132,380,058	$13,260,199
Cow-Calf	$25,670,343	$2,571,338
Pork	$12,981,550	$1,300,331
Chicken	$13,803,280	$1,400,000
Eggs	$14,049,672	$1,407,323
Sheep	$10,638,615	$1,065,645
Livestock - Total	**$2,910,157,835**	**$291,521,014**
Crops		
Wheat	$170,329,322	$90,407,913
Canola	$165,675,834	$87,937,920
Durum wheat	$134,158,562	$71,209,087
Barley	$118,175,994	$62,725,812
Potatoes	$117,447,456	$62,339,116
Dry field peas	$45,002,835	$23,886,741
Greenhouses	$43,926,318	$23,315,344
Sugar beets	$14,252,736	$7,565,110
Flaxseed	$6,414,510	$3,404,713
Lentils	$4,585,155	$2,433,723
Crops - Total	**$819,968,723**	**$435,225,479**
Total -- Agriculture	**$3,730,126,558**	**$726,746,493**