2017

# AN OVERVIEW
## OF THE CANADIAN AGRICULTURE AND AGRI-FOOD SYSTEM

Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada
Canada

## An Overview of the Canadian Agriculture and Agri-Food System 2017

**Project Management Team**
Sam Bonti-Ankomah, Amanda Stamplecoskie and Olivier Carrier-Leclerc.

**Project Team**
Members of the Agri-Food Industry and Competitiveness Analysis Section and the Agri-Food Support, Measurement and Analysis section. This publication comprises data and analysis provided by all three divisions of the Research and Analysis Directorate as well as contributions from other divisions and branches of Agriculture and Agri-Food Canada.

November 2017

Research and Analysis Directorate
Strategic Policy Branch
Agriculture and Agri-Food Canada

**NOTE TO READERS**
This publication reflects the latest data available as of June 2017.
Due to rounding, totals may not equal the sum of their components.


Catalogue No. A38-1/1E
ISSN 1919-8396
AAFC No. 12714E

Electronic versions of Research and Analysis Directorate publications are available on the Internet at http://www.agr.gc.ca
Paru également en français sous le titre *Vue d'ensemble du système agricole et agroalimentaire canadien 2017*

For more information, reach us at www.agr.gc.ca or call us toll-free at 1-855-773-0241.

# TABLE OF CONTENTS

# LIST OF CHARTS

## SECTION A: SPECIAL FEATURES:
## SECTION A1: TRENDS IN CANADIAN AGRICULTURE



## SECTION A2: BIOPRODUCT PRODUCTION AND DEVELOPMENT IN CANADA



## SECTION B: GDP AND EMPLOYMENT

## SECTION C: INTERNATIONAL TRADE



## SECTION D: PRIMARY AGRICULTURE
## SECTION D1: FARM PERFORMANCE

## SECTION D2: FARM INPUTS



## SECTION E: POST FARM GATE
## SECTION E1: FOOD AND BEVERAGE PROCESSING



## SECTION E2: FOOD RETAIL AND FOODSERVICE

## SECTION F: HOUSEHOLD FOOD EXPENDITURES, FOOD PRICES AND FOOD CONSUMPTION PATTERNS



## SECTION G: GOVERNMENT EXPENDITURES AND SUPPORT

# ABSTRACT

This 2017 report provides an economic overview of the Canadian agriculture and agri-food system using the most recent data available. It is meant to be a multi-purpose reference document that presents:

- the agriculture and agri-food system in the context of the Canadian economy and international markets; and
- a snapshot of the composition and performance of the agriculture and agri-food system as it evolves in response to challenges, opportunities and market developments.

The report describes the Canadian agriculture and agri-food system as a complex and integrated supply chain that includes input and service suppliers, primary agricultural producers, food and beverage processors, food retailers and wholesalers and foodservice providers. The activities along this supply chain generate significant economic benefits at both the national and provincial levels.

In celebration of Canada's 150th anniversary, the 2017 report begins with a special feature on trends in Canadian agriculture followed by a second special feature that provides information on bioproduct production and development in Canada using results from the 2015 Bioproducts Production and Development Survey.

The rest of the report examines the agriculture and agri-food system's importance to the Canadian economy, as measured by its contribution to the Canadian gross domestic product (GDP) and employment. It also reviews Canada's performance internationally, in terms of its share of global agriculture and agri-food trade, and presents a snapshot of each segment of the agriculture and agri-food system covering: farm inputs, primary agriculture, food and beverage processing, food retail, foodservice, and consumers. In addition, the report provides an overview of government support to agriculture.

# HIGHLIGHTS

## SPECIAL FEATURE – TRENDS IN CANADIAN AGRICULTURE

- Canadian agriculture has evolved over time in response to challenges, opportunities and market developments.
- From 1871 to 2016, there was a shift to fewer and larger farms, both in terms of farmland and revenues, for most commodities produced in Canada. As population increased, the number of farms in Canada peaked in 1941, reaching 732,832 and has steadily declined since then to 193,492 in 2016. The average area per farm was 40 hectares in 1871 and increased to reach 332 hectares in 2016.
- Agricultural production in Canada has changed over time, as producers responded to market signals as well as opportunities from new production practices and technologies. The seeded area of wheat peaked in 1986 at 14.3 million hectares, while the area allocated to canola has increased steadily since 1976, and now accounts for more than one-fifth of all cropland. In addition, the number of animals on Canadian farms has increased steadily since 1871, despite periodic declines.
- After 2006, there was a shift from livestock-based farms to crop-based farms in Canada, based on the number of farms, with the share of crop-based farms increasing from 49% in 2006 to 58% in 2011. Strong prices for certain field crops like canola, soybean and corn contributed to the increase in crop-based farms.

## SPECIAL FEATURE – BIOPRODUCT PRODUCTION AND DEVELOPMENT IN CANADA

- Non-conventional industrial bioproducts including biofuels, plant-based plastics, biocomposites and chemicals are a growing part of Canada's Bioeconomy.
- In 2015, 190 firms were engaged in the production or development of non-conventional industrial bioproducts in Canada. The total revenue from bioproducts production was $4.27 billion and employment reached 5,618 people. Biofuels is the largest bioproduct category with revenues of $2.72 billion in 2015, of which 75% were from ethanol and 24% from biodiesel.
- Canada's bioproduct firms transformed over 21 million metric tonnes of biomass into bioproducts in 2015, of which 12.3 million metric tonnes were sourced from forestry and 8.8 million metric tonnes were from from agriculture.

## IMPORTANCE OF THE AGRICULTURE AND AGRI-FOOD SYSTEM (AAFS) TO THE CANADIAN ECONOMY

- In 2016, the AAFS generated $111.9 billion of gross domestic product (GDP), accounting for 6.7% of Canada's total GDP. Of this, the food retail and wholesale industry accounted for the largest share (1.8%), followed closely by the food and beverage processing industry (1.7%). The GDP of the AAFS has increased steadily since 2007 with the exception of the global economic recession of 2009.
- The AAFS employed approximately 2.3 million people in 2016, accounting for 12.5% of employment in the Canadian economy. The foodservice industry was the largest employer in the AAFS, accounting for 5.7% of Canadian employment. Employment in the AAFS declined by 1.3% in 2016 compared to the previous year, the first decline since 2010.

## GLOBAL CONTEXT

- The value of Canada's agriculture and agri-food exports reached $56.0 billion in 2016, and with the addition of seafood exports, $62.6 billion. In this report, the trade values do not include seafood, as the report focusses on agriculture and agri-food products.

- Canada's agriculture and agri-food sector saw subdued growth in exports and imports in 2016 relative to 2015. With higher export volumes slightly offsetting lower export prices, export values grew by 0.6% to reach $56.0 billion in 2016.
- Export growth to the U.S. slowed from 9.2% annual growth in 2015 to 2.4% annual growth in 2016, but export growth to China expanded by 8.0% in 2016, mainly due to increased sales of oilseeds and oilseed products.
- Canadian exports of processed agri-food products increased from $27.3 billion in 2015 to $29.2 billion in 2016. Exports of primary agricultural products declined from $28.4 billion to $26.8 billion over the same period.
- Of the Canadian food and beverage processing enterprises that directly exported their products abroad in 2016, large enterprises (500+ employees) accounted for 46.9% of the value of their exports. Among food and beverage processing enterprises of all sizes, those that exported to multiple countries accounted for 78.4% of the value of their exports.
- Canada relies on imports to meet domestic demand for a variety of agriculture and agri-food products. Canadian agriculture and agri-food imports grew by 2.0% to reach $44.4 billion in 2016.

## PRIMARY AGRICULTURE

- Farm market receipts remained at a record high of $57.6 billion in 2016. The growth in farm market receipts has been mainly driven by grain and oilseeds receipts which have increased by 6.5% annually on average since 1971.
- Farm performance, as measured by net cash income and net value added, has been strong in recent years. Net cash income reached a record high of $15.8 billion in 2016 with farm cash receipts growing at a faster rate than net operating expenses. Net value added in agriculture reached $18.7 billion in 2015, surpassed only by the record high of $22.2 billion in 2013.
- Farm net worth reached a record high in 2015 with increases in farm asset values offsetting increases in farm debt.
- The operating costs of agricultural producers increased by 41.9% between 2006 and 2016 despite the slight decline (0.9%) between 2015 and 2016. Net commercial feed, the largest single expense item, increased by 53.5% between 2006 and 2016. Crop related expenses have grown by the largest amount, as area seeded to crops has increased along with a reduction in summerfallow. Fertilizer expenses, the largest share of crop expenses, increased by 76.1% over the same period.

## FOOD AND BEVERAGE PROCESSING

- The food and beverage processing industry is the largest manufacturing industry in Canada, accounting for the largest share (16.4%) of the total manufacturing sector's GDP in 2016. It also accounted for the largest share (17.3%) of jobs in the manufacturing sector during the same year.
- The food and beverage processing industry continues to grow, and the value of its shipments has more than doubled since 1992, reaching $112.4 billion in 2016. Meat, dairy and beverage processing accounted for more than half of the total value of food and beverage processing shipments in 2016.
- Food and beverage processors continue to experience lower, but more stable, profit margins compared to the overall manufacturing sector. Profit margins in the food and soft drink processing industry increased by 16.6% from 2015 to 2016, while the overall manufacturing sector's margins declined by 4.4%.

## FOOD RETAIL AND FOODSERVICE

- In 2016, Canada's top three food retailers together accounted for $83.8 billion in sales and 3,190 stores.
- The total number of Canadian food stores has declined by 871 per year on average while sales increased by an average of 3.1% per year between 1990 and 2016.
- Commercial foodservice sales were $61.1 billion in 2015, representing a 5.2% increase from the previous year. In 2015, the number of jobs in foodservice was 1,083,515, which was 6.6% higher than in 2014. From 2010 to 2015, commercial foodservice sales grew at 25.2% and employment in the sector, increased by 15.4%.

## HOUSEHOLD FOOD EXPENDITURES, FOOD PRICES AND FOOD CONSUMPTION PATTERNS

- Canadians spent $213.3 billion on food, beverages and tobacco products in 2016. This represented the second-largest household expenditure category, after shelter.
- Average spending on food and non-alcoholic beverages by households was $8,629 in 2015, an increase of 9.9% from $7,850 in 2010. More than two-thirds of the average total food expenditure is purchased from stores (71%).
- In 2015, food and non-alcoholic beverage purchases accounted for 10.4% of average household expenditures in Canada.
- Retail food prices increased by 1.5% in 2016, after rising by 3.7% in 2015. The increase in retail food prices is greater than the overall rate of inflation which was 1.4% in 2016.

## GOVERNMENT EXPENDITURES AND SUPPORT

- Government expenditures (federal and provincial) in support of the agriculture and agri-food sector are estimated to be $5.4 billion in 2016-17, which is 24.2% of agricultural GDP.
- Program payments make up the largest portion of both federal and provincial government expenditures in support of the agriculture and agri-food sector. However, total program payments have generally declined from 2003-04 through 2015-16 fiscal years, but are estimated to increase slightly in the 2016-17 fiscal year.
- Canada's public R&D spending in the agriculture and agri-food sector, as a share of gross farm receipts (GFR), has decreased since 1989-1995. However, it continues to exceed that of the U.S., though it has been surpassed by Australia since 2003-09.
- The Producer Support Estimate (PSE) as a percentage of GFR for Canada, the U.S., the EU and Australia has declined over time. In 2016, the EU had the highest level of support at 21% followed by Canada at 11%, the U.S. at 9% and Australia at 1%.

*Celebrating* **150** *years of agriculture*

# SECTION A1

**For generations, agriculture has made significant contributions to Canada's economy, food supply and culture.**

# TRENDS IN CANADIAN AGRICULTURE

**To celebrate the 150th anniversary of Canada, the Overview of the Canadian Agriculture and Agri-Food System includes this special feature meant to highlight key changes in the Canadian agricultural landscape over time.**

For generations, agriculture has made significant contributions to Canada's economy, food supply and culture. The contribution of agriculture to the Canadian economy has grown over time and is likely to continue increasing. Agricultural sales and farm incomes are currently at record highs and Canada continues to be one of the world's largest exporters of agricultural commodities.

## THE DIVERSITY OF CANADA'S LANDSCAPE AND CLIMATE HAS PLAYED AN IMPORTANT ROLE IN SHAPING AGRICULTURAL PRODUCTION AND PRACTICES OF CANADA'S REGIONS.

The dry and harsh climate of the Prairies, combined with the short growing season, was a challenge to the development of Western Canada. In the 1880s, Indigenous farming in Western Canada was often a collective endeavour with many bands pooling labour and resources to purchase equipment [2]. While Indigenous and European farmers faced many of the same challenges, such as pests, drought and short growing seasons, government policies during this time displaced many successful Indigenous farming practices and hindered Indigenous peoples' ability to farm. [2] From 1896 to 1905, the federal Minister of the Interior welcomed agricultural immigration to the Prairies, particularly from Eastern Europe given the similarities in climate. Challenging socioeconomic conditions in Europe combined with the opportunity to obtain homestead land in Western Canada acted as a strong incentive for immigrants to settle in that region. [3]

Farms vary regionally across Canada because of differences such as soil conditions, climate and topography, and many of the differences seen today were established in the early years. Wheat production was dominant in Ontario during the first half of the 19th century. The diversification of commodities in the province began in the second half of the century. Towards the end of the 19th century, there was a shift from the production of wheat to dairy in Quebec. Around the same time, large-scale cattle production was established in Alberta and Saskatchewan and wheat became economically important in the Prairies, while the horticulture and dairy industries were well established in Atlantic Canada and British Columbia. [4]

Today, larger farms in terms of acreage tend to be located in the Prairies, particularly in Saskatchewan and Alberta, with a strong presence of grain and oilseed crops like canola and wheat. Cattle production remains common in this region. Ontario and Quebec, with a smaller average farm size, are more diversified than other provinces and contribute a large share to Canada's production of dairy, hogs, corn, soybeans and horticulture.

Indigenous peoples have made significant contributions to agriculture. When Europeans arrived in North America, Indigenous populations had long since cultivated maize, squash and beans over a wide area. They harvested various berries, nuts and fungi while wild rice, maple and birch sap were also harvested in some areas. [1] The regional nature of some products such as fish led to the trade of certain food commodities. Many of the foods harvested by Indigenous peoples including blueberries, cranberries, maple and various nuts have become widely adopted over time and are still harvested today.

British Columbia and Atlantic Canada's farms are also generally smaller in size. A large share of their farm income continues to come from horticulture, dairy, poultry and egg production.

## FROM 1871 TO 2016, THERE WAS A SHIFT TO FEWER AND LARGER FARMS, BOTH IN TERMS OF FARMLAND AND REVENUES, FOR MOST COMMODITIES PRODUCED IN CANADA.

### This trend mainly reflects technological advancements and farm consolidation in the sector, as traditional family farms evolved into more complex and profitable businesses.

The number of farms in Canada peaked in 1941, reaching 732,832 farms, but gradually declined thereafter to 193,492 farms in 2016, reflecting increasing mechanisation which encouraged consolidation in the sector. The decline in farm numbers occurred across all provinces, although the extent varies by region. British Columbia shows the smallest relative decline in the number of farms since the province's peak in 1951, which could be partially explained by the high proportion of small farms in the province today. Conversely, in New Brunswick and Nova Scotia, total farms declined by the highest rate since their peak in 1891. The increased use of mechanisation in the 1950s and 1960s led to a reduction in farmland area, particularly in New Brunswick and Nova Scotia, as farms on lower quality land exited the industry since they were unable to remain competitive. [5]

As farm equipment, processes and technologies evolved, consolidation increased as producers were able to cover larger areas with reduced inputs. As a result, average farm size increased over time. Despite this increase, total farm area has remained fairly constant since 1961 with innovation leading to increased productivity in the Canadian agricultural sector. Namely, the use of fertilizers and pesticides, the development of new seed varieties and the adoption of innovative cultivation practices have allowed farmers to produce more with the same amount of land.

**Infographic A1.1**


The Canadian agricultural landscape is still characterized by a strong presence of small-size farms (with farm receipts under $100,000) representing over half of all farms. Their share in terms of production is decreasing as the value of their agricultural sales represents less than 5% of all farm receipts, down from almost 17% in 1986. On the other hand, the contribution of very large farms (with farm receipts of at least $1,000,000) is increasing in importance. In 2016, they represented about 8% of all farms, up from less than 1% in 1986. Very large farms were responsible for over 60% of all farm receipts in 2016, up from 17% in 1986.

As farms became larger and markets changed, the business structure of Canadian farms evolved as shown by the decreasing proportion of sole proprietorship farms over time. In 1971, sole proprietorship farms accounted for 92% of all farms while their share dropped to 52% in 2016; however, this operating arrangement still represents the most common farm business structure in Canada. The gradual change from sole proprietorship farms to other business options is mainly due to the shift to larger farms, which are managing more animals and hectares of land and generating more farm revenue. These larger operations can benefit from the business advantages and limited liability offered by business options such as incorporation.

**Infographic A1.2**


There is a trend towards more incorporation over time. The share of incorporated farms went from 2% in 1971 to 25% in 2016. Family corporations, in particular, represent a large share of Canada's farm revenue since they account for the majority of farms with revenues of one million dollars or more. The share of partnerships and non-family corporations is on the rise since 1971 though non-family corporations continue to represent a very small proportion (less than 3%).

Although the majority of agricultural land is owned by those who operate it, owned hectarage is decreasing while area rented is increasing. The share of owned land gradually declined between 1966 and 2011, from 76% to 59%; however, it increased to 63% in 2016. Rising land values in the last decade have made renting land a more viable option for farmers. The ageing farm population has also played a role in the overall trend since older operators are more likely to rent a portion of their land to other farmers while scaling back their own production. [6]

## AGRICULTURAL PRODUCTION IN CANADA HAS CHANGED OVER TIME, AS PRODUCERS RESPONDED TO MARKET SIGNALS AS WELL AS OPPORTUNITIES FROM NEW PRODUCTION PRACTICES AND TECHNOLOGIES.

### The structure of Canadian agriculture has evolved over time with changes in farm types, technological advancements, crop mix and livestock herd size in response to changing market conditions and consumer demand.

1840 marked the beginning of a gradual decline in the share of crop farming with an increase in the share of beef cattle production in Eastern Canada. From the late 18th century until the late 19th century, wheat was the most dominant and profitable commodity in Ontario and Quebec, and was grown intensively. By 1870, the soil quality had been depleted due to intensive mono-cropping and lack of crop rotation resulting in lower yields. At the same time, increased competition from the U.S. Midwest drove wheat prices down, while cattle prices improved due to factors such as the American Civil War and improved access to the U.S. market, creating an incentive for cattle farming in Canada. Also, in the 1870s, new flour milling and sifting technologies were developed in response to increased demand for white flour. However, these technologies were better suited for hard wheat varieties mostly grown in Western Canada, which further reduced demand for the soft wheat varieties grown in Eastern Canada. Additionally, the construction of the Canadian Pacific Railway in the early 1880s opened up opportunities for grain farmers in Western Canada, who could market their wheat production on the larger U.S. and Eastern Canada markets and thus, increased competition for eastern grain producers. [7]

Trade conditions with other countries also created an additional incentive for farmers to diversify into cattle ranching. Beginning in 1874, the United Kingdom became an export market for live Canadian cattle, with Canadian cattle also benefitting from a premium over American cattle between 1879 and 1892. [7] By the 1870s, Southern Ontario had become Canada's first specialized cattle producing region, but at the same time, Western Canada started becoming a competitor. [7]

Unlike the gradual increase in cattle production in Eastern Canada, the industry appeared quite suddenly in Western Canada, at the peak of a global cattle boom when prices were high in the Northeastern United States because of the American Civil War. [7] Demand for animal protein was also increasing with the domestic population. Furthermore, when the Canadian Pacific Railway was

established in the Prairies in the early 1880s, interest in cattle production increased because of the ability to access distant markets. As a result, large-scale ranching expanded rapidly in Western Canada in the 1880s. [8]

The number of animals on Canadian farms has increased steadily since 1871, despite periodic declines. The Canadian pig herd has nearly quadrupled since 1921, and the average herd size has also increased. Hog production has seen considerable consolidation over the years, with fewer and larger hog farms accounting for most of the production. Similarly, cattle farms have consolidated, though at a relatively slower rate than hog farms. The average herd size of cattle farms has trended upward since 1941. Innovative technologies, increased mechanisation and improved production methods have allowed farmers to increase their herd size to take advantage of market opportunities in Canada and abroad. The introduction of the North American Free Trade Agreement (NAFTA) in 1994 also contributed to the red meat sector's growth. However, events such as the discovery of bovine spongiform encephalopathy (BSE) on a farm in Alberta in 2003 and an oversupply of cattle and hogs in North America slowed the red meat sector's growth during the first decade of the 2000's.

The development of pasteurization and butter and cheese manufacturing led to an increase in the consumption of dairy products in the late nineteenth century. Canada's long history of innovation in dairy cattle genetics contributed to the increase in milk production per cow. Advancements in animal nutrition have also played an important role. [9]

**The total number of dairy cows has declined since 1956, but the production of milk per cow more than doubled between 1981 and 2016.**

**THE SHARE OF CROP-BASED FARMS INCREASED FROM 49% IN 2006 TO 58% IN 2011 WITH STRONG PRICES FOR CERTAIN FIELD CROPS LIKE CANOLA, SOYBEAN AND CORN CONTRIBUTING TO THE INCREASE.**

**Wheat, a traditional Canadian commodity, has seen significant shifts in production over the past several decades. The seeded area of wheat more than doubled between 1911 and 1921 and for most of the 1920s and 1930s, Canada was the largest wheat exporter in the world.**

The seeded area of wheat peaked in 1992, but then the production of other crops increased in response to competition from other wheat producing countries, shifting market demands and the success of other crops such as canola, soybeans, corn and pulses.

Rapeseed was initially grown in Canada during World War II (WWII) for use in steam powered engines when the supplies from Europe and Asia were cut off. The conversion of steam power to diesel in 1950 resulted in a significant drop in rapeseed demand and consequent declines in rapeseed production to the point where the crop almost disappeared.

Due to its chemical composition, rapeseed was not ideal for consumption. At the time, most of the edible oil in Canada came from imported oilseeds. During the 1960s and 1970s, researchers in Saskatchewan and Manitoba developed canola through cross-breeding to minimize the undesirable compounds in rapeseed and develop new varieties that were more suitable for human consumption. Since then, there has been a steady increase in canola production in Canada.

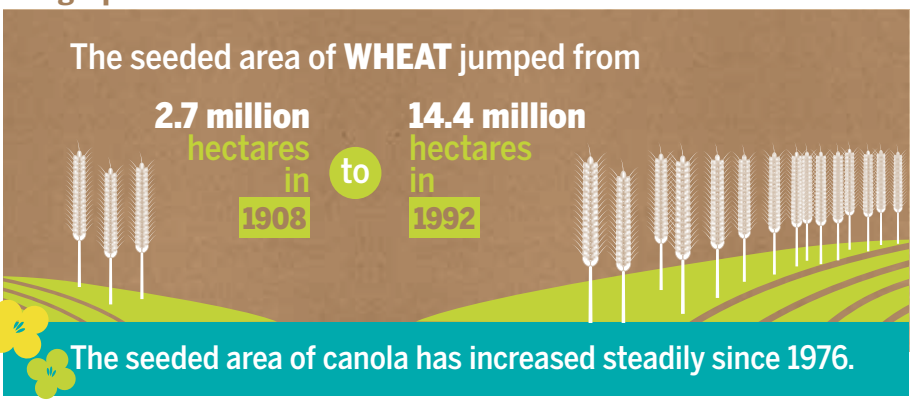
Since 1976, the area allocated to canola has increased with growing demand for canola oil and meal and from the biofuel industry. Canola has been the largest crop in Canada in terms of market receipts since 2010 and it accounts for more than one-fifth of all cropland.

Soybeans followed a similar trend with the introduction of new varieties adapted to Canada's shorter growing season. Beginning in 1995, the first genetically modified crops, including canola and soybeans, were commercialized in Canada.

The development of new varieties suitable for different uses and growing conditions contributed to the expansion of grain corn. Its versatility as human food, animal feed and for industrial applications has been key to its growth. It is the fourth largest crop in Canada in terms of revenue. Between 1971 and 2016, corn receipts increased by more than thirtyfold.

Pulse area and production have increased significantly since the 1980s with research on new varieties and growing export sales playing an important role. Canada is now one of the leading producers and exporters of pulses. Lentils and dry peas, in particular, are driving the increase.

**Infographic A1.3**




Beginning in the early 2000s, the production of labour-intensive fruit crops like apples declined while production of machine-harvested crops like blueberries and cranberries increased. Increased demand from domestic and international markets combined with lower harvesting costs have contributed to the growth in these small fruit crops. [10]

In 2016, horticulture farms had the highest share of organic production although grain and oilseed farms represented the largest number of organic farms in Canada. The number of farms reporting in transition or certified organic products continued to grow due to growing consumer demand. The total number of farms with transitional or certified organic products reached 4,289 in 2016, an increase of 10% since 2006. Quebec has the largest share and number of farms with transitional or certified organic products, mostly in the production of maple products, hay and field crops.

## THE CONTINUOUS INCREASE IN LABOUR-SAVING FARM TECHNOLOGY HAS IMPACTED FARM EMPLOYMENT.

**In 1891, about 50% of Canada's employment was in agriculture with males making up the majority. By 1921, agriculture was still the most common occupation, accounting for one-third of all jobs, and employing one million Canadians [10].**

The number of paid employees trended upwards until 1931 and has generally declined since then. Today, the primary agriculture sector employs almost 300,000 people, which represents nearly 2% of all Canadian employment.

The composition of farm operators has changed and reflects changes in the composition of the workforce and the general population. The share of women employed in agriculture has been increasing over time, and although it is low compared to all industries, it is higher than the goods-producing sector. Women represented 30% of employment in agriculture in 2016 compared to almost 50% for all industries and 22% in the goods-producing sector. Similarly, the share of female farm operators is also increasing, reaching 29% in 2016, up slightly from 1991. A larger increase was seen on farms with one operator where the share of female operators almost tripled between 1991 and 2016, reaching 12% in 2016.

The average age of farm operators is increasing with 2011 marking the first time that operators aged 55 and over represented the largest share of operators. The share reached 54% in 2016 while the share of operators under the age of 35 was 9%. Although this is consistent with the aging population, agriculture has a higher share of workers aged 55 and over compared to the overall economy. High levels of self-employment in agriculture and technological advancements have enabled operators to work at an older age.

The seasonality of agriculture leads some operators to supplement farm income with off-farm income. However, the proportion of operators working off-farm has declined in recent years. The increase in the average age of operators may be a contributing factor along with the shift towards larger, more specialized farms which generally require operators to spend more time working on the farm. In 1991, 37% of all farm operators reported off-farm employment. The share peaked in 2005 at 48% and has trended downwards since then [11].

The seasonality of crop production, particularly in horticulture, poses a challenge to the sector and contributes to high job vacancy rates. In 2010, 62% of farm employees were seasonal or temporary. While the share was still high in 2015 at 57%, the difference between year-round and seasonal employees narrowed, party due to increased mechanisation.

The seasonality of employment in primary agriculture is also a factor that has contributed to the demand for temporary foreign workers. The Seasonal Agricultural Worker Program (SAWP) was established in 1966. Initially, the program brought in workers from Jamaica, but it has since expanded to include several Caribbean countries; and Mexico was added in 1974. Today, the vast majority of temporary foreign workers in SAWP are from Mexico.

**By 2016, the average age of operators was 55 compared to 47.5 in 1991.**

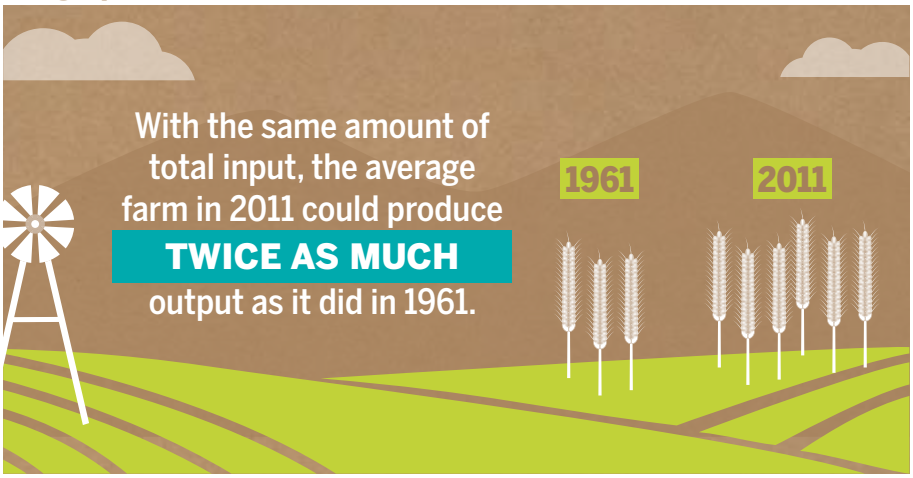
The Temporary Foreign Worker Program (TFWP) was established in 1973 and SAWP was added to the program. In 1996, 10,930[1] temporary foreign workers were hired in primary agriculture through the TFWP. Policy changes implemented in 2006 and 2007 simplified the hiring process, and led to a rise in the number of temporary foreign workers starting in 2007. By 2015, the number of temporary foreign workers reached 39,665[1].

## ADOPTION OF INNOVATION HAS CONTRIBUTED TO INCREASES IN OUTPUT AND PRODUCTIVITY.

### Total factor productivity growth, which accounts for the difference between output growth and input growth, has been increasing steadily.

Between 1961 and 2011[2], total factor productivity grew at an annual average rate of over 1%. Output grew at an annual average rate of 2% over the same period, driven mostly by improvements in productivity, while growth in total inputs was less than 1% per year. With the same amount of total input, the average farm in 2011 could produce twice as much output as it did in 1961. This is consistent with the shift to larger farms since they tend to be more efficient and are more likely to adopt new technologies.

**Infographic A1.4**




Prior to 1921, cultivating, planting, harvesting and transportation were largely done with horses. The number of horses on farms peaked in 1921, after which trucks, tractors, combines and other machinery using internal combustion engines began replacing them. The use of tractors instead of horses on Canadian farms slowed down during the Great Depression and the Second World War, but increased after 1945 with advances in tractor technology and production. By 1951, 55% of farms had a tractor. Since 1963, the number of horses has remained fairly constant though they are primarily used for recreational activities rather than for farming, while the number of tractors has remained fairly constant since 1986. Looking ahead, mechanisation will continue to contribute to increases in efficiency with autonomous tractors expected to be commercialized in the near future.

[1]Source: IRCC Temporary Residents, January 2017 Data.
[2]Latest data available.

Innovation and improvements in breeding and feeding have led to long-term growth in livestock output. The average cattle carcass weight increased by 42% between 1980 and 2015 with the use of larger breeds that finish at higher weights. [12] Average hog carcass weights have followed a similar trend.

**Changes in agricultural practices have also contributed to increases in productivity.**

Similarly, innovation and improvements in plant genetics and production practices have led to increases in crop yields.

Intellectual property rights (IPR) protection on new crop varieties was introduced in the 1980s. As a result of IPR protection and increased collaboration among producers, industry and the public sector, there has been steady growth in private sector research and development (R&D) investments in Canadian agriculture. [13] Overall, public R&D funding in support of the agriculture and agri-food sector has trended upward since the mid-1980s despite some fluctuations over the thirty year period.

The pulse industry, which uses check-offs as a source of R&D funding, has also seen increases in production with new varieties contributing to the increase. Saskatchewan Pulse Growers, for example, collects producer check-offs as a percentage of final sales to fund pulse research benefitting growers.

There has been a shift to conservation and no-till practices which has contributed to the decrease in summerfallow in addition to a decrease in input costs, namely fuel and labour. No-till, in particular, leads to improvements in soil moisture retention, while increasing planted acreage compared to summerfallow. In 2006, no-till replaced conventional tillage as the most widely used tillage practice. A government incentive program introduced in 2002 to encourage the use of no-till, contributed to the increase. By 2011, conventional tillage was the least used tillage practice with no-till and conservation tillage playing a larger role.

**A recently developed technology that feeds pigs individually with daily tailored diets will make significant contributions to improving the sustainability of pig production by reducing pollutant emissions (40% nitrogen, 6% GHG), labour requirements and antibiotic use while lowering feed costs (8-10%).**

## CANADIAN AGRICULTURAL POLICIES HAVE EVOLVED OVER TIME BECAUSE OF CHANGING POLICY STRUCTURE AND NEEDS.

**Specific considerations for Canadian agricultural policy development include the joint responsibilities of the federal and provincial governments, the diversity of Canadian agriculture, high transportation costs due to the large size of the country, the importance of trade given the relatively small population, obligations under the World Trade Organization (WTO) and NAFTA, and the evolution of Canada's agricultural industry.**

Policy has also been shaped by the nature and diversity of commodities. For example, specific considerations for grains and oilseeds include their importance as an export product and the key role of transportation since they are produced in the country's interior.

To enhance agricultural immigration policy, the *Experimental Farm Stations Act* was established in 1886 to strengthen research on new crops and technologies better suited to Canada's soil and climate conditions. [14]

In 1897, the Canadian government and the Canadian Pacific Railway negotiated the Crow's Nest Pass Agreement in response to Prairie farmers concerns regarding high freight rates and input prices under the monopoly railway system. The main purpose of the agreement was to encourage settlement and development of Western Canada. Under this agreement, freight rates were capped and coverage of the rate cap evolved with the diversification of Prairie agriculture.

Following World War I, the Canadian government temporarily introduced the Canadian Wheat Board (CWB) in response to the collapse of grain and oilseed prices. By 1923, Prairie farmers had established wheat pools since the CWB was no longer supported by the Canadian government and a Central Selling Agency (CSA) was established to market half of the wheat production. However, the CSA faced financial trouble and was disbanded when the Great Depression resulted in low grain prices and market volatility. Further losses in 1930 forced intervention from the federal government. The CWB was re-established in 1935. Initially, it was a voluntary marketing agency, however selling Prairie wheat through the board became mandatory during WWII, to deal with war-time demands. Pools remained a feature of Prairie agriculture until the late 1990s. In 2012, the *Marketing Freedom for Grain Farmers Act* ended the CWB's monopoly on the marketing of western Canadian wheat and barley.

In 1946, a Mutual Aid agreement was established between Canada and the United Kingdom. Under this agreement, Canada supplied the UK with a large share of its wheat and bacon and smaller shares of its eggs, cheese and canned fish. The agreement was not renewed due to Europe's quick recovery from WWII, leading to surpluses in the Canadian market along with rapid price declines. As a result, the Canadian government established the *Agricultural Stabilization Act* in 1958, providing payments for specific commodities when prices fell below a certain level. The Act, combined with the *Crop Insurance Act* and the *Prairie Grain Advance Payments Act*, was the federal government's first suite of income stabilization programs.

Between the 1950s and the late 1980s, there was a focus on stabilizing returns to producers through commodity based programs and regulations like supply management. National marketing agencies were established to administer prices and manage supplies.

By the 1970s, the rates imposed on the railways for grain transportation were below their costs leading to a lack of incentive for rail lines to be improved or expanded. As a result, grain transportation was faced with delays and limited capacity. To address these issues, the *Western Grain Transportation Act* came into effect in 1984, allowing the gradual increase of freight rates with the increased shipping costs shared by the federal government and farmers.

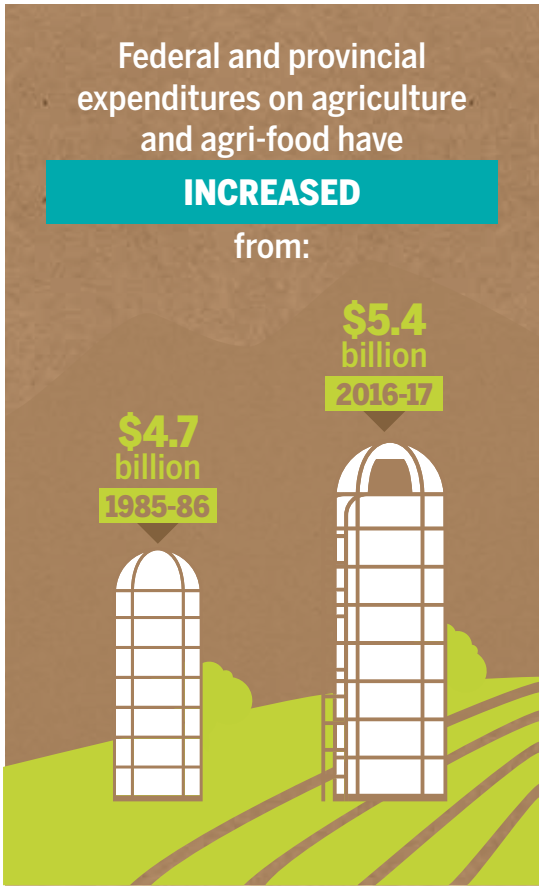
In the early 1980s, there was inter-provincial competition due to a fragmented federal, provincial and territorial (FPT) policy environment, where provinces were designing policies in isolation to support their industries. This highlighted the need and subsequent drive to have greater FPT coordination leading to the introduction of National Tripartite Stabilization Programs in 1986 with new emphasis on federal-provincial partnerships.

Then in the 1990s, there was a movement away from uncoordinated FPT and commodity-based programs to whole farm programs based on income. Trade disputes and the gradual adoption of more rules-based agricultural support under the General Agreement on Tariffs and Trade and WTO agreements were main drivers. Another key driver was the grain subsidy wars of the 1980s, with large ad hoc payments for grains as prices crashed in response to global oversupply and export subsidies by the U.S. government.

In 2003, the government moved from ad hoc support programs, which created uncertainties, to the development of the first comprehensive policy framework for the sector, the Agriculture Policy Framework (APF). The APF was introduced to address concerns beyond income stability, though income stability continues to account for the majority of program expenditures. It led to improvements in federal-provincial-territorial relationships and Canadian agriculture became more responsive to market conditions with a focus on meeting consumer demands, ensuring food safety and encouraging innovation.

Although ad hoc payments have been reduced, they are still sometimes required in the face of events that are difficult to plan for, such as drought and the BSE crisis. The AgriRecovery framework, introduced as a component of the income stability suite of programs, was implemented in 2008 to deal with natural disasters and provide a framework across governments to manage the demand for ad hoc payments.

**Infographic A1.5**




## CANADIAN AGRICULTURE HAS EVOLVED OVER TIME IN RESPONSE TO CHALLENGES, OPPORTUNITIES AND MARKET DEVELOPMENTS.

**Today, the modern, innovative and resilient sector remains a key contributor to the Canadian economy. Looking ahead, Canadian agriculture will continue to grow and evolve and there are many opportunities for the sector on the horizon.**

## REFERENCES


1. Bishop, C. A. (2011). "Indigenous People: Eastern Woodlands." The Canadian Encyclopedia. Retrieved from http://www.thecanadianencyclopedia.ca/en/article/aboriginal-people-eastern-woodlands/

2. Carter, S. (1989). "Two Acres and a Cow: 'Peasant' Farming for the Indians of the Northwest, 1889-97." The Canadian Historical Review, 70(1), pp. 27-52. Retrieved from http://www.utpjournals.press/doi/abs/10.3138/CHR-070-01-02

3. Gagnon, E. (n.d.). "Settling the West: Immigration to the Prairies from 1867 to 1914." Canadian Museum of Immigration at Pier 21. Retrieved from https://www.pier21.ca/research/immigration-history/settling-the-west-immigration-to-the-prairies-from-1867-to-1914

4. Dick, L. & Taylor, J. (2007). "History of Agriculture to the Second World War." The Canadian Encyclopedia. Retrieved from http://www.thecanadianencyclopedia.ca/en/article/history-of-agriculture/

5. Parson, H. E. (1999). "Regional Trends of Agricultural Restructuring in Canada." Canadian Journal of Regional Science, XXII:3, 343-356. Retrieved from http://cjrs-rcsr.org/archives/22-3/Parson.pdf

6. Statistics Canada. (2017). "A Portrait of a 21st Century Agricultural Operation." Publication 95-640-X. Retrieved from http://www.statcan.gc.ca/pub/95-640-x/2016001/article/14811-eng.pdf

7. MacLachlan, I. (1996). "The Historical Development of Cattle Production in Canada." Retrieved from https://www.uleth.ca/dspace/bitstream/handle/10133/303/Historical_cattle_Canada.pdf;sequence=3

8. Breen, D. H. (2009). "Ranching History." The Canadian Encyclopedia. Retrieved from http://www.thecanadianencyclopedia.ca/en/article/ranching-history/

9. Agriculture and Agri-Food Canada. (2015). "Canadian Dairy Genetics." Retrieved from http://www.agr.gc.ca/eng/industry-markets-and-trade/buying-canadian-food-products/canadian-dairy-genetics/?id=1425928406920

10. Statistics Canada. (2011). "Canada Year Book." Publication 11-402-X. Retrieved from http://www.statcan.gc.ca/pub/11-402-x/2011000/chap/ag/ag-eng.htm

11. Statistics Canada. (2011). "Snapshot of Canadian Agriculture." Publication 95-640-X. Retrieved from http://www.statcan.gc.ca/pub/95-640-x/2011001/p1/p1-02-eng.htm#VI

12. Canfax Research Services. (September 2016). "CRS Special Edition: The Price Cycle and Evolving Cycle Drivers." Fact Sheet. Retrieved from http://www.canfax.ca/samples/The%20Price%20Cycle%20and%20Evolving%20Cycle%20Drivers.pdf

13. Agriculture and Agri-Food Canada. (2013). "An Overview of the Canadian Agriculture and Agri-Food System." p. 71.

14. Hedley, D. D. (2015). "The Evolution of Agricultural Support Policy in Canada." CAES Fellows Paper. Retrieved from https://caes.usask.ca/meetings/the-evolution-of-agricultural-support-policy-in-canada.pdf

# SECTION A2

## Bioproduct Production and Development in Canada

# SECTION A2

## Bioproduct Production and Development in Canada

### Introduction:

Canada has a substantial supply of diverse biological resources available to support the growth of the industrial bioproducts sector. This section presents results from the 2015 Bioproducts Production and Development Survey.

In 2015, 190 firms were engaged in the production or development of non conventional industrial bioproducts in Canada. The total revenue from bioproducts production was $4.27 billion. This included a wide spectrum of bioproducts, such as biofuels, bioenergy, organic chemicals, materials and composites, and intermediary products (e.g. lignin, polymer and cellulose nanomaterials). Examples of commercially available bioproducts include lubricants, geotextiles, paints, and plastic utensils.

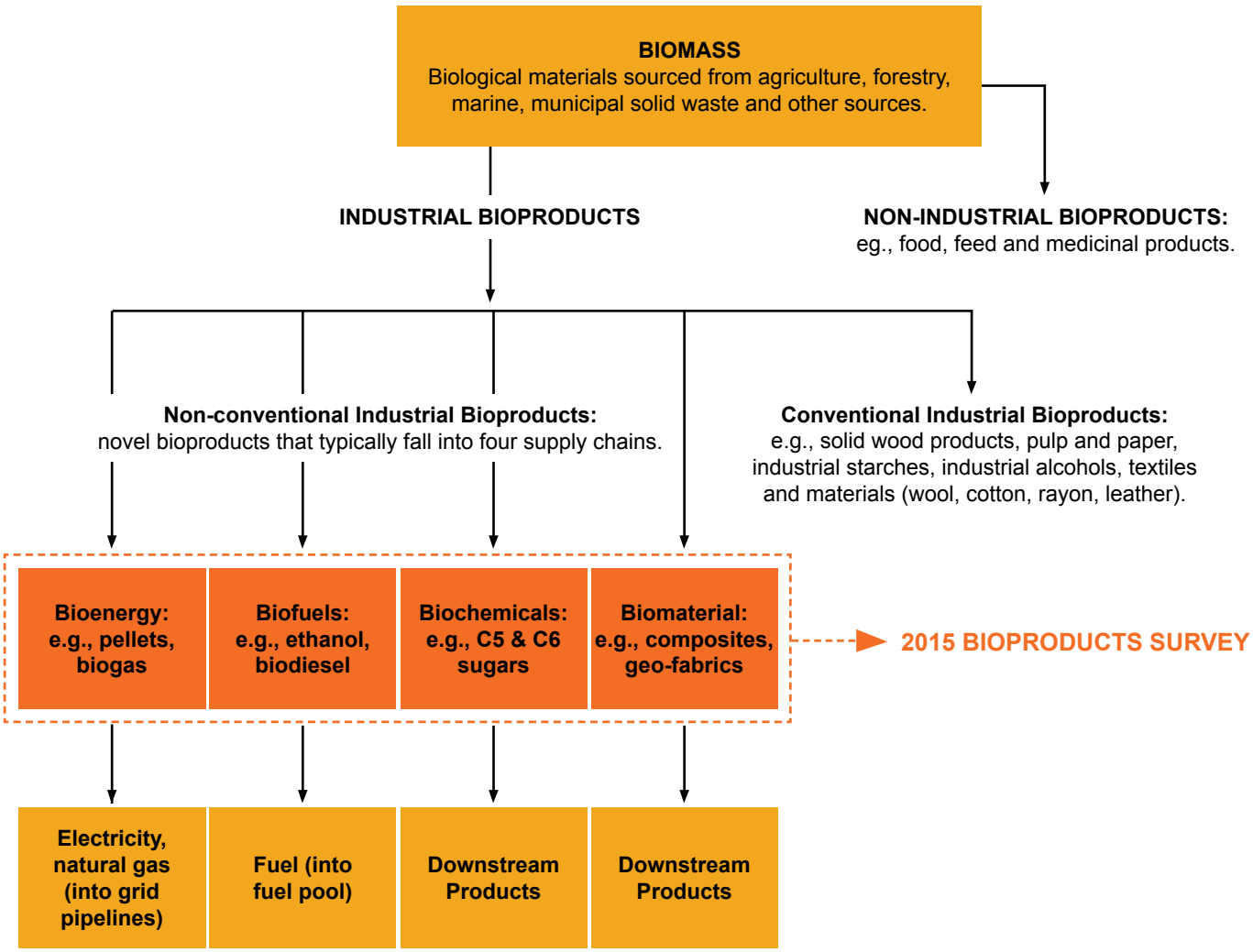
# Canada's Non-conventional Industrial Bioproducts sector.

**Non-conventional industrial bioproducts including biofuels, plant-based plastics, biocomposites and chemicals are a growing part of Canada's Bioeconomy.**

Bioproduct firms transform biomass into novel products, or, use novel processes to develop non-conventional industrial bioproducts. Bioproducts, such as biofuels, are often supplied directly into the fuel supply system. Biomaterials and biochemicals are typically used by other industries to produce downstream products. Many of these bioproducts are designed to substitute for non-renewable inputs used to produce industrial products.

Within the Industrial Bioproducts supply chain, the use of biomass to produce non-conventional bioproducts represents the primary level (1st level) of the Non-conventional Industrial Bioproducts Supply Chain (represented by the red box in Chart A2.1). The 2015 Bioproducts Production and Development Survey targeted this section of the supply chain.

**Chart A2.1**
**Bioproducts Supply Chain**




Note: The firms involved in activities in the Non-conventional Industrial Bioproducts sector may also be involved in other lines of business, alongside their bioproduct business lines.

# Canada's bioproduct firms develop, produce, and sell a broad spectrum of industrial bioproducts.

**In 2015, the revenue from non-conventional industrial bioproducts produced in Canada was estimated at $4.27 billion.**

Biofuels generated revenues of $2.72 billion (63.6% of all revenues). The remaining 36.4% of revenues originated from across a wide spectrum of products including bioenergy, organic chemicals, materials and composites, intermediary biochemical/biomaterials, and other types of bioproducts.

Many firms reported activities at different stages of product development and production as well as in several types of bioproducts. For example, a firm may have biodiesel fuel on the market and, at the same time, they may have other biofuel or specialty oil products at earlier stages of development.

The bioproduct being reported by the largest number of firms was biofuels, with 111 firms reporting activities in the production or development of biofuels.

**Chart A2.2**
**Bioproduct Revenues and Activity by Product Type, 2015**

| | Firms Involved in Production and/or Development* | Revenues |
|---|---|---|
| | Number Reporting** | Thousand Dollars |
| **BIOFUEL** | **111** | **2 715 874** |
| Ethanol for Fuel | 30 | 2 042 200 |
| Biodiesel for Fuel | 29 | 653 450 |
| Gaseous Fuels | 24 | x |
| Black Pellets | 7 | 0 |
| Biochar | 21 | x |
| Other Biofuel | 33 | x |
| **BIOENERGY** | **40** | **140,027** |
| **ORGANIC CHEMICALS** | **27** | **x** |
| **MATERIALS AND COMPOSITES** | **33** | **x** |
| Composites | 15 | 349 583 |
| Bioplastics | 12 | 20 966 |
| Agri-Based or Wood Composites | 9 | x |
| Other Materials and Composites | 14 | x |
| **INTERMEDIARY BIOCHEMICAL AND BIOMATERIALS** | **38** | **49 529** |
| Lignin | 12 | x |
| C5 and C6 Sugars | 8 | x |
| Other Intermediary Biochemical and Biomaterials | 24 | x |
| **OTHER BIOPRODUCTS** | **21** | **x** |

Source: Statistics Canada and AAFC calculations.
Note: x indicates data was not available due to the confidentiality requirements of the *Statistics Act*.
* Stages of development: This includes firms involved in research & experimental development; product development or proof of concept; or that have bioproduct(s)
in production.
** Each business reporting activities at any development stage is counted only once (although they may have several different products in one product category at various stages of development).

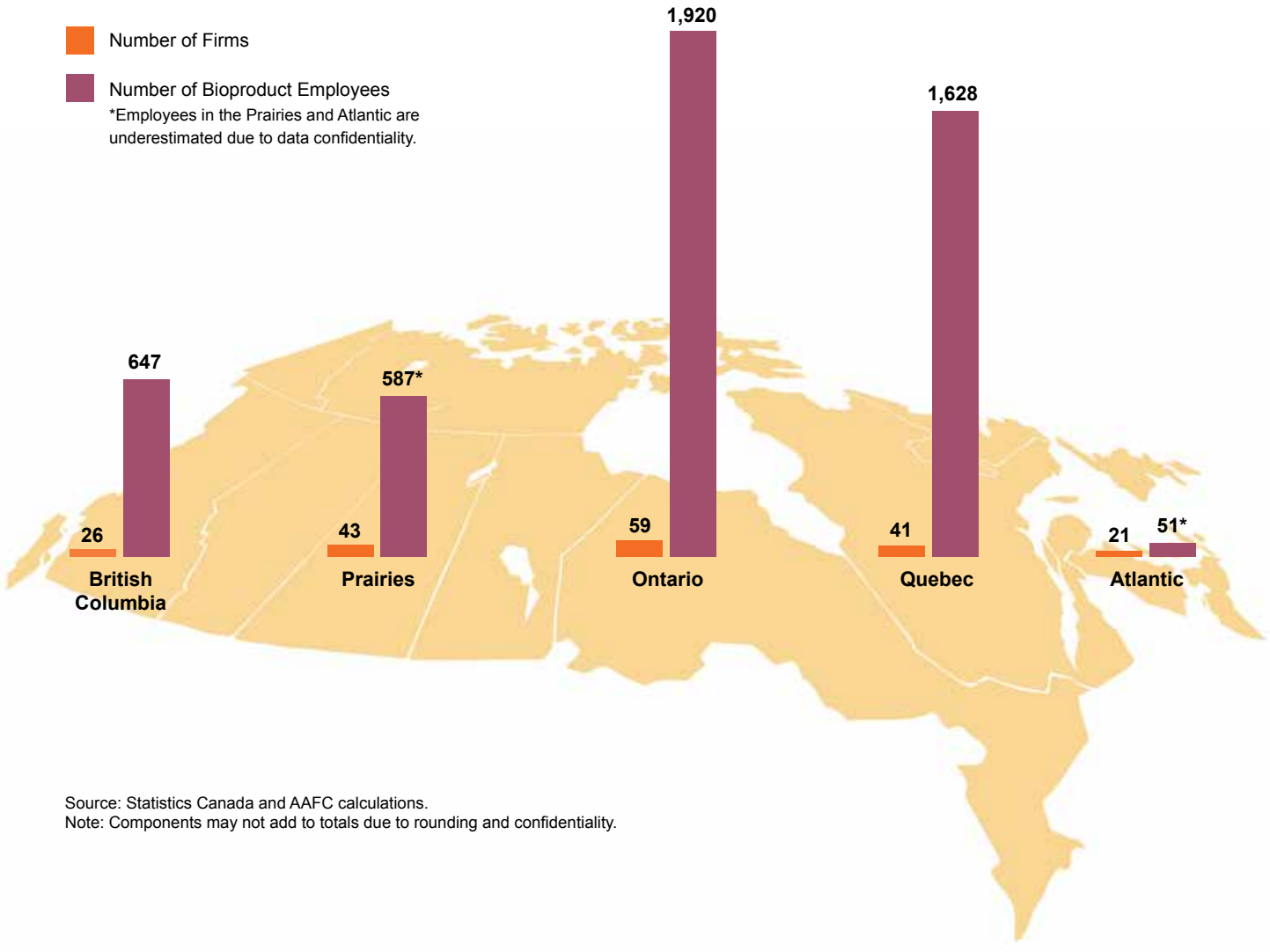
# Bioproduct firms are dispersed across Canada.

**In 2015, 190 firms were involved in producing or developing non-conventional industrial bioproducts for commercial purposes in Canada.**

Bioproduct firms were distributed across the country, with 52.6% located in central Canada (59 firms in Ontario and 41 in Quebec).

In 2015, 5,618 employees were directly involved in production and development of bioproducts, or, in biomass improvement in Canada's bioproduct firms. Since firms were concentrated in Ontario and Quebec, approximately 63.2% of these employees were located in Ontario (1,920) and Quebec (1,628). The remaining 36.8% were located in British Columbia, the Prairies, and the Atlantic.

**Chart A2.3**
**Regional Distribution of Bioproduct Firms and Bioproduct and Biomass-Related Employment in Canada, 2015**



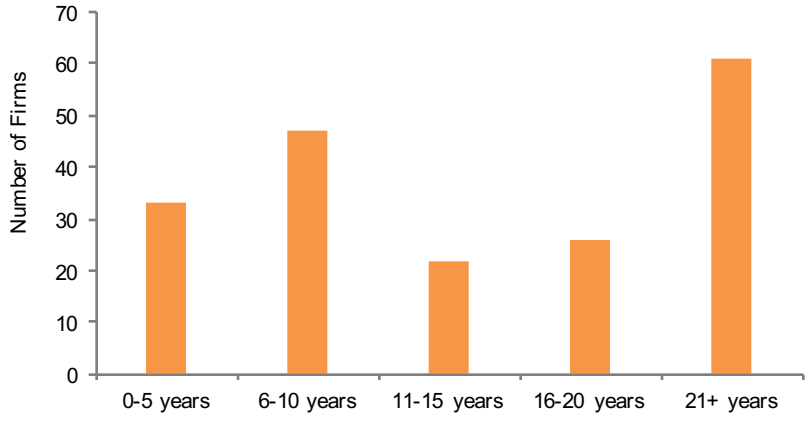

Source: Statistics Canada and AAFC calculations.
Note: Components may not add to totals due to rounding and confidentiality.

# Canada's bioproducts sector is represented by a high proportion of new entrants into bioproducts.

**In terms of time-in-operation in Canada, as of 2015, 42.4% of the bioproduct firms had been in operation for 10 years or less.**

In 2015, 17.5% of firms reported they had been in operation for 5 years or less, 24.9% had operated for 6 to 10 years. About 32.3% of the firms had been in operation for a long time – over 20 years.

**Chart A2.4**
**Bioproduct Firms by Length of Time in Operation, 2015**




Source: Statistics Canada and AAFC calculations.

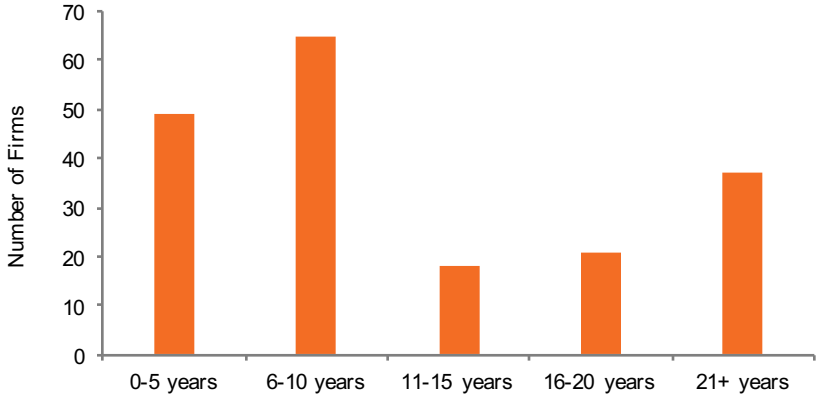
**A greater proportion of bioproduct firms added bioproducts to their established businesses.**

Sixty percent of bioproduct firms active in Canada became involved in bioproduct-related activities within the last 10 years.

Only 9.5% of firms had been involved in bioproduct-related activities for a period of between 11 to 15 years, 11.1% for 16 to 20 years, and 19.5% for 21 years or more.

The 2015 survey results indicate that over 17% of the firms now involved in bioproducts, started out in non-bioproduct activities and later expanded into the bioproducts area.

**Chart A2.5**
**Bioproduct Firms by Length of Time Involved in Bioproduct Activities, 2015**



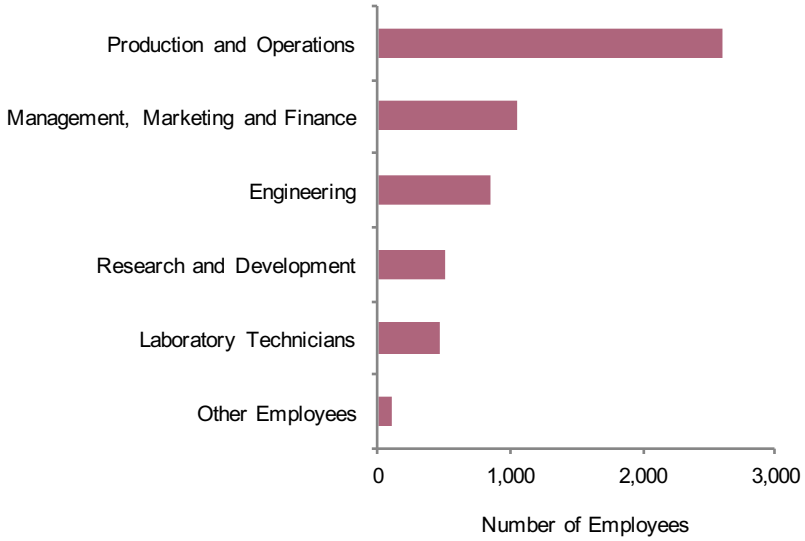

Source: Statistics Canada and AAFC calculations.

# Canada's bioproducts firms employed 5,618 in the production and development of bioproducts.

**The total workforce of bioproduct firms in bioproduct-related activities (4,118) and biomass-related activities* (1,500) was 5,618 in 2015.**

This workforce can be broken down by the type of work activities: production and operations (46.4%), management, marketing and finance (18.8%), engineering (15.3%), research and development (9.2%), laboratory technicians (8.2%) and other work activities employees (2.0%).

**Chart A2.6**
**Number and Type of Employees in Bioproduct Firms, (in Bioproduct and Biomass-Related* Activities), 2015**




Source: Statistics Canada and AAFC calculations.
*Biomass-related activities include collecting, aggregating, drying, cleaning, grading, separating or refining of biomass post-harvest to prepare the biomass for efficient conversion into bioproducts.

# Biomass from the forestry and agricultural sectors provide the majority of feedstocks for Canada's industrial bioproducts production.

**Canada's bioproducts firms transformed over 21 million metric tonnes of biomass into bioproducts in 2015, of which almost 8.8 million metric tonnes were from agricultural sources and 12.3 million metric tonnes were from forestry.**

Biomass input (or feedstock) refers to renewable biological materials and includes: biological materials from forestry, agriculture, marine and aquaculture sources, or of a micro-biological origin; by-products from processing (e.g., agricultural, forestry, pulp and paper, food and feed processing); recycled bio-materials (e.g., construction and demolition materials); and waste materials (e.g., municipal solid wastes).

About 42% of the 190 firms reported using agricultural biomass as their primary biomass for bioproduct production. Almost all of the 8.8 million metric tonnes of agricultural biomass was from grains and oilseeds.

**Chart A2.7**
**Types and Quantity of Biomass Used as Input, 2015**

| | Quantity of Biomass Used | Reporting Use ** | Reported as Primary Biomass |
|---|---|---|---|
| | Metric Tonnes | Number of Firms | |
| **AGRICULTURAL BIOMASS** | **8 768 015** | **104** | **80** |
| Grain and Oilseeds | 8 676 586 | 46 | |
| Wheat Grain | x | 14 | |
| Corn Grain | 5 579 442 | 31 | |
| Other Field Crop Materials* | 77 889 | 66 | |
| Primary Livestock Products and By-Products | 13 540 | 16 | |
| **FORESTRY BIOMASS** | **12 314 424** | **74** | **50** |
| Forest Residue | x | 40 | |
| Mill Processing Residue | 8 532 225 | 63 | |
| Round Wood | x | 13 | |
| Other Forestry Biomass (Excludes Urban Wood Residue) | x | 20 | |
| **MARINE AND AQUACULTURE MATERIALS OR PRODUCTS** | **1 864** | **15** | **9** |
| **FOOD PROCESSING, SLAUGHTER AND RENDERING BY-PRODUCTS** | **623 774** | **23** | **35** |
| **FOOD SERVICE BY-PRODUCTS** | **63 647** | **26** | **9** |
| **OTHER BIOMASS (INCLUDES MUNICIPAL ORGANIC SOLID WASTE)** | **x** | **35** | **6** |

Source: Statistics Canada and AAFC calculations.
Note: x indicates data was not available due to the confidentiality requirements of the *Statistics Act*.
* Other field crop materials include non-grain field crop residues, horticultural crop residue and forage materials.
** Components may not add to category totals as firms may report in more than one category.

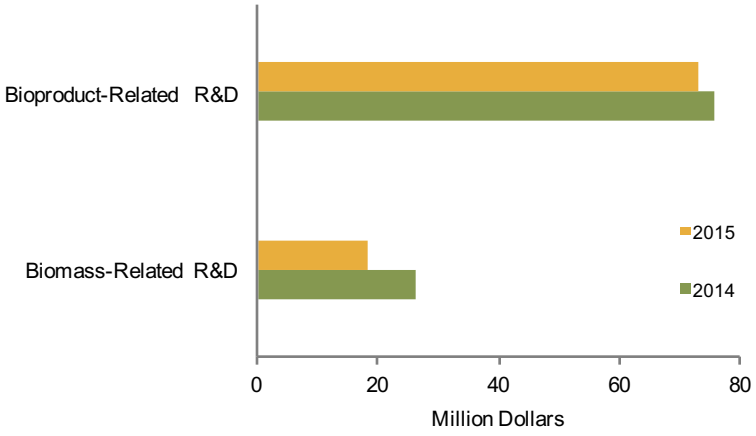
# Bioproduct firms expand their innovative capacities through in-house research.

**Bioproduct firms invested $91 million in in-house research and development (R&D) in their bioproduct business lines in 2015.**

This in-house R&D included bioproduct-related and biomass-related R&D. Firms used about 80% of their in-house R&D investments on bioproducts and 20% on biomass-related research in 2015.

Bioproduct firms employed over 518 researchers and 463 laboratory technicians (see Chart A2.6) in 2015. These employees accounted for approximately 17.4% of the total employees employed in bioproduct activities in 2015.

**Chart A2.8**
**Bioproduct Business In-House R&D Expenditures, 2014 and 2015**




Source: Statistics Canada and AAFC calculations.

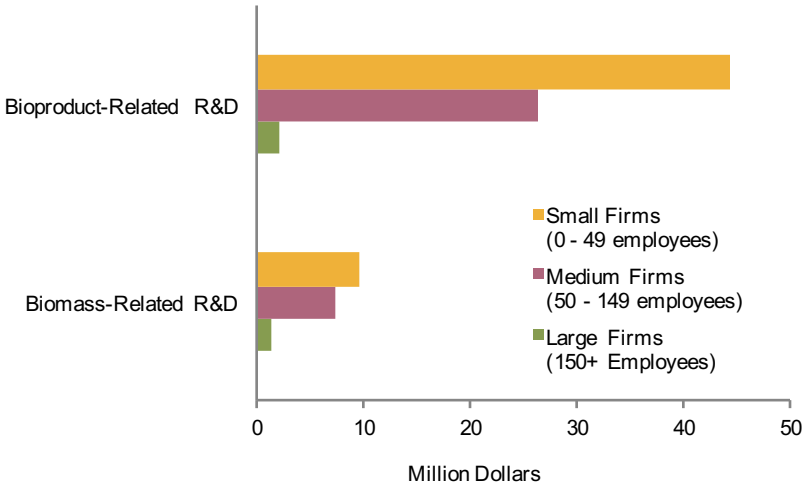
**Bioproduct firms invested in both bioproduct and biomass-related R&D.**

Small firms, which make up 70.1% of bioproduct firms, accounted for 60.8% of all in-house bioproduct-related R&D investments in 2015. Large-sized firms accounted for only 3.0%, of this R&D.

Medium and large-sized firms accounted for 47.8% of the in-house biomass-related R&D expenditures.

Average in-house expenditure on bioproduct plus biomass R&D was $480 thousand per firm. Medium sized firms averaged $1.29 million, small firms averaged $399 thousand, and large firms $123 thousand.

**Chart A2.9**
**In-House Bioproduct and Biomass R&D Expenditures, by Size of Firm, 2015**




Source: Statistics Canada and AAFC calculations.
Note: Firm size is determined by the number of employees in the firm (those working on bioproducts as well as those working on other products).

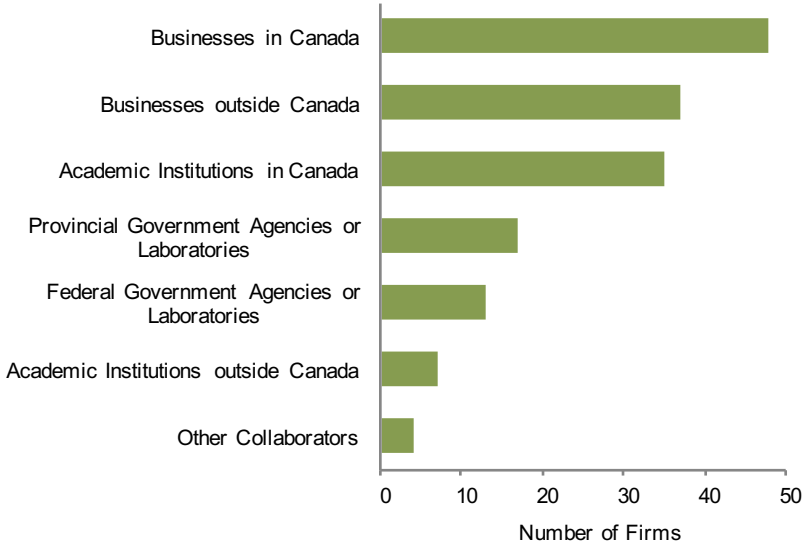
# Bioproduct firms expand their innovative capacities through collaborative arrangements.

**Bioproduct firms used collaborative arrangements to actively enhance their innovative capacity.**

In 2015, 69 of the 190 firms were involved in 218 collaborative arrangements (approximately one quarter of these were multi-partner arrangements).

Firms most commonly collaborate with other firms (both inside and outside Canada) and academic institutions in Canada.

**Chart A2.10**
**Bioproduct Firm Collaborations by Partner Type, 2013-2015**




Source: Statistics Canada and AAFC calculations.

**Bioproduct firms engaged in collaborative relationships for several reasons during the period 2013-2015.**

The two main reasons for firms to be involved in collaborative arrangements were to access outside scientific expertise or knowledge (80.4%), and to undertake R&D (66.5%).

**Chart A2.11**
**Reasons Bioproduct Firms Collaborated, 2013-2015**

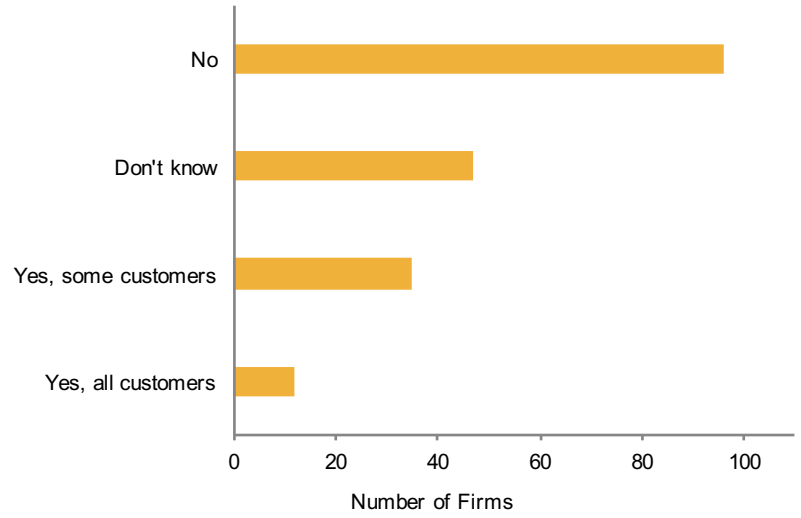

Source: Statistics Canada and AAFC calculations.
Note: Only firms involved in collaborating responded to this question. Firms could select more than one reason for collaboration.

# Canada's bioproduct firms differentiate their products through the use of sustainability certifications.

**In 2015, 25% of bioproduct firms indicated that some of their customers required proof of sustainably-sourced biomass inputs.**

Six percent (6%) of bioproduct firms indicated that all of their customers required evidence of sustainably-sourced biomass inputs.

**Chart A2.12**
**Bioproduct Firms Whose Customers Require Sustainably-Sourced Biomass Inputs, 2015**



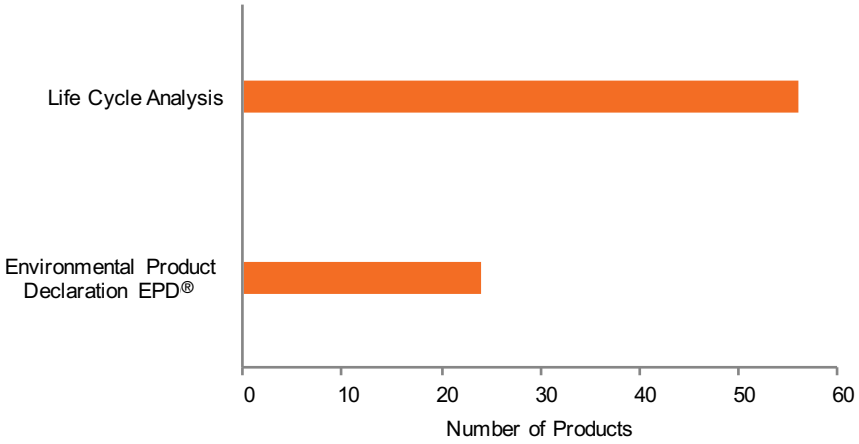

Source: Statistics Canada and AAFC calculations.

**Some bioproduct firms have completed sustainability assessments to identify the environmental attributes of their products.**

In 2015, firms producing industrial bioproducts in Canada indicated that 80 of their bioproducts had an associated life cycle analysis (LCA) or environmental product declaration (EPD). LCAs, the more popular assessment tool, were used to evaluate 70% of the bioproducts with certification.

To continue to differentiate their products, firms are expected to increase the number of products with certifications. In 2015, 17% of firms indicated their intentions to obtain LCA and 13% intended to obtain EPD certifications for additional bioproducts.

**Chart A2.13**
**Number of Products and Type of Certification Reported by Bioproduct Firms, 2015**



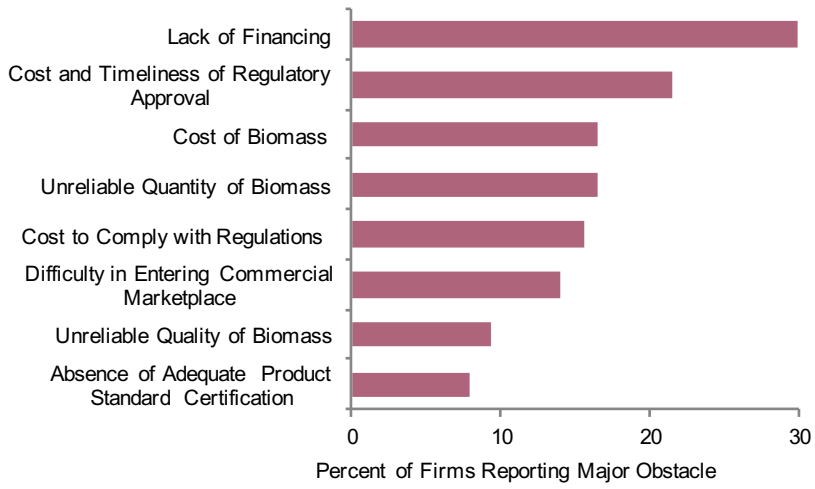

Source: Statistics Canada and AAFC calculations.

# The key challenge to the production and development of bioproducts in Canada is lack of financing.

**In 2015, 29.8% of all bioproduct firms indicated that lack of financing was a major obstacle to the development or production of bioproducts.**

Other major obstacles identified by firms included: the cost and timeliness of regulatory approvals (21.4%), the cost of biomass (16.5%), the unreliable quantity of biomass (16.4%), and the cost of compliance to meet regulations (15.6%).

**Chart A2.14**
**Barriers to Production or Development of Bioproducts, 2015**

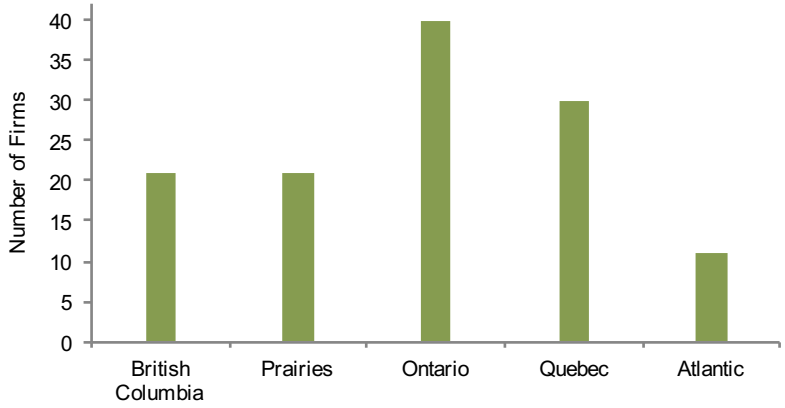



Source: Statistics Canada and AAFC calculations.

**Bioproduct firms are actively involved in applying for external funding and using government incentive programs (e.g., the Scientific Research and Experimental Development (SR&ED) tax incentive program) to finance and to a lesser extent, outsource R&D.**

One hundred and twenty three or 64.7% of all bioproduct firms across Canada applied for refunds or tax credits under the SR&ED program. In addition, 38% of firms applied for government programs for bioproduct R&D.

**Chart A2.15**
**Firms who Applied for Refunds or Tax Credits Under the SR&ED* Tax Incentive Program, 2011 to 2015**




Source: Statistics Canada and AAFC calculations.
* Scientific Research and Experimental Development.

# SECTION B

## GDP and Employment

# SECTION B

## GDP and Employment

### Introduction:

The Canadian Agriculture and Agri-Food System (AAFS) is a complex and integrated supply chain which includes input and service suppliers, primary agricultural producers, food and beverage processors, food retailers and wholesalers, and foodservice providers. The AAFS makes significant direct and indirect contributions to the gross domestic product (GDP) and employment in Canada.

The AAFS contributed 6.7% to Canada's GDP and over 12% to Canadian employment in 2016. The GDP of the AAFS has increased annually since 2007, the exception being during the economic recession of 2009. During that time period, the primary agriculture and foodservice industries experienced the largest growth of all AAFS components. In 2016, employment in most industries in the AAFS decreased, resulting in a decline in overall AAFS employment following years of steady growth.

Primary agriculture and food and beverage processing industries have tended to show higher job vacancy rates than other industries. To help meet labour needs, there has been strong growth in the use of temporary foreign workers (TFWs) in recent years.

# The Canadian Agriculture and Agri-Food System produces, processes and distributes products to consumers both domestically and abroad.

The Canadian Agriculture and Agri-Food System (AAFS) is a complex, integrated and competitive system consisting of input suppliers, primary producers (farmers), food and beverage processors, food retailers and wholesalers and foodservice providers.

**Chart B.1**
**The Agriculture and Agri-Food System, 2016**


Source: Statistics Canada and AAFC calculations.
Note: Components may not add up due to rounding.

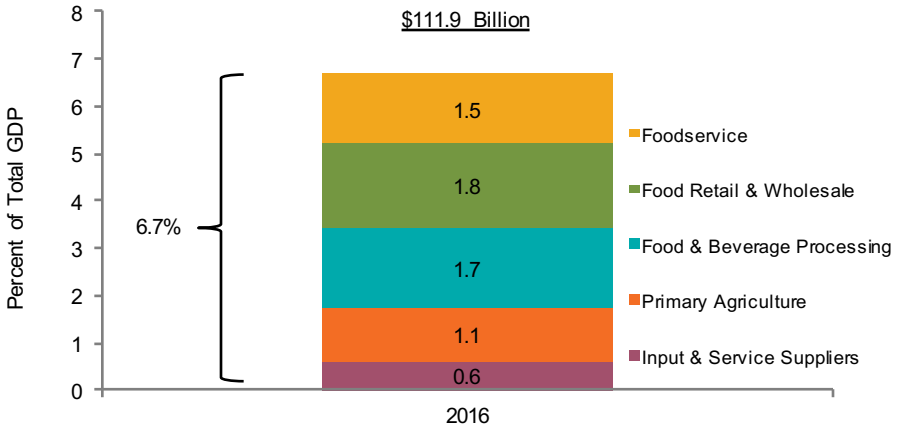
# The agriculture and agri-food system's contribution to GDP is growing faster than the average growth rate of the Canadian economy.

**In 2016, the AAFS generated $111.9 billion of gross domestic product (GDP) and accounted for 6.7% of Canada's total GDP.**

The food retail and wholesale industry had the largest share of AAFS GDP with $29.6 billion representing 1.8% of Canada's total GDP in 2016.

It was followed closely by the food and beverage processing industry with $28.5 billion (1.7% of total GDP), the foodservice industry with $24.6 billion (1.5%), the primary agriculture industry with $18.7 billion (1.1%), and input and service suppliers with $10.4 billion (0.6%).

**Chart B.2**
**Agriculture and Agri-Food System's Contribution to Canadian GDP, 2016**



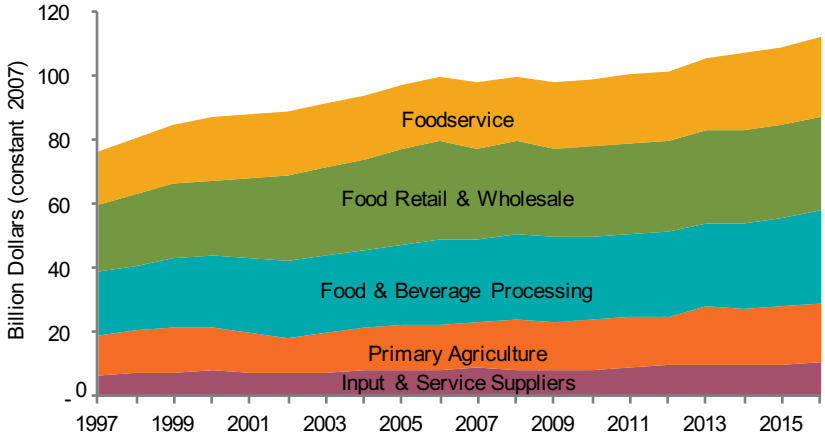

Source: Statistics Canada and AAFC calculations.
Notes: (1) Data is preliminary and subject to revisions. (2) Components may not add up due to rounding.

**GDP in the AAFS grew by 11.0% from 2012 to 2016. In comparison, GDP across all sectors of the Canadian economy grew by 7.8% over the same time period.**

In 2016, AAFS GDP grew by 3.4% over that of the previous year, compared to 1.4% for the rest of the economy. The AAFS GDP growth averaged 2.7% per year from 2012 to 2016.

GDP generated by all components of the AAFS increased in 2016, with food and beverage processing experiencing the largest annual growth of 4.4%. It was followed closely by primary agriculture (4.4%), foodservice (3.7%), input and service suppliers (2.9%), and food retail and wholesale (1.8%).

**Chart B.3**
**Agriculture and Agri-Food System's Contribution to Canadian GDP, 1997-2016**




Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.

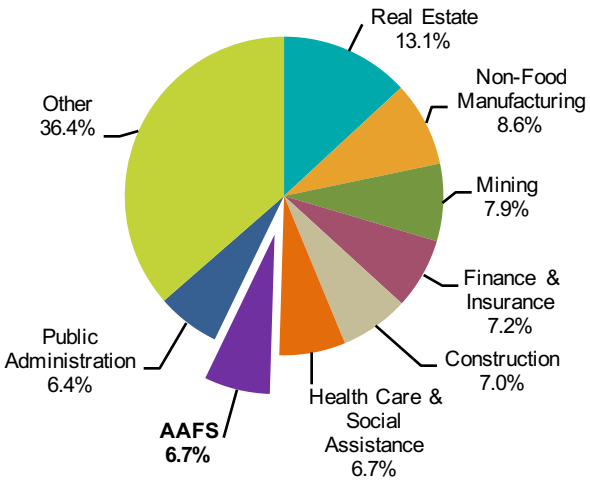
# The GDP contribution of the agriculture and agri-food system compares well to the rest of the Canadian economy.

**Across all sectors of the economy, the AAFS was the seventh-largest contributor to Canadian GDP in 2016.**

AAFS contribution to GDP followed real estate (13.1%), non-food manufacturing (8.6%), mining, quarrying and oil and gas extraction (7.9%), finance and insurance (7.2%), construction (7.0%) and health care and social assistance (6.7%).

Even though the GDP of the AAFS has continued to grow, its share of total Canadian GDP has remained at approximately 6.7% over the past 10 years.

**Chart B.4**
**Distribution of Canadian GDP by Sector, 2016**




Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.

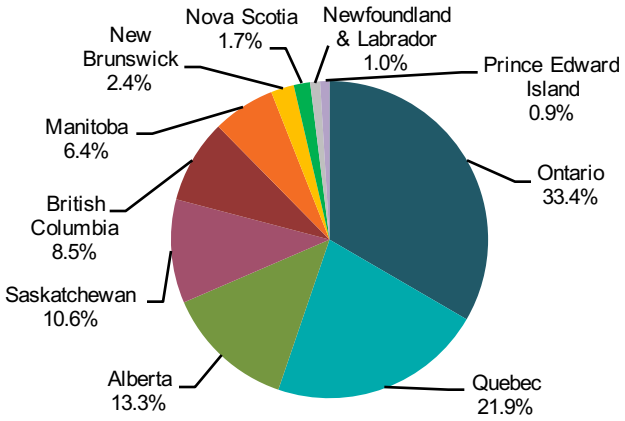
# The primary agriculture and food and beverage processing industries are important contributors to the Canadian economy in most provinces.

**Ontario and Quebec accounted for more than half of the GDP generated by the Canadian primary agriculture and food and beverage processing industries in 2016.**

With 33.4%, Ontario accounted for the largest share of the combined GDP of primary agriculture and food and beverage processing industries, while Quebec and Alberta accounted for 21.9% and 13.3%, respectively.

Over the past decade, the provincial distribution of primary agriculture and food and beverage processing GDP has remained stable. During that time period, Ontario and Quebec have seen their shares decrease by 2.6 and 0.8 percentage points, respectively, while Saskatchewan and Alberta experienced increases of 2.5 and 0.7 percentage points, respectively.

**Chart B.5**
**Provincial Distribution of Primary Agriculture and Food and Beverage Processing GDP, 2016**



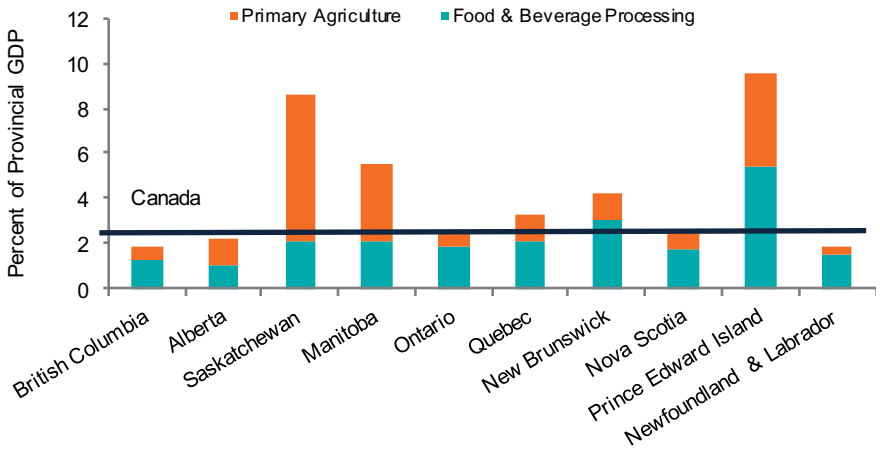

Source: Statistics Canada and AAFC calculations.
Notes: (1) Data is preliminary and subject to revisions. (2) Percentages may not add up to 100% due to rounding.

**The primary agriculture and food and beverage processing industries accounted for varying shares of provincial GDP.**

In 2016, the primary agriculture and food and beverage processing industries generated the highest economic contribution in Prince Edward Island and Saskatchewan, accounting for 9.5% and 8.6% of the GDP in those provinces, respectively.

Food and beverage processing accounted for a larger share of provincial GDP than primary agriculture in all provinces except in Alberta, Saskatchewan and Manitoba.

**Chart B.6**
**Contribution of Primary Agriculture and Food and Beverage Processing to Provincial GDP, 2016**




Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.

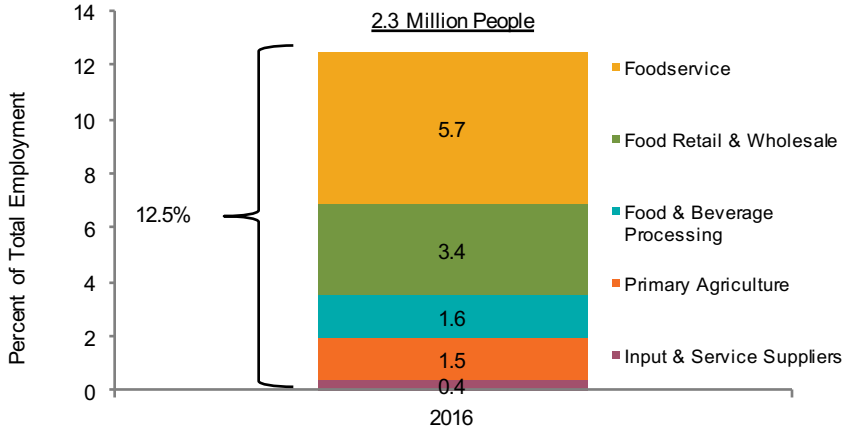
# The agriculture and agri-food system employs many in Canada.

**In 2016, the AAFS employed approximately 2.3 million people, representing 12.5% of Canadian employment.**

The foodservice industry was the largest employer in the AAFS in 2016, employing 1,022,900 people and representing 5.7% of Canadian employment.

It was followed by the food retail and wholesale industry which employed 608,100 (3.4% of Canadian employment), the food and beverage processing industry which employed 285,100 (1.6%), the primary agriculture industry which employed 276,200 (1.5%) and input and service suppliers, which employed 71,600 (0.4%).

**Chart B.7**
**Agriculture and Agri-Food System's Contribution to Canadian Employment, 2016**




Source: Statistics Canada and AAFC calculations.
Notes: (1) Components may not add up due to rounding. (2) See glossary for the definition of employment.

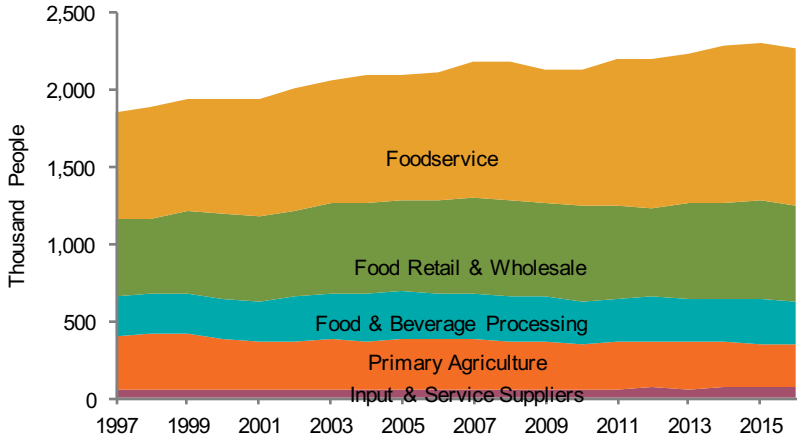
**Employment in the AAFS grew by 3.2% between 2012 and 2016. In comparison, employment across all sectors of the Canadian economy grew by 3.7%.**

The AAFS' annual employment growth averaged 0.8% from 2012 to 2016. Employment in the AAFS declined by 1.3% compared to the previous year.

Employment by food retailers and wholesalers, food and beverage processors, and primary agricultural producers decreased in 2016 from the previous year by 3.8%, 3.4% and 1.9%, respectively.

This was partially offset by increases in employment by input and service suppliers and foodservice providers of 2.0% and 0.8% respectively, between 2015 and 2016.

**Chart B.8**
**Agriculture and Agri-Food System's Contribution to Canadian Employment, 1997-2016**



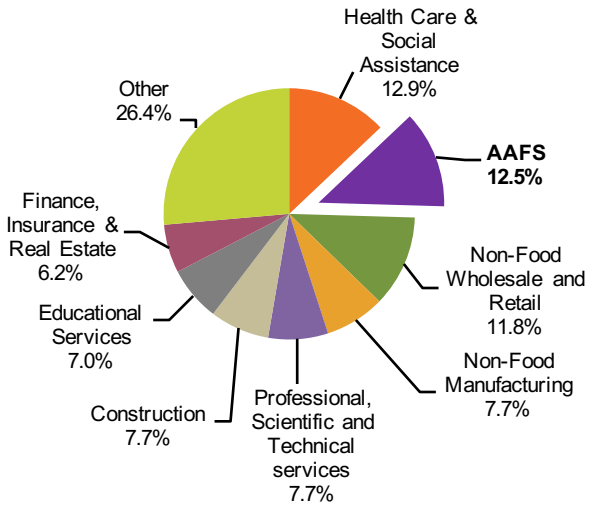

Source: Statistics Canada and AAFC calculations.
Note: See glossary for the definition of employment.

# The agriculture and agri-food system is one of the largest employers in Canada.

**Across all sectors of the economy, the AAFS was the second-largest employer in Canada in 2016.**

The health care and social assistance sector was the largest employer with a 12.9% share of employment. AAFS employment was followed by non-food wholesale and retail (11.8%), non-food manufacturing (7.7%), professional, scientific and technical services (7.7%), construction (7.7%), education services (7.0%) and finance, insurance and real estate (6.2%).

**Chart B.9**
**Distribution of Canadian Employment by Sector, 2016**




Source: Statistics Canada and AAFC calculations.
Notes: (1) Percentages may not add to 100% due to rounding. (2) See glossary for the definition of employment.

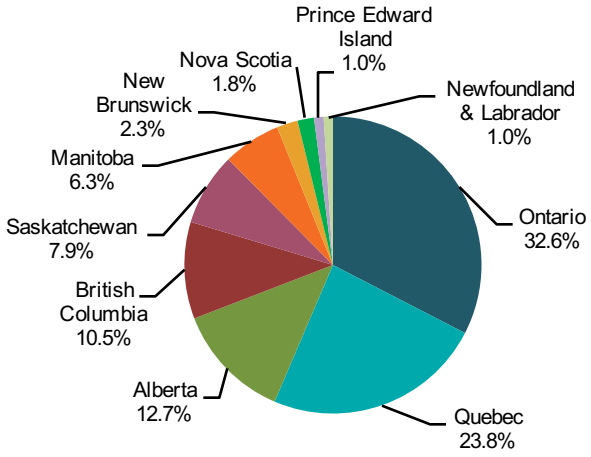
# The agriculture and agri-food system is a major employer in most provinces.

**Ontario and Quebec account for more than half of the employment in the primary agriculture and food and beverage processing industries.**

In 2016, Ontario accounted for 32.6% of the combined employment of the primary agriculture and food and beverage processing industries in Canada, while Quebec and Alberta accounted for 23.8% and 12.7%, respectively.

Employment growth in 2016 varied substantially by province, with the largest increase seen in British Columbia at 12.6% and the largest decrease in Alberta at 17.1%.

**Chart B.10**
**Provincial Distribution of Primary Agriculture and Food and Beverage Processing Employment, 2016**



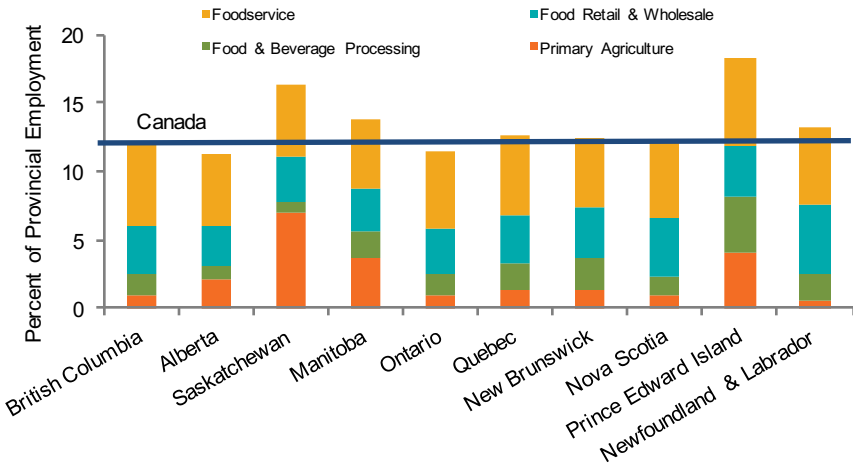

Source: Statistics Canada and AAFC calculations.
Notes: (1) Percentages may not add up to 100% due to rounding. (2) See glossary for the definition of employment.

**In 2016, the AAFS' share of provincial employment was highest in Prince Edward Island and Saskatchewan, accounting for 18.3% and 16.3% respectively, of total employment in each province.**

In most provinces, the foodservice industry provided the largest share of AAFS employment. The exception was Saskatchewan where primary agriculture accounted for the largest share of employment (7.0%).

The shares of the foodservice industry and the food retail and wholesale industry were fairly consistent across all provinces, while the shares of primary agriculture, and food and beverage processing saw more variation across provinces.

**Chart B.11**
**Agriculture and Agri-Food System's Share of Provincial Employment, 2016**



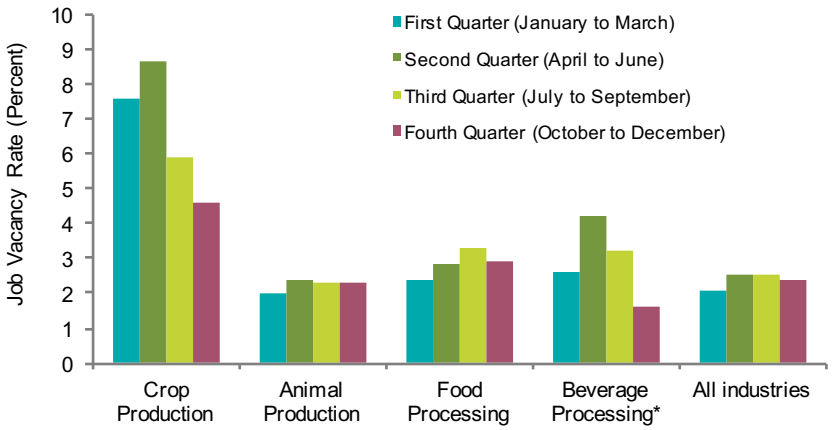

Source: Statistics Canada and AAFC calculations.
Notes: (1) Input and service suppliers have been excluded due to confidentiality requirements of the *Statistics Act*. (2) See glossary for the definition of employment.

# Temporary foreign workers are used to help meet some of the labour needs in the agriculture and agri-food sector.

**Primary agriculture and food and beverage processing industries tend to show higher job vacancy rates than other industries.**

Crop production saw significantly higher vacancy rates throughout 2016 when compared to other industries and a more significant decline across quarters, shrinking significantly from the first quarter (7.6%) to the fourth quarter (4.6%). This may be due partly to the seasonal nature of crop production.

**Chart B.12**
**Job Vacancy Rate, Primary Agriculture, Food and Beverage Processing and All Industries, 2016**



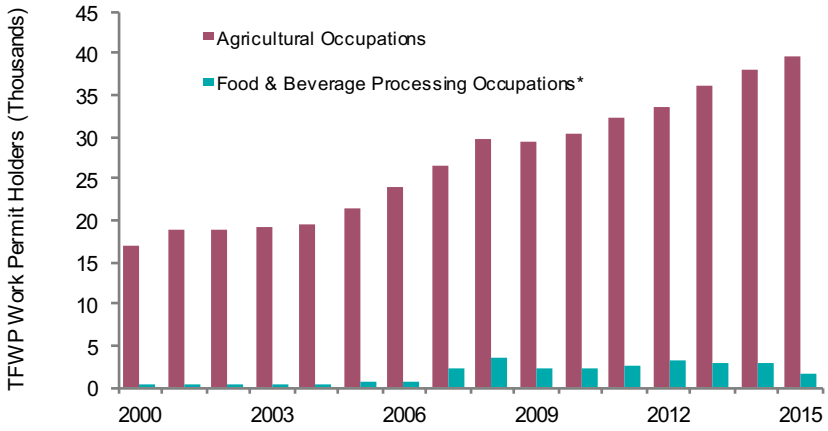

Source: Statistics Canada.
* Includes tobacco processing.

**There has been strong growth in the use of temporary foreign workers (TFWs) through the Temporary Foreign Worker Program (TFWP) since 2000 to fill some job vacancies.**

The number of TFWs in agricultural occupations increased from 16,865 to 39,665 between 2000 and 2015 and from 205 in 2000 to 1,770 in 2015 in food and beverage processing occupations.

TFWs are used mainly to fill lower-skill jobs in the sector, more commonly in certain primary agriculture and food processing industries.

**Chart B.13**
**Temporary Foreign Workers in Agriculture and Food and Beverage Processing, 2000-2015**




Source: Immigration, Refugees and Citizenship Canada and AAFC calculations.
* Includes tobacco processing.

# SECTION C

International Trade

# SECTION C

## International Trade

### Introduction:

The value of Canada's agriculture and agri-food exports reached $56.0 billion in 2016, and with the addition of seafood exports, $62.6 billion. In this section, the trade values do not include seafood, as the section focusses on agriculture and agri-food product exports.

Canada's agriculture and agri-food sector saw subdued growth in exports and imports in 2016 relative to 2015. With higher export volumes slightly offsetting lower export prices, export values grew by 0.6% to reach $56.0 billion in 2016. Exports to the U.S. softened, but exports to China expanded by 8.0% relative to the previous year, mainly due to increased sales of oilseeds and oilseed products.

Canada also relies on imports to meet domestic demand for a variety of agriculture and agri-food products. Canadian agriculture and agri-food imports grew by 2.0% to reach $44.4 billion in 2016.

Of the Canadian food and beverage processors that directly exported their products abroad in 2016, large enterprises accounted for the largest share of the value of exports, as did enterprises that exported to multiple countries.

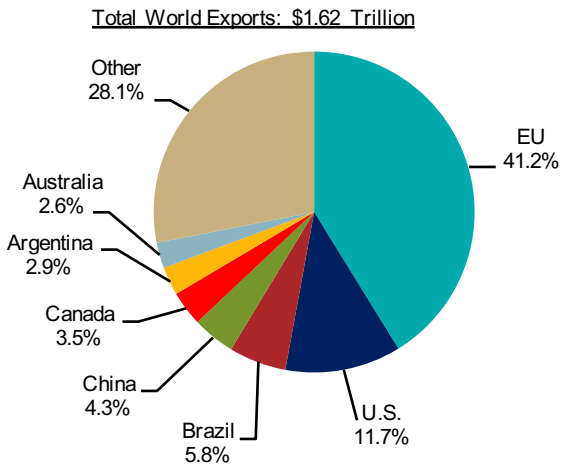
# Canada is a major player in the international trade of agriculture and agri-food products.

**Canada is one of the world's largest exporters of agriculture and agri-food products after the EU, the U.S., Brazil and China.**

With export sales of $56.0 billion, Canada accounted for 3.5% of the total value of world agriculture and agri-food exports ($1.62 trillion) in 2016.

The EU trade shares reflect total trade between members of the EU in addition to trade between the EU and the rest of the world.

**Chart C.1**
**World Agriculture and Agri-Food Export Share by Country of Origin, 2016**

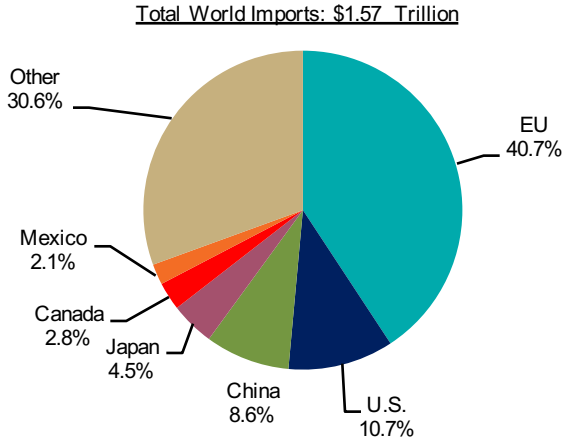



Source: Global Trade Tracker and AAFC calculations.
Notes: (1) Excludes All Seafood - Fresh and Processed. (2) Includes Intra-EU trade.
(3) Percentages may not add up to 100% due to rounding.

**Canada is one of the world's largest importers of agriculture and agri-food products after the EU, the U.S., China, and Japan.**

Canadian imports of agriculture and agri-food products amounted to $44.4 billion in 2016, representing 2.8% of the total value of world imports, which was $1.57 trillion.

**Chart C.2**
**World Agriculture and Agri-Food Import Share by Country of Destination, 2016**



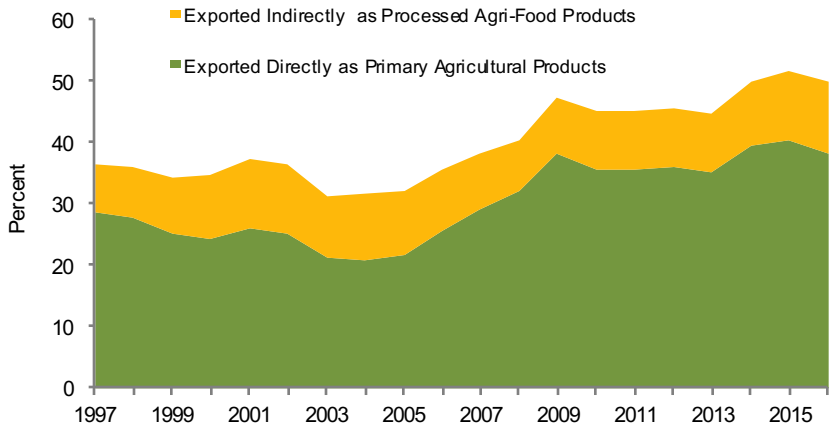

Source: Global Trade Tracker and AAFC calculations.
Notes: (1) Excludes All Seafood - Fresh and Processed. (2) Includes Intra-EU trade.
(3) Percentages may not add up to 100% due to rounding.

# The Canadian agriculture and agri-food sector is highly export-focused.

**On a value basis, it is estimated that in 2016 just over one-half of the value of primary agricultural production in Canada was exported, either directly as primary agricultural commodities or indirectly as processed food and beverage products.**

The estimated export share of primary agricultural production increased from 36% in 1997 to 50% in 2016. Much of this increase started in the mid-2000s when the value share of primary agricultural products exported directly increased rapidly due to higher commodity prices.

**Chart C.3**
**Estimated Share of Canadian Primary Agriculture Production that is Exported Directly and Indirectly, 1997-2016**

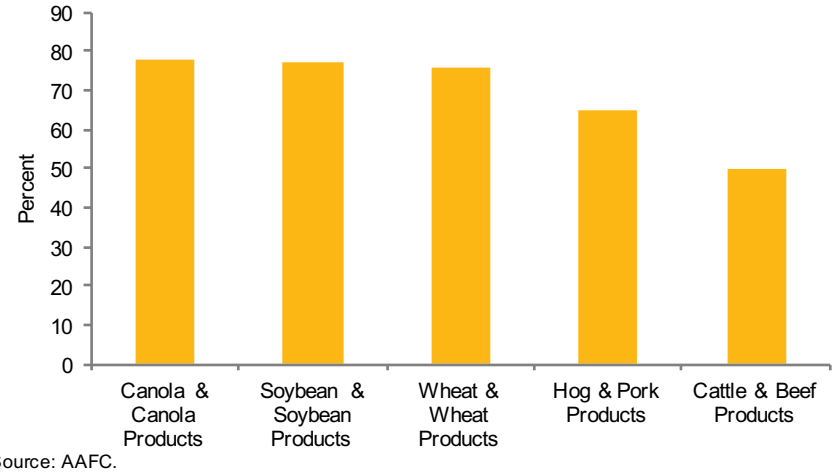



Source: AAFC.
Note: Excludes All Seafood - Fresh and Processed.

**The share of primary and processed agricultural products exported varies by commodity and is relatively high for canola, soybeans, wheat and their respective processed products.**

On a volume basis, over the 2014 to 2016 period, 78% of canola and canola products, 77% of soybeans and soybean products, 76% of wheat and wheat products, 65% of hogs and pork products and 50% of cattle and beef products were exported.

**Chart C.4**
**Estimated Shares of Primary and Processed Agricultural Products that are Exported, Volume-Basis, Average 2014-2016**




Source: AAFC.

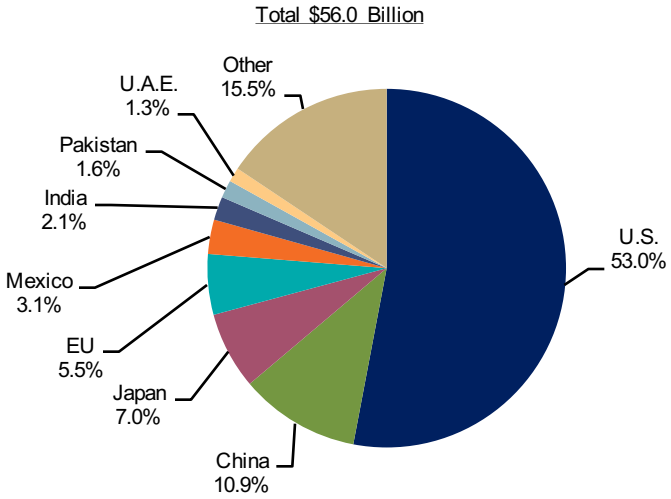
# The U.S. remains Canada's largest and most important agriculture and agri-food trading partner.

**In 2016, the U.S. accounted for 53.0% of the value of all Canadian agriculture and agri-food exports.**

China (10.9%), Japan (7.0%), the EU (5.5%) and Mexico (3.1%) accounted for an additional 26.5% of Canadian agriculture and agri-food exports. One hundred sixty-seven countries accounted for the remainder.

Canada's dependence on the U.S. market has varied over time. For instance, 67.2% of the total value of Canadian agriculture and agri-food exports was accounted for by the U.S. in 2002, but only 48.3% in 2012.

**Chart C.5**
**Canadian Agriculture and Agri-Food Exports by Country of Destination, 2016**

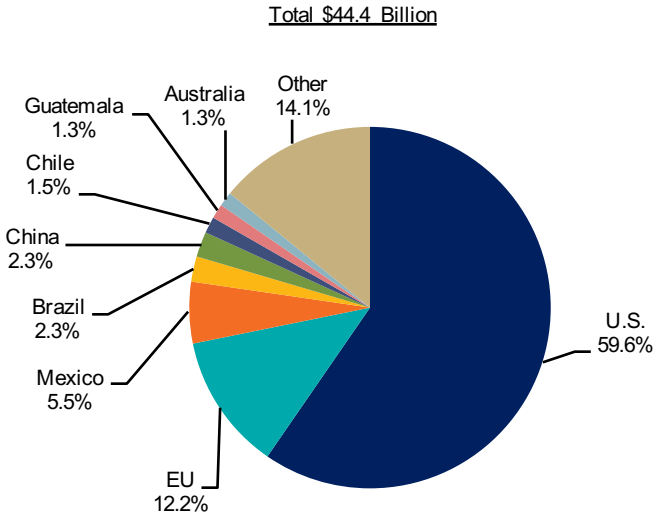



Source: Statistics Canada and AAFC calculations.
Note: Percentages may not add up to 100% due to rounding.

**The U.S. accounted for 59.6% of the value of Canadian agriculture and agri-food imports in 2016. The U.S. import share has been quite consistent over the last two decades, averaging 61% over that period.**

The EU accounted for 12.2% of total imports, followed by Mexico (5.5%), Brazil (2.3%), and China (2.3%).

**Chart C.6**
**Canadian Agriculture and Agri-Food Imports by Country of Origin, 2016**



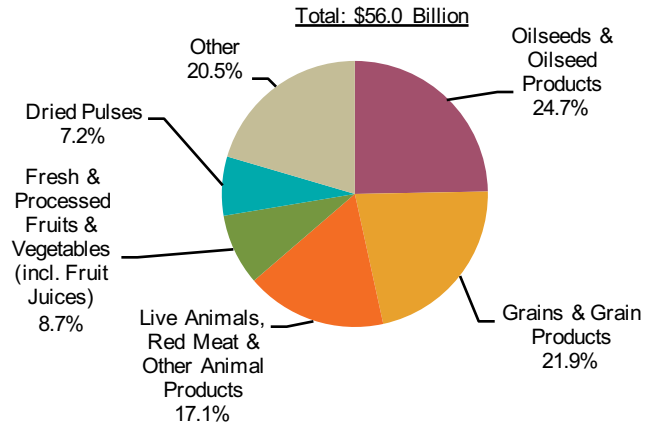

Source: Statistics Canada and AAFC calculations.
Note: Percentages may not add up to 100% due to rounding.

# Three main commodity groups account for nearly two-thirds of all Canadian agriculture and agri-food exports.

**Of the $56.0 billion in Canadian agriculture and agri-food exports in 2016, oilseeds and oilseed products accounted for 24.7%, followed by grains and grain products at 21.9%, and live animals, red meat and other animal products at 17.1%.**

Other important export products included fresh and processed fruits and vegetables (including fruit juices) (8.7%) as well as dried pulses (7.2%).

**Chart C.7**
**Commodity Composition of Canadian Agriculture and Agri-Food Exports, 2016**

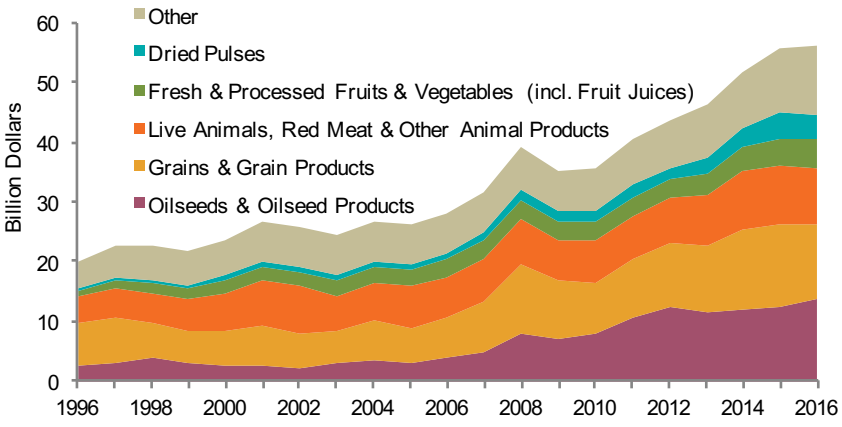



Source: Statistics Canada and AAFC calculations.
Notes: (1) Percentages may not add up to 100% due to rounding. (2) The Other category is largely composed of food preparation materials, cocoa products, confectionaries and coffee products.

**Oilseed and oilseed product exports grew by 12.0% to $13.8 billion between 2015 and 2016, and exports of fresh and processed fruits and vegetables (including fruit juices) increased by 5.3% to $4.9 billion.**

Over the same period, exports of grains and grain products declined by 11.4% to $12.3 billion. Exports of live animals, red meat and other animal products also decreased by 2.0% to $9.6 billion, and exports of dried pulses decreased by 2.5% to $4.0 billion.

**Chart C.8**
**Canadian Agriculture and Agri-Food Export Sales by Commodity Group, 1996-2016**




Source: Statistics Canada and AAFC calculations.
Note: The Other category is largely composed of food preparation materials, cocoa products, confectionaries and coffee products.

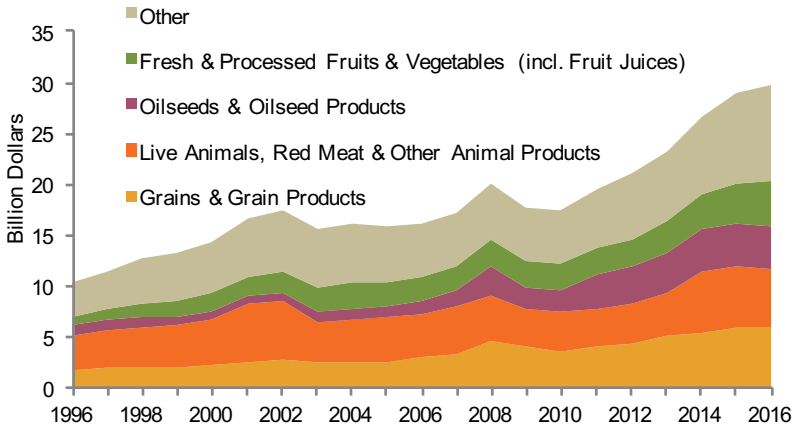
## While Canada has long exported a broad range of products to the U.S., China is increasingly becoming a major export destination for some Canadian products.

**Exports to the U.S. totaled $29.7 billion in 2016, a 2.4% increase over 2015. This contrasts with 9.2% growth in 2015 and 14.2% growth in 2014.**

With the exception of oilseeds and oilseed products, export growth to the U.S. slowed or declined across a broad range of product categories in 2016 relative to 2015.

Examples of key exports to the U.S. in 2016 included baked goods, canola oil and oilcakes, live cattle, beef and potatoes.

**Chart C.9**
**Canadian Agriculture and Agri-Food Export Sales to the U.S. by Commodity Group, 1996-2016**



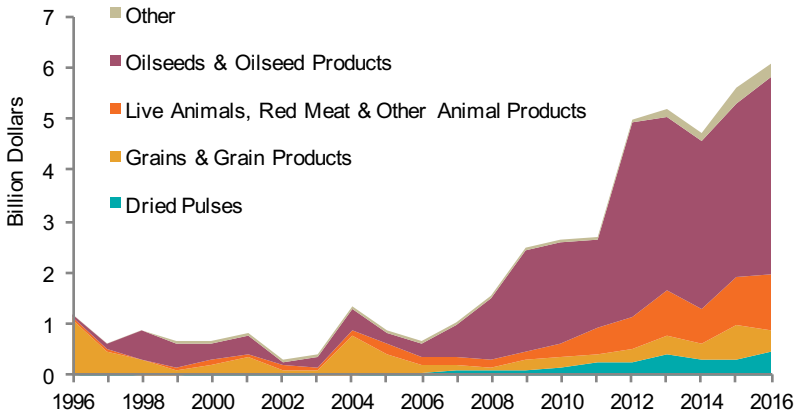

Source: Statistics Canada and AAFC calculations.
Note: The Other category is largely composed of food preparation materials, cocoa products, confectionaries and coffee products.

**China is Canada's second-largest agriculture and agri-food export market. Exports to China in recent years have been driven by oilseeds and oilseed products, which grew from $233 million in 2006 to nearly $3.9 billion in 2016.**

In 2016, exports of oilseeds and oilseed products to China, accounted for 63% of the total value of exports to China. Canola seeds, soybeans and canola oil were the top exports in this category.

Canadian exports in the second largest category of live animals, red meats and other animal products mainly included frozen pork and other swine products.

**Chart C.10**
**Canadian Agriculture and Agri-Food Export Sales to China by Commodity Group, 1996-2016**



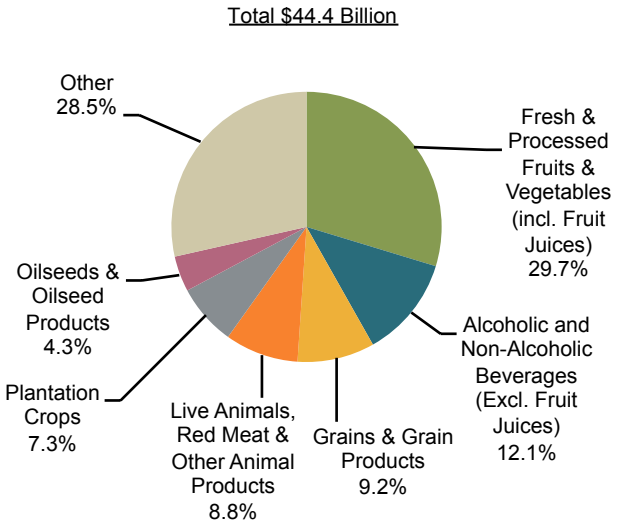

Source: Statistics Canada and AAFC calculations.
Note: The Other category is largely composed of food preparation materials, cocoa products, confectionaries and coffee products.

# Canada imports a wide variety of agriculture and agri-food products.

**Imports of fresh and processed fruits and vegetables accounted for 29.7% of the total value of Canadian agriculture and agri-food imports in 2016.**

Alcoholic and non-alcoholic beverages (excluding fruit juices) (12.1%), and grains and grain products (9.2%) were the next largest import categories by value.

**Chart C.11**
**Commodity Composition of Canadian Agriculture and Agri-Food Import Sales, 2016**



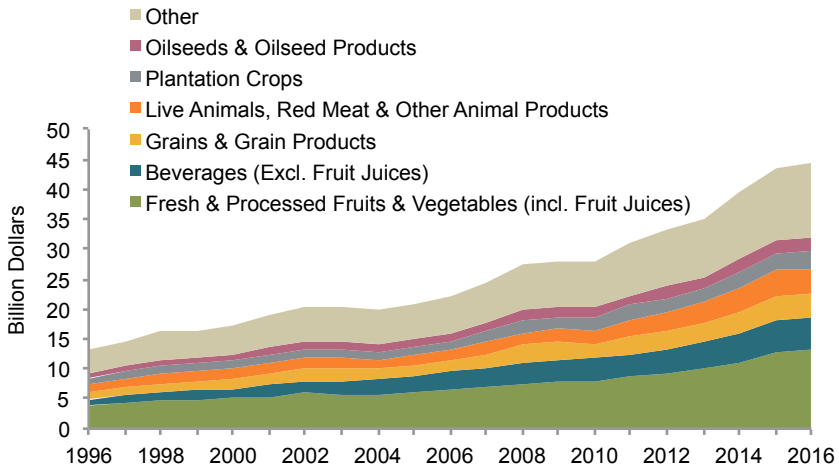

Source: Statistics Canada and AAFC calculations.
Notes: (1) Percentages may not add up to 100% due to rounding. (2) The Other category is largely composed of food preparation materials, cocoa products, confectionaries and coffee products.

**The value of imported agriculture and agri-food products grew by 2.0% in 2016 relative to 2015. Annual average growth was 7.8% over the last decade.**

Imports of fresh and processed fruits and vegetables (including fruit juices) were up 3.4% in 2016 to $13.2 billion, while imports of beverages (excluding fruit juices) increased by 2.5% to $5.4 billion.

Slower growth in most import categories and year-over-year decreases in the value of imports of both grain and grain products and live animals, red meat and other animal products contributed to the slower overall import growth in 2016 relative to 2015.

**Chart C.12**
**Commodity Composition of Canadian Agriculture and Agri-Food Imports, 1996-2016**




Source: Statistics Canada and AAFC calculations.
Note: The Other category is largely composed of food preparation materials, cocoa products, confectionaries and coffee products.

# The value of primary agriculture exports decreased in 2016, in contrast to growth in the value of processed agri-food exports.

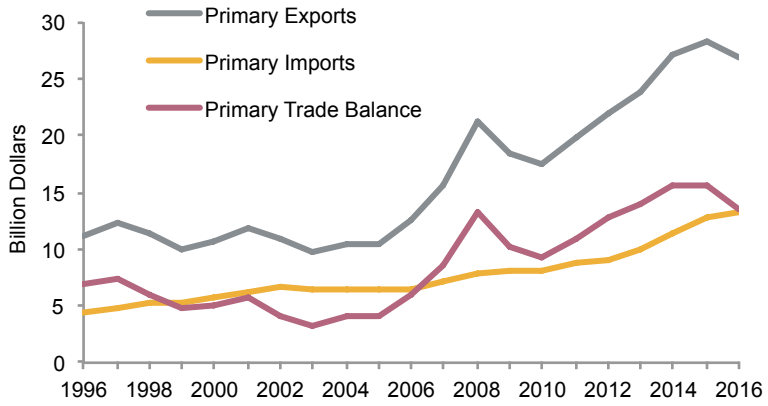
**Canadian exports of primary agricultural products (i.e. exports directly from the farm sector) declined from $28.4 billion to $26.8 billion between 2015 and 2016.**

Over the same period, imports of primary agricultural products to Canada increased from $12.9 billion to $13.3 billion.

As a result, Canada's trade surplus in primary agriculture declined from $15.5 billion to $13.5 billion between 2015 and 2016.

Despite decreases in 2009, 2010 and 2016, exports of primary agricultural products have grown at an annual average rate of 9.9% since 2006, a faster pace of growth than that of primary imports of 7.1%. As a result, the trade surplus for primary agriculture has grown at an annual average rate of 14.3% over this period.

**Chart C.13**
**Canadian Primary Agriculture Exports, Imports and Trade Balance, 1996-2016**




Source: Statistics Canada and AAFC calculations.

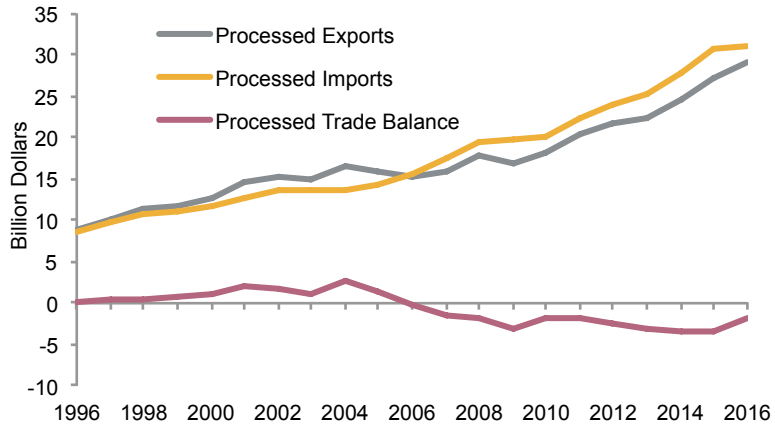
**Exports of processed agri-food products (i.e. agri-based products that have gone through processing) increased from $27.3 billion in 2015 to $29.2 billion in 2016.**

Imports of processed agri-food products to Canada also increased from $30.6 billion to $31.1 billion over the same period.

Canada's trade deficit in processed agri-food products was $1.9 billion in 2016, a decline from $3.3 billion in the previous year.

Exports of processed agri-food products have grown at an average annual rate of 5.8% since 2006 while imports have grown at a rate of 7.3%. However, year-to-year variations in export and import growth rates mean that Canada's trade deficit in processed agri-food products has been relatively stable since the late-2000s.

**Chart C.14**
**Canadian Processed Agri-Food Exports, Imports and Trade Balance, 1996-2016**




Source: Statistics Canada and AAFC calculations.

# Trade values grew more slowly in 2016 than in previous years, mainly due to lower commodity prices for both exports and imports.

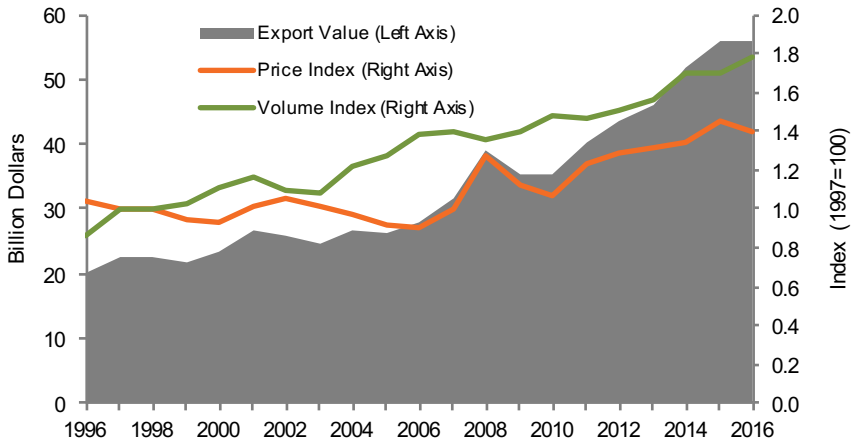
**A decrease of 3.6% in export prices was offset by export volume growth of 4.3%, leading to 0.6% growth in export values in 2016 over 2015.**

In terms of major export categories, strong export volume growth, which more than offset a modest decline in prices, contributed to an increase in the value of oilseed and oilseed product exports in 2016 relative to 2015.

Lower export prices and export volumes contributed to a decline in export values for grains and grain products.

Lower export prices for live animals, red meats and other animal products contributed to a decrease in export values despite higher export volumes.

**Chart C.15**
**Prices, Volumes and Values of Canadian Exports of Agriculture and Agri-Food Products, 1996-2016**




Source: Statistics Canada and AAFC calculations.

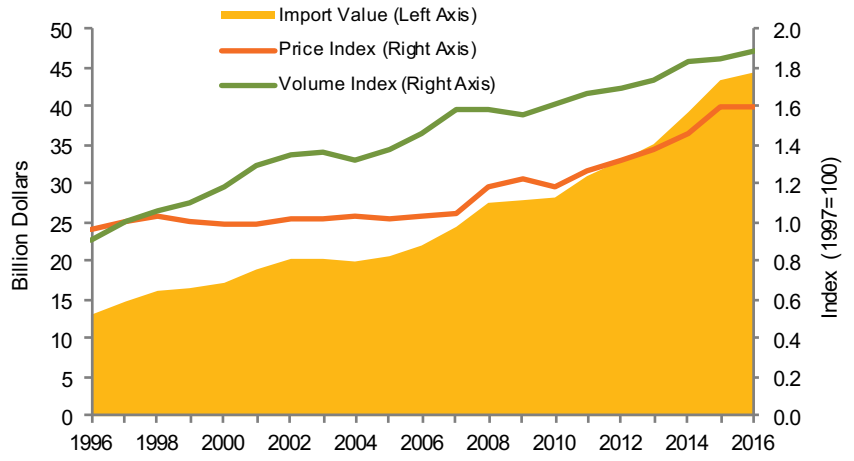
**Import volume growth of 2.2% more than offset a 0.2% decline in import prices which resulted in 2.0% growth in the value of agriculture and agri-food imports in 2016 relative to 2015.**

In terms of major import categories, higher import prices and import volumes in 2016 relative to 2015 contributed to higher import values for fresh and processed fruits and vegetables and for alcoholic and non-alcoholic beverages (excluding fruit juices).

Higher import volumes were offset by lower import prices, leading to a decline in the import value of grains and grain products.

Lower import values were observed for live animals, red meats and other animal products due to both lower import prices and volumes.

**Chart C.16**
**Prices, Volumes and Values of Canadian Imports of Agriculture and Agri-Food Products, 1996-2016**




Source: Statistics Canada and AAFC calculations.

# Most of the value of exports from food and beverage processors comes from large processors and those that export to multiple countries.

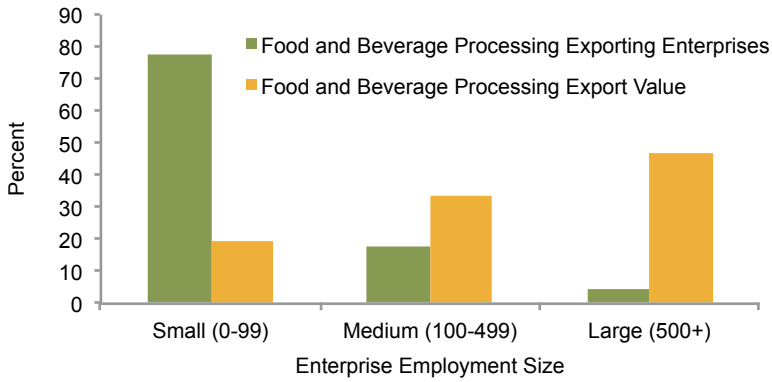
**In 2016, 1,240 food and beverage processing enterprises exported their products abroad.**

An enterprise is defined as the unit for which consolidated financial statements are maintained and may have multiple plants.

Large enterprises (with 500+ employees) represented only 4.8% of exporters in 2016 but accounted for 46.9% of the value of direct exports from food and beverage processing enterprises.

Small enterprises (with fewer than 100 employees) accounted for the largest share of food and beverage processing exporters (77.5%) but the smallest share of the value of exports from food and beverage processing enterprises (19.8%).

**Chart C.17**
**Share of Exporting Enterprises and Export Value, by Enterprise Employment Size, Food and Beverage Processing, 2016***




Source: Statistics Canada and AAFC calculations.
Notes: (1) Exports that take place through third parties such as wholesalers and retailers are not included in these figures. (2) Uses Innovation, Science and Economic Development Canada definition of small and medium-sized enterprises.
* Includes tobacco processing.

**The majority (60.1%) of exporting food and beverage processing enterprises exported to a single partner country in 2016, but those that exported to more than 20 countries accounted for the largest share (26.9%) of the value of exports of food and beverage processing enterprises.**

Food and beverage processing enterprises that exported to two partner countries accounted for the next largest share of exporting enterprises (14.8%). Enterprises that exported to one partner country accounted for the second largest share of export value (21.6%).

**Chart C.18**
**Share of Exporting Enterprises and Export Value, by Number of Partner Countries, Food and Beverage Processing, 2016***


Source: Statistics Canada and AAFC calculations.
Notes: (1) Exports that take place through third parties such as wholesalers and retailers are not included in these figures. (2) Uses Innovation, Science and Economic Development Canada definition of small and medium-sized enterprises.
* Includes tobacco processing.

# SECTION D

## Primary Agriculture

# SECTION D1

## Farm Performance

### Introduction:

Primary agriculture is directly linked to all stages of the agri-food supply chain with upstream and downstream industries benefitting from primary agricultural products.

As a result, agricultural producers have a variety of marketing options including direct sales to consumers, direct exports to foreign markets and as input suppliers for the food and beverage processing industry.

There has been a steady growth in receipts in the primary agricultural industry over the past few decades. Over the last few years in particular, the industry has seen substantial growth in grain and oilseed receipts due in part to higher prices. Similarly, average net operating income has increased over time. The average net worth of farms has also trended upwards and reached a record high in 2015.

# Canadian agriculture is diversified geographically.

**Some provinces are more diversified than others. For example, Ontario's farm market receipts are more evenly distributed across the different commodities than the Prairies where receipts mainly come from grains, oilseeds and red meat.**

Beef cattle farming occurs primarily in Alberta, Saskatchewan and Ontario while hog and pig farming is mainly concentrated in Manitoba, Ontario and Quebec. Ontario and Quebec are the major dairy-producing provinces. The majority of grain and oilseed farms are located in the Prairies and Ontario while horticultural operations (e.g., fruits and vegetables) are more common in British Columbia, Ontario and Atlantic Canada.

British Columbia is the top producer of fruits in Canada while Saskatchewan is the leader in pulse production. Quebec is the top producer of hogs nationally.

**Chart D1.1**
**Geographic Distribution of Key Commodities by Province and Territory, 2016**


Source: Statistics Canada.

# Farm market receipts have grown substantially over the past four decades, largely due to growth in crop receipts.

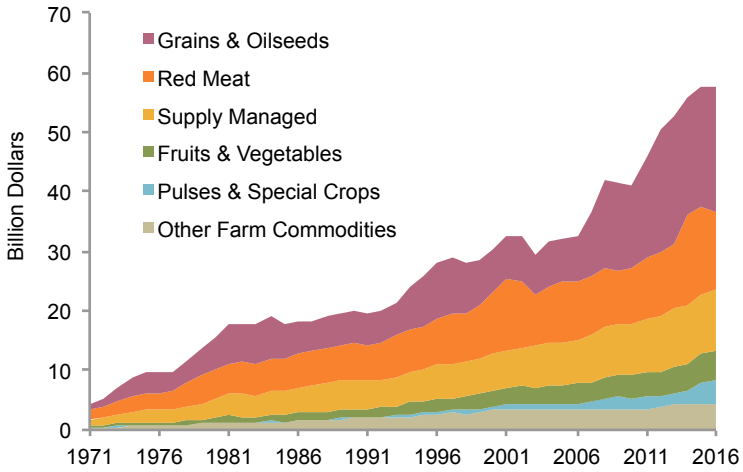
**Farm market receipts remained at the record high of $57.6 billion in 2016.**

Farm market receipts grew by 5.8% per year, on average, between 1971 and 2016, driven by grain and oilseed receipts, which increased by 6.5% annually on average over the same period. Canola receipts in particular reached $9.2 billion in 2016, compared to $134 million in 1971, due to consistent growth in production and strong oilseed prices.

The average annual growth in receipts from red meats was 4.9% from 1971 to 2016. The red meat industry has faced several challenges such as diseases like bovine spongiform encephalopathy (BSE), U.S. Country-of-Origin Labelling (COOL), exchange rate fluctuations, along with its cyclical supply and price variability.

Receipts from pulses and special crops have seen their most impressive growth in recent years. Receipts from lentils and peas, in particular, have seen very strong growth since 2007 at 16.1% per year.

**Chart D1.2**
**Total Farm Market Receipts, by Major Commodity Groups, 1971-2016**




Source: Statistics Canada.

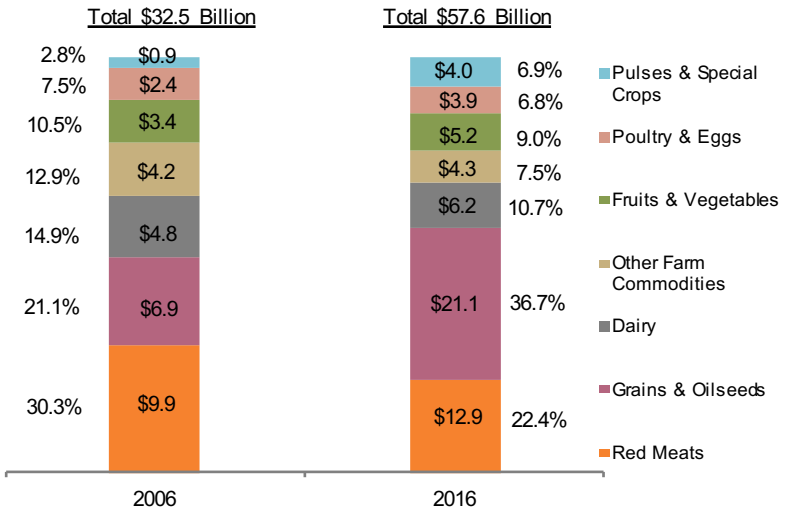
# The composition of farm market receipts has shifted over time.

### The share of farm market receipts has shifted from livestock to crops, particularly grains and oilseeds.

Receipts from red meats accounted for 30.3% of total market receipts in 2006. By 2016, the share of red meat receipts had declined and accounted for 22.4% of total market receipts. Receipts from dairy and poultry products also declined as a share of total market receipts, between 2006 and 2016.

Over the same period, the share of grain and oilseed receipts increased from 21.1% of total market receipts to 36.7%, mainly due to the substantial growth in canola production and increases in international crop prices. Receipts from pulses and special crops have also increased substantially. Receipts from lentils and peas in particular have grown in the Prairies since 2007, in response to continuing growth in international demand.

**Chart D1.3**
**Total Farm Market Receipts, Share of Major Commodity Groups, 2006 and 2016**




Source: Statistics Canada and AAFC calculations.

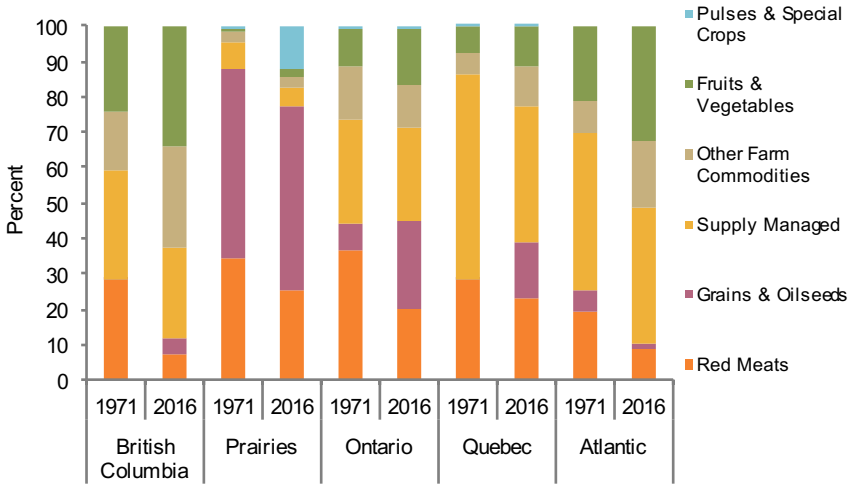
### The regional composition of farm market receipts also highlights significant shifts and differences between 1971 and 2016.

In the Prairies, grains and oilseeds continue to account for the major share of farm market receipts while the share from red meats has declined. The share of farm market receipts from pulses and special crops have increased substantially.

In Ontario and Quebec, the horticulture and grain and oilseed industries now account for a larger share of farm market receipts than red meat products, while receipts from supply managed commodities account for a smaller share of market receipts.

In the Atlantic region and British Columbia, the share of fruit and vegetable farm market receipts increased, while the share from the red meat industry declined.

**Chart D1.4**
**Total Farm Market Receipts, by Region and Commodity Groups, 1971 and 2016**




Source: Statistics Canada and AAFC calculations.

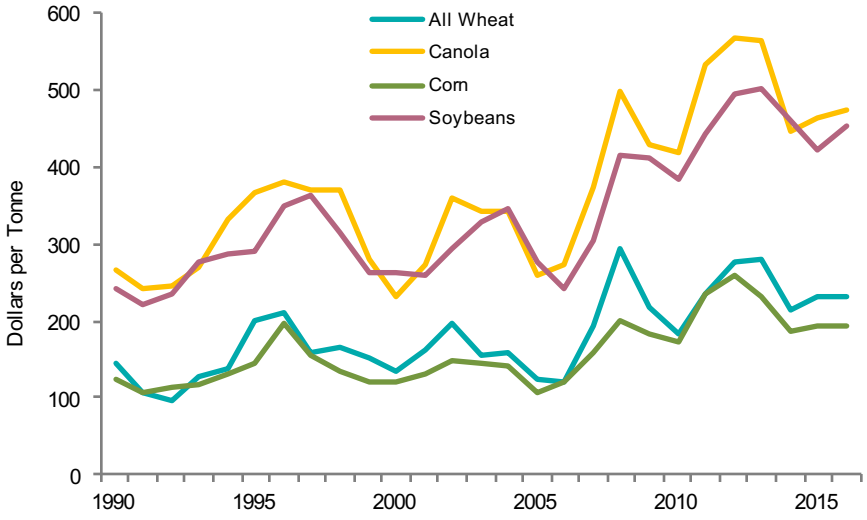
# Over the past five years in particular, higher prices for some agricultural commodities have been the main driver of the growth in farm market receipts.

**Grain and oilseed prices have recently softened but remain at relatively high levels.**

From 1990 to 2006, the long run trend in grain and oilseed prices in Canada was relatively flat, but from 2006 to 2013, prices increased substantially in response to increased demand. Over that time period, corn, canola, soybean and wheat prices in Canada increased by 91%, 107%, 109% and 131% respectively.

Since 2013, abundant harvests in major crop producing countries, including Canada, expanded worldwide stocks. This resulted in lower commodity prices between 2014 and 2016, although still above price levels in the early 2000s.

**Chart D1.5**
**Prices of Major Crops, Canada, 1990-2016**



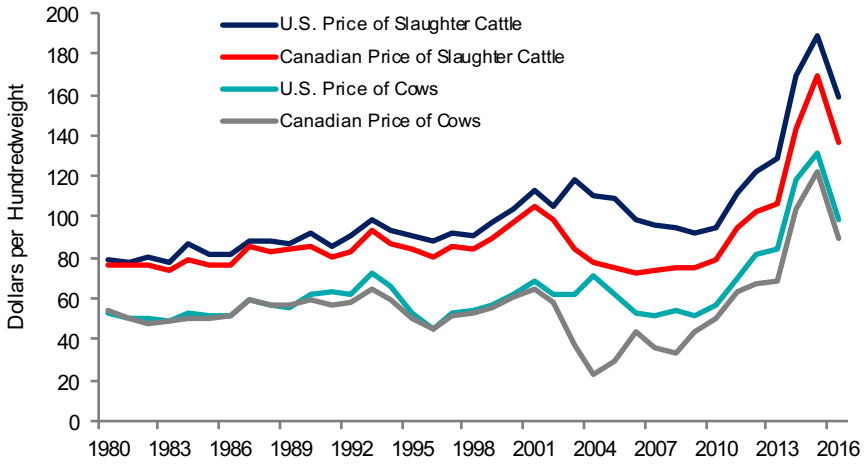

Source: Statistics Canada and AAFC calculations.

**The Canadian and U.S. cattle markets are highly integrated and cattle prices in both countries have been closely linked historically. Some events, including fluctuations in the Canada-U.S exchange rate, have disrupted the price linkages.**

The ban on animal trade from Canada by the U.S. in 2003 following the outbreak of BSE, and the implementation of U.S. COOL in 2008, put downward pressure on cattle prices in Canada, leading to large cattle price differentials between the two countries.

The North American drought conditions in 2012 drove feed costs higher, and cattle producers liquidated their herds, reducing North American cattle production between 2012 and 2014. This led to record high prices in 2014 and 2015, but a return to herd expansions more recently has increased the supply of cattle in both Canada and the U.S., which has contributed to downward pressure on cattle prices in both countries in 2016.

**Chart D1.6**
**Cattle Price Cycle, 1980-2016**




Source: United States Department of Agriculture, National Agricultural Statistics Service. Statistics Canada; and AAFC, Red Meat Market Information.

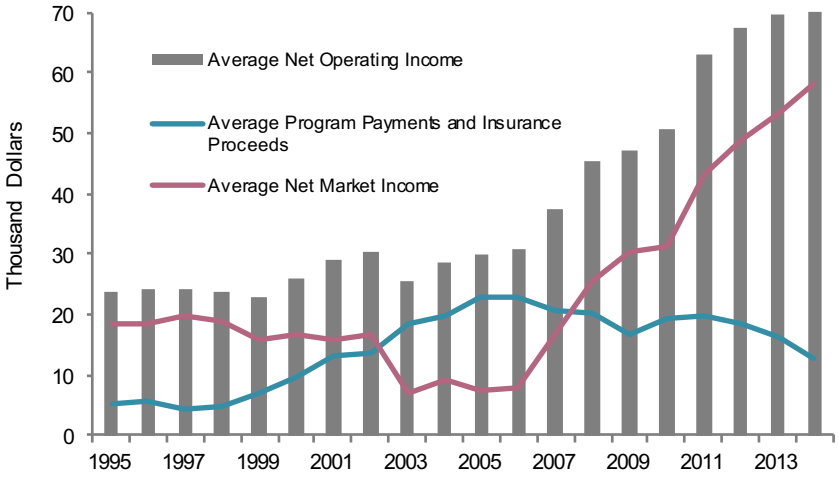
# Average net operating income has increased, particularly in the last decade, but varies by province.

**Average net farm operating income which includes average net market income and average program payments and insurance proceeds, increased in 2014 mainly due to an increase in net market income.**

Between 1995 and 2014, the average net operating income tripled from $23,600 to $71,000 per farm. This is an increase of 6.0% per year, which is greater than the average inflation rate of 1.8%.

While average program payments and insurance proceeds have decreased since 2006, average net market income increased and represented 82% of average farm operating income in 2014.

**Chart D1.7**
**Average Net Operating Income, 1995-2014**



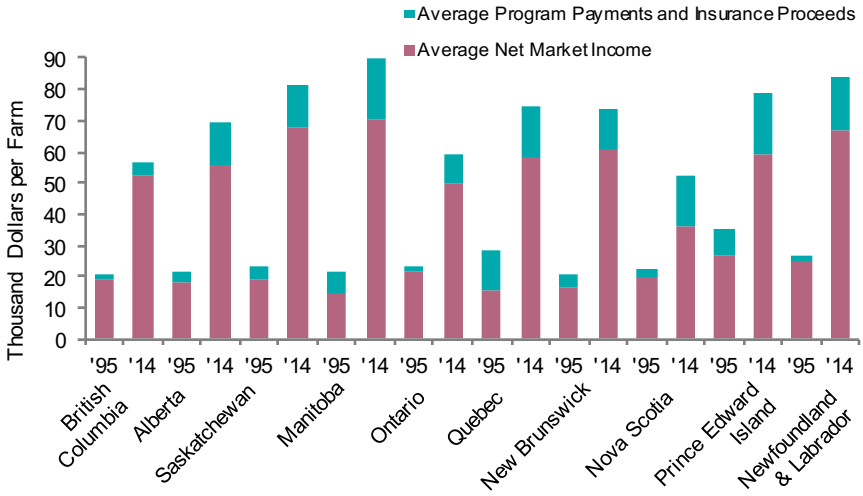

Source: Statistics Canada, and AAFC calculations.
Note: Average net operating income = total product (crop or livestock) and other revenues + program payments and insurance proceeds.

**In 2014, Manitoba had the highest average net operating income per farm ($89,600), followed by Newfoundland and Labrador ($83,900).**

Between 1995 and 2014, Manitoba also had the highest increase in average net market income.

The contribution of average net market income to average net operating income varies by province. British Columbia, at 92%, had the highest share of average net market income to net operating income in 2014 and five other provinces had 80% or more: Ontario (85%), Saskatchewan (83%), New Brunswick (82%), Alberta (80%), and Newfoundland and Labrador (80%).

**Chart D1.8**
**Average Net Operating Income by Province, 1995 and 2014**




Source: Statistics Canada, and AAFC calculations.
Note: Average net operating income = total product (crop or livestock) and other revenues + program payments and insurance proceeds.

# Average net operating income also varies by farm type.

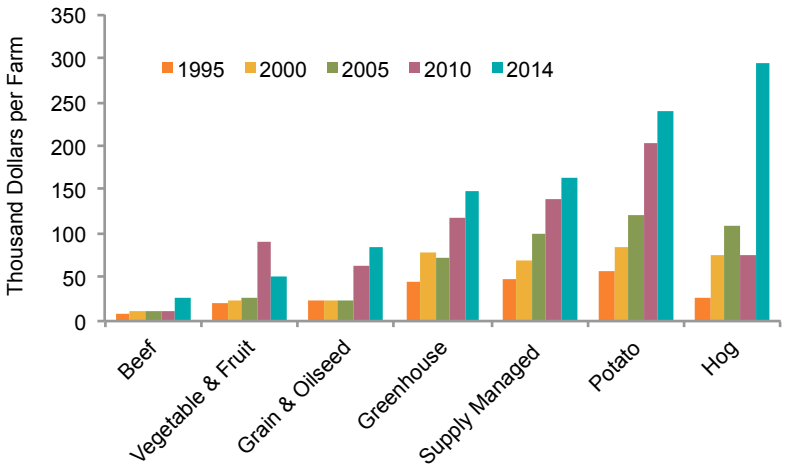
**Differences in average net operating income by farm type are related to many factors including differences in commodity prices, farm size and changing market conditions.**

Hog, potato, and supply managed farms reported the highest average net operating incomes in 2014.

Beef farms and vegetable and fruit farms reported the lowest average net operating incomes.

Hog farms experienced the largest increase in net operating income between 1995 and 2014, reflecting strong growth in net market incomes over the period.

**Chart D1.9**
**Average Net Operating Income By Farm Type, 1995 to 2014**




Source: Statistics Canada and AAFC calculations.
Note: Average net operating income = total product (crop or livestock) and other revenues + program payments and insurance proceeds.

**In general, the total income of unincorporated farm families is slightly higher than that of the average Canadian family.**

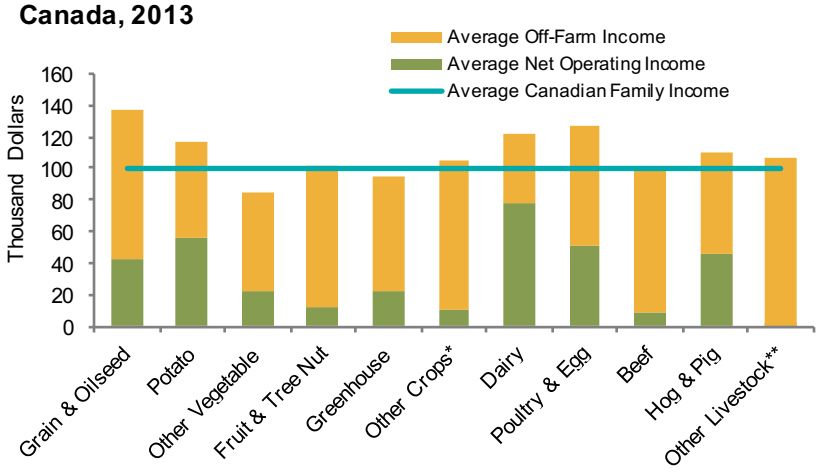
In 2013, the average farm family income was estimated at $117,400 compared to $100,400 for the average Canadian family with two persons or more. One important reason for this trend is recent high commodity prices.

In 2013, unincorporated family farms accounted for 23.7% of the total farm operating revenues of all farms.

Average farm family incomes differ significantly depending on farm type and off-farm income.

Off-farm employment depends in part on the type of farm operated. In 2013, dairy producers reported the lowest average off-farm income. Other livestock farms reported the highest average off-farm income of all farm types in 2013, followed by other crop farms, beef farms and grain and oilseed farms.

**Chart D1.10**
**Average Farm Family Income, Unincorporated Sector, Canada, 2013**




Source: Statistics Canada and AAFC calculations.
* Other crops include establishments primarily engaged in growing crops such as sugar beets, hay, grass seed and tobacco.
** Other livestock includes establishments primarily engaged in raising animals such as sheep, goats, bees, horses and fur-bearing animals.

# Net cash income of farms has grown substantially over the past five years as total farm cash receipts have grown faster than net operating expenses during this time.

**Net cash income grew on average by 5.1% per year between 1971 and 2016, with the highest growth occurring since 2010.**

Net cash income is the difference between total farm cash receipts and net farm operating expenses.

Net cash income in agriculture was $15.8 billion in 2016 compared to $1.7 billion in 1971. Since 2010, growth in total farm cash receipts has, on average, outpaced growth in net operating expenses.

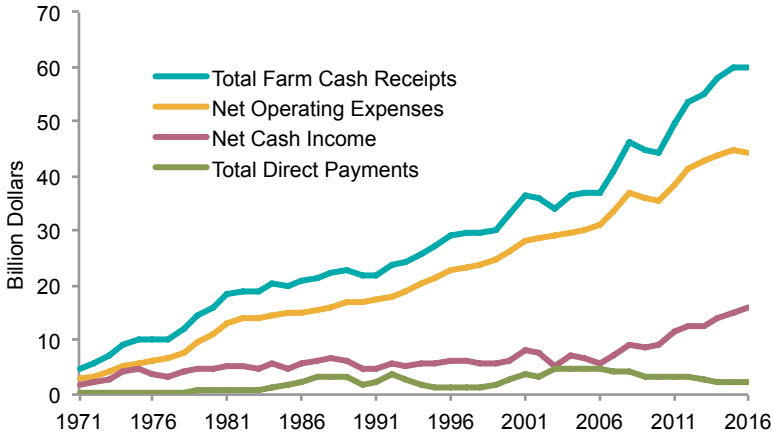
Total farm cash receipts include commodity receipts and program payments.

Total farm cash receipts reached $60.0 billion in 2016, up from $4.7 billion in 1971. Net farm operating expenses were $44.2 billion in 2016 compared to $3.0 billion in 1971.

Direct program payments to producers, used to help stabilize farm income and offset production losses, reached $2.42 billion in 2016 compared to $0.13 billion in 1971.

Total direct payments grew on average by 6.7% per year between 1971 and 2016. Direct payments rose rapidly in the 1980s due to the financial crisis, and then peaked in 2005, following several years of low grain and oilseed prices, drought and disease challenges, including the BSE crisis.

**Chart D1.11**
**Trends in Net Cash Income and its Main Components, Canada, 1971-2016**




Source: Statistics Canada.

# Net value added in agriculture hit its second highest level on record in 2015.

**In 2015, net value added in agriculture totaled $18.7 billion, the second highest level on record after the record level of $22.2 billion in 2013.**

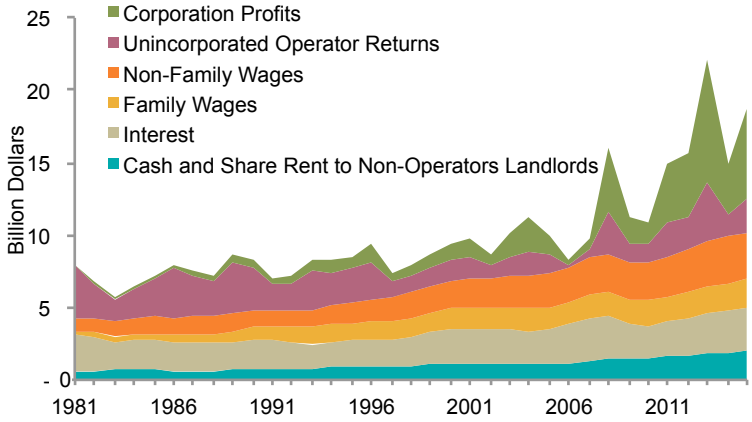
Net value added represents the net value of production after expenses on inputs, business taxes and depreciation have been taken into account.

Net value added is then distributed to the main factors of agricultural production: rent to non-operator landlords, interest to lenders, wages to family and non-family members, as well as profits to corporations and unincorporated operators.

Net value added in agriculture has grown, on average, by 6.4% per year since 2005. The rate of growth has been faster since 2012, as high commodity prices combined with growth in crop yields have contributed to record farm market receipts. A record crop harvest in 2013 drove net value added to record levels due to the large increase in the value of crop inventories.

In 1981, corporation profits and unincorporated operator returns accounted for 1.6% and 45.9% of net value added respectively. Starting in 2004, the share of corporation profits was greater than that of unincorporated operator returns. By 2015, 32.8% and 12.7% of net value added was attributed to corporation profits and unincorporated operator returns respectively.

**Chart D1.12**
**Distribution of Net Value Added in Agriculture, Canada, 1981-2015**




Source: Statistics Canada.
Note: Starting in 2005, changes were made to the net value added methodology so that resales are no longer included in agricultural sales to other farms or in expenses on inputs from other farms.

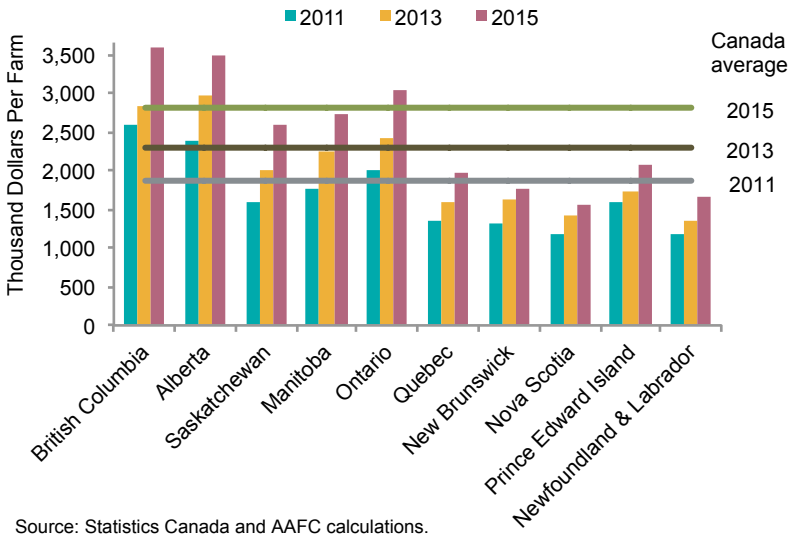
# In 2015, average net worth increased in Canada although there were variations across provinces and farm types.

**In 2015, the average net worth per farm was $2.8 million, an all time high.**

This extends a national trend of increasing average farm net worth since 2003. Overall, Canadian farms have a strong balance sheet as increases in farm debt have been more than offset by increases in farm asset values in all provinces. The increase in farm asset values reflects, in part, a general optimism in the industry.

Provincially, between 2011 and 2015, the highest increase in average net worth was found in Saskatchewan (63%), followed by Manitoba (55%) and Ontario (51%). Prince Edward Island (31%) had the lowest increase, followed closely by Nova Scotia (32%) and New Brunswick (33%).

**Chart D1.13**
**Average Farm Net Worth By Province, 2011 to 2015**




Source: Statistics Canada and AAFC calculations.

**The average net worth of farms varies by farm type. This reflects differences in capital intensity and average farm size among the various farm types.**

For most farm types, farm land and buildings account for most of the farm assets, ranging from fruit farms (82%) to potato farms (64%) in 2015. Supply managed farms - dairy and poultry and eggs - have less assets in farm land and buildings (47% and 33% respectively) but these farms have added assets from quota values: 35% and 54% respectively.

Cattle farms are predominantly small farms and thus tend to report lower farm net worth and liabilities (or debt).

Poultry and egg farms on the other hand are predominantly large farms and tend to report higher farm net worth and liabilities.

**D1.14**
**Average Net Worth By Farm Type, 2015**


Source: Statistics Canada and AAFC calculations.

# SECTION D2

## Farm Inputs

### Introduction:

Agriculture-specific input and service suppliers support primary agriculture and also act as buyers of products from downstream industries such as prepared animal feed from grain and oilseed mills. Input and service suppliers are very diverse and include multinational firms, commodity brokers and small businesses.

Since 2006 the average annual growth rate of farm cash receipts has outpaced that of net farm operating expenses leading to significant increases in net cash income.

In 2016, commercial feed, hired labour, and fertilizer and lime expenses were the top operating expenses for agricultural producers.

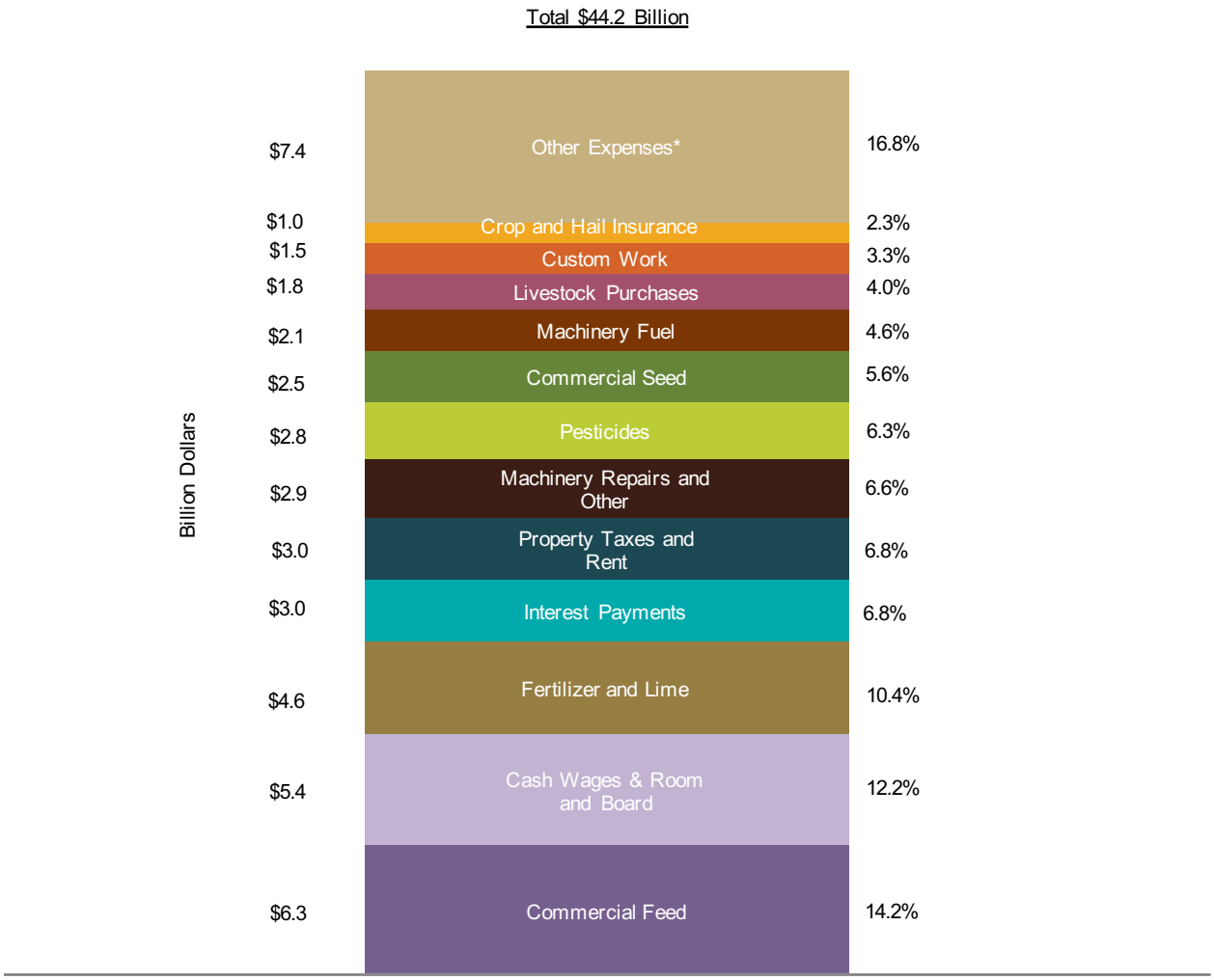
# Commercial feed accounted for the largest share of farm expenses in 2016, due to slightly larger herds and above average crop prices.

**In 2016, net farm operating expenses dropped to $44.2 billion, a decrease of 0.9% from the previous year. This was the first decline in six years driven by lower fertilizer, machinery fuel and cattle prices.**

Commercial feed expenses rose to $6.3 billion in 2016, increasing by 2.1% from 2015, and accounting for 14.2% of total net farm operating expenses.

After feed expenses, hired labour ($5.4 billion), fertilizer and lime ($4.6 billion), interest payments ($3.0 billion), and property taxes and rent ($3.0 billion) rounded out the top five largest expense items for agricultural producers.

**Chart D2.1**
**Net Farm Operating Expenses, 2016**




Source: Statistics Canada.
Note: *Other Expenses is the sum of smaller-value categories including: Legal and Accounting Fees, Repairs to Buildings and Fences, Irrigation, Twine, Wire and Containers, Artificial Insemination Fees & Veterinary, Business Insurance and Stabilization Premiums.

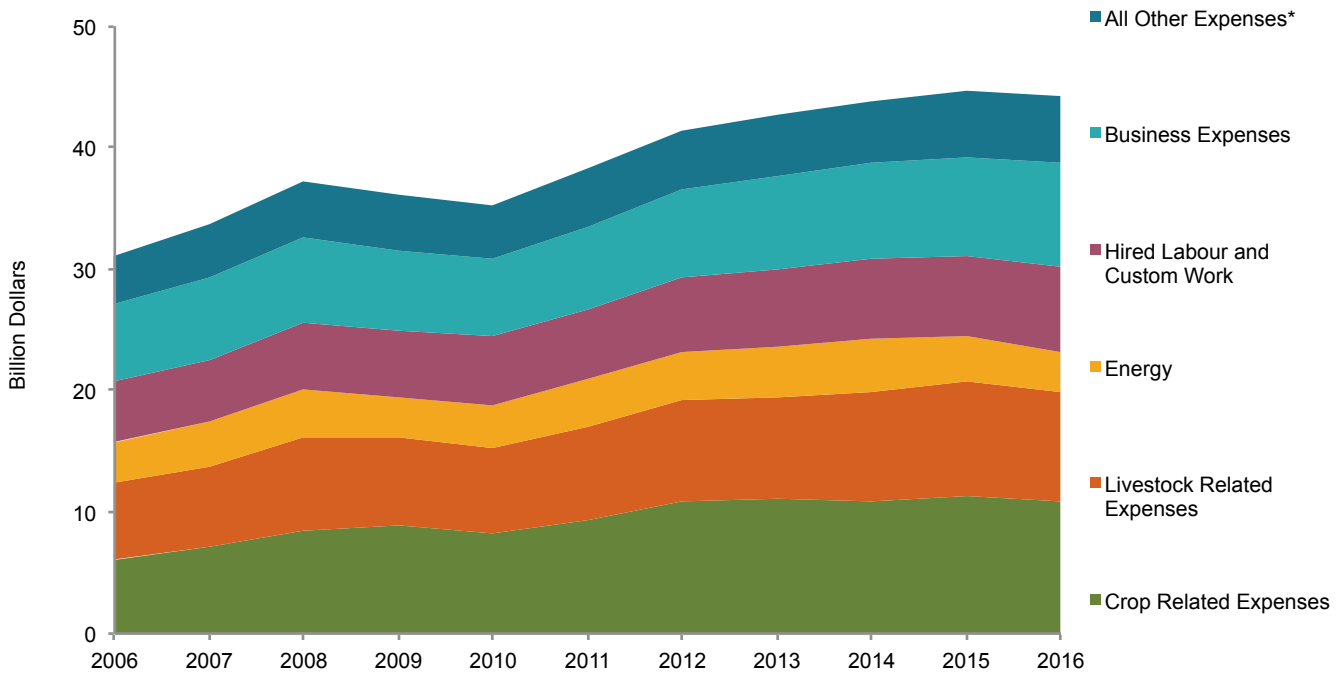
# Total farm operating expenses continued their upward trend over the past decade, due in part to the continued growth in input prices.

**Producers saw their overall operating costs increase by 41.9% between 2006 and 2016 despite the slight decline between 2015 and 2016.**

Net commercial feed, which is the largest single expense item, increased by 53.5% between 2006 and 2016, contributing to the steady increase in livestock expenses.

On the other hand, crop related expenses have grown by the largest amount, as area seeded to crops has increased along with a reduction in summerfallow. Fertilizer expenses are the largest share of crop expenses, and have increased by 76.1% since 2006. Out of all expense items, commercial seed expenses grew by the largest amount, increasing by 111.2% between 2006 and 2016. Over the same period, crop insurance premiums also increased substantially, doubling from $505 million to $1,018 million in 2016.

**Chart D2.2**
**Net Farm Operating Expenses, 2006-2016**




Source: Statistics Canada and AAFC calculations.

Notes: (1) Crop Related Expenses include fertilizers, pesticides, seeds, crop insurance and irrigation; (2) Livestock Related Expenses include feed, livestock purchases and vetrenary expenses; (3) Energy includes machinery and heating fuel and electricity; (4) Hired Labour and Custom Work includes cash wages and custom work; (5) Business Expenses include taxes, rent, interest, business insurance, telephone, legal and accounting fees; (6) All Other Expenses include machinery and building repairs, twine, wire and containers and other operating expenses.

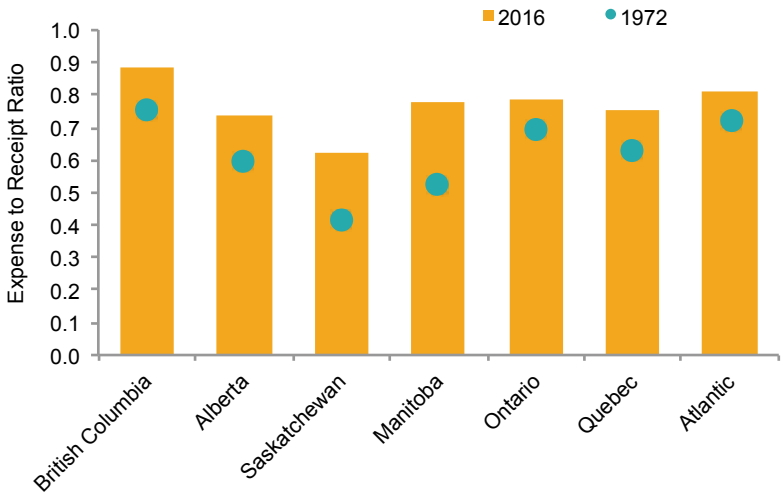
# Over the past several decades, the expense to receipt ratio has increased for all Canadian provinces.

**The expense to receipt ratio varies by province and farm type. Dairy, and grain and oilseed farms tend to have a more favourable ratio while that of cattle, hog and sheep farms tend to be less favourable.**

On average, for every dollar in farm cash receipts, farms in British Columbia incurred 88 cents in expenses in 2016, compared to 62 cents in Saskatchewan. The difference is largely attributed to the predominant farm types in those provinces. British Columbia has a high concentration of floriculture and fruit and tree nut farms which are associated with a higher expense to receipt ratio compared to grain and oilseed farms which are more common in Saskatchewan.

Between 1972 and 2016, the expense to receipt ratio has increased in every province.

**Chart D2.3**
**Expense to Receipt Ratio by Province and Region, 1972 and 2016**




Source: Statistics Canada and AAFC calculations.

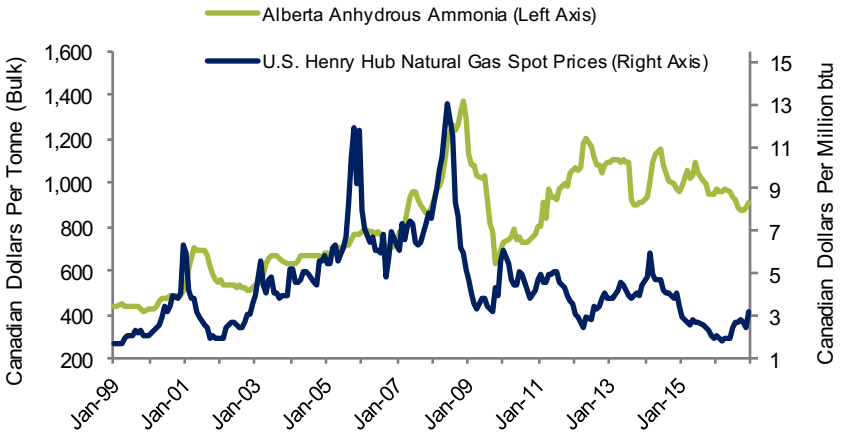
# Transportation and fertilizer costs are key components of farm operating expenses.

**Fertilizer prices have been more tied to international demand and supply factors than to natural gas prices in recent years.**

Thus, the nitrogen fertilizer price has not tracked the natural gas price as closely since 2007.

China is the largest consumer and a significant global supplier of fertilizers. Shifts in the Chinese supply/demand balance generally have a significant impact on global fertilizer markets and prices.

**Chart D2.4**
**Anhydrous Ammonia and Natural Gas Spot Prices, 1999-2016**



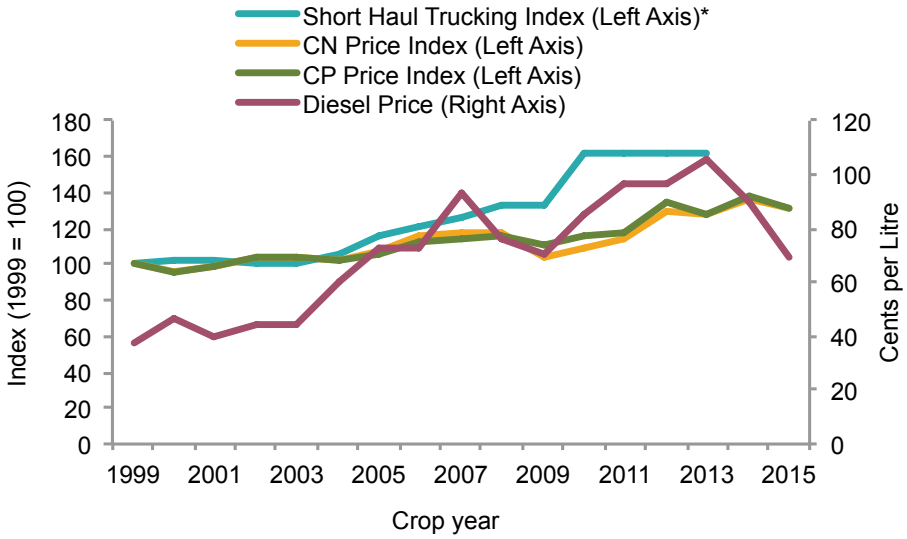

Source: Alberta Agricultural Input Monitoring System (AIMS), the United States Energy Information Administration and AAFC calculations.

**Diesel costs have declined significantly from 2013 levels.**

The decline in crude oil prices has led to reduced diesel prices for farmers, which has lowered overall machinery fuel expenses for farmers. Between 2014 and 2015, machinery fuel expenses declined by 18.6% and they declined by an additional 11.3% between 2015 and 2016.

The cost of shipping grain by rail decreased in 2015 following increases in 2014. Prices decreased by 3.9% and 5.6% for CN and CP rail respectively.

**Chart D2.5**
**Rail and Trucking Rate Index, Western Canada, 1999-2015**




Source: Quorum Corporation, Kent Group Ltd.
* Data not available for 2014 and 2015.

# SECTION E

Post Farm Gate

# SECTION E1

## Food and Beverage Processing

### Introduction:

The food and beverage processing industry produces processed agri-food products using both primary and processed products as inputs, which are then distributed to food processors, food retailers, foodservice establishments, and ultimately, consumers. In an effort to supply the market with food products most in demand, the industry has become increasingly integrated across the supply chain, in both domestic and global markets.

The Canadian food and beverage industry does, however, face challenges arising from commodity price volatility, exchange rate fluctuation, tight labour markets, increases in input costs, competition and structural changes, including the entrance of new retailers, the expansion of existing retailers, and the closure and/or merger of some processing establishments.

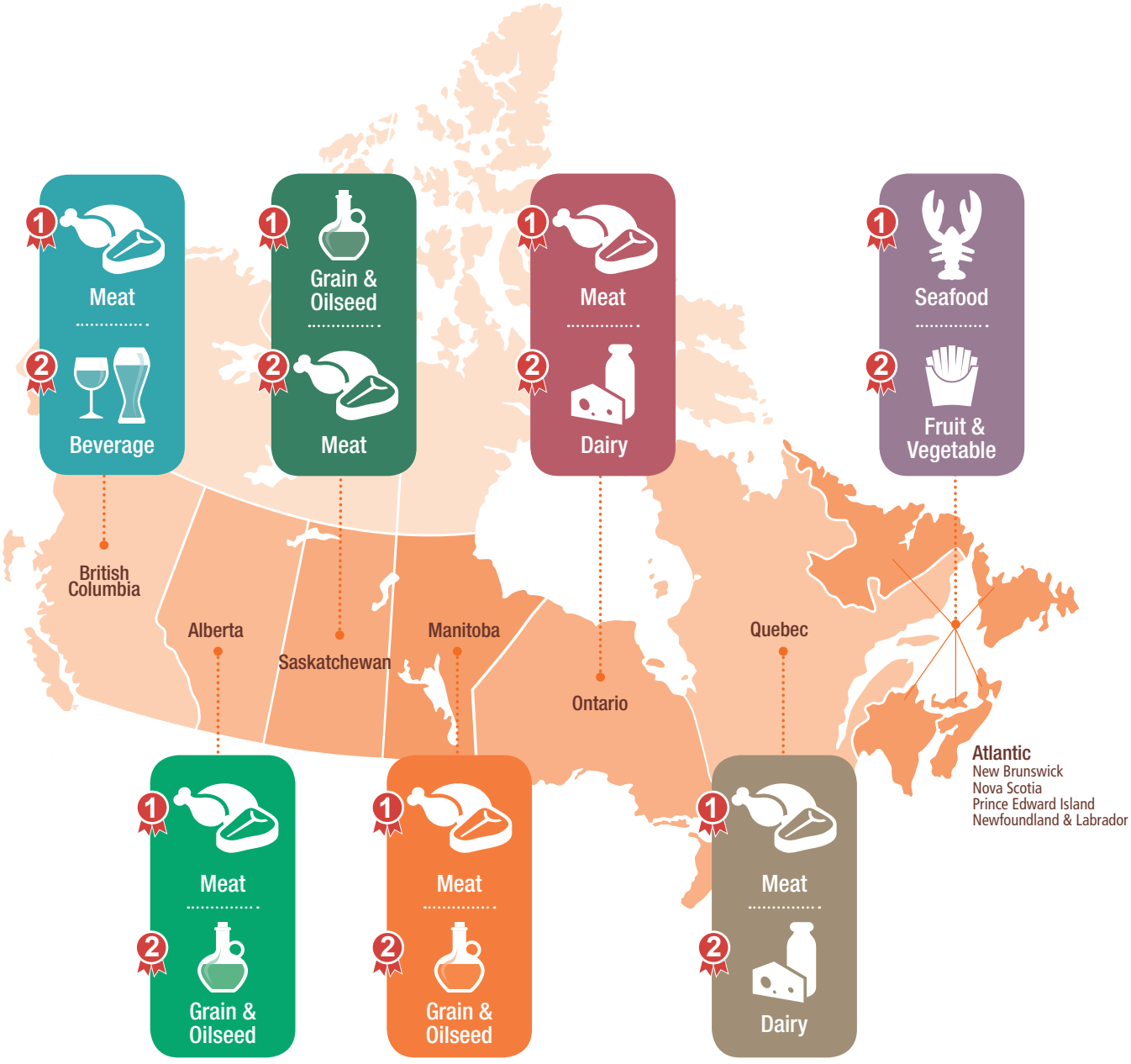
Despite these pressures, the food and beverage processing industry continues to be a leader in the Canadian manufacturing sector in terms of GDP and employment.

# The Canadian food and beverage processing industry is diversified geographically.

**Shipments, or revenue from goods manufactured, by the food and beverage processing industry vary across the provinces, yet in all provinces, the meat processing sub-industry is in the top three of the food and beverage processing industries.**

Seafood processing is the main food processing sub-industry in the Atlantic Provinces while the meat and grain and oilseed sub-industries are the most important in the Prairies. Other major sub-industries in Canada, as indicated by the total value of shipments, include dairy, beverage, and fruit and vegetable processing.

**Chart E1.1**
**Top Food and Beverage Processing Shipments by Province and Region, 2015**




Source: Statistics Canada.

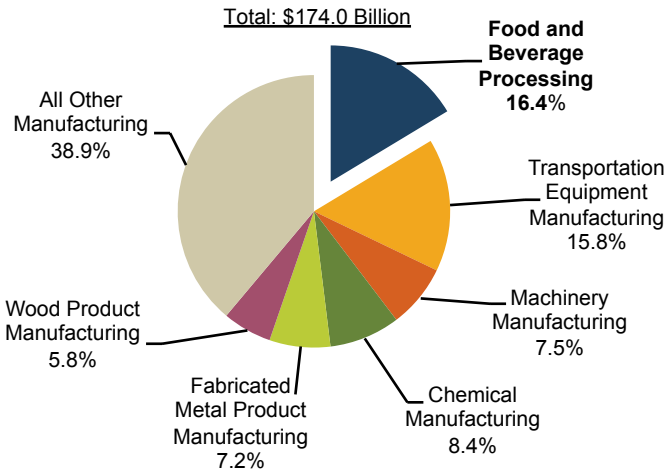
# The food and beverage processing industry continues to be the largest manufacturing industry in Canada.

**The food and beverage processing industry accounted for the largest share (16.4%) of the $174.0 billion in total manufacturing sector GDP in 2016.**

With a GDP of $28.5 billion, the food and beverage processing industry accounted for the largest share (16.4%) of the GDP of total manufacturing sector while the transportation manufacturing industry represented the second largest share (15.8%) with a GDP of $27.5 billion.

The food and beverage processing industry has consistently accounted for either the largest or second largest share in the manufacturing sector's GDP since 1997. It has remained a forerunner by capitalizing on technology improvements, developing new processes and products, and increasing supply chain integration.

**Chart E1.2**
**Distribution of Total Manufacturing GDP by Industry, 2016**



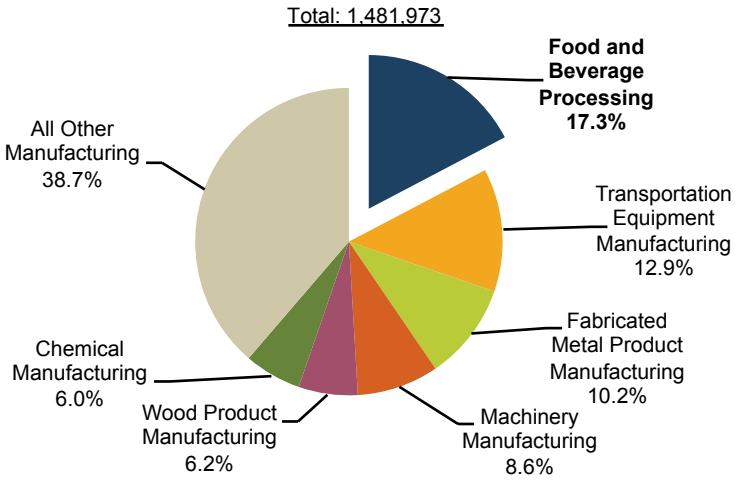

Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.

**The food and beverage processing industry has consistently been a leader in providing manufacturing jobs.**

In 2016, the food and beverage processing industry's share of total manufacturing employment increased to 17.3% from 17.1% in 2015, providing 256,456 jobs. As a whole, the entire manufacturing sector experienced a decrease in employment over the previous year by 1.1% with relatively significant drops in the machinery (3.9%) and fabricated metal product (2.5%) manufacturing industries. The food and beverage processing industry experienced the lowest decline, 1.9%, between 2015 and 2016.

The food and beverage processing industry has increased its use of foreign workers over time through the Temporary Foreign Worker Program.

**Chart E1.3**
**Distribution of Total Manufacturing Employment by Industry, 2016**



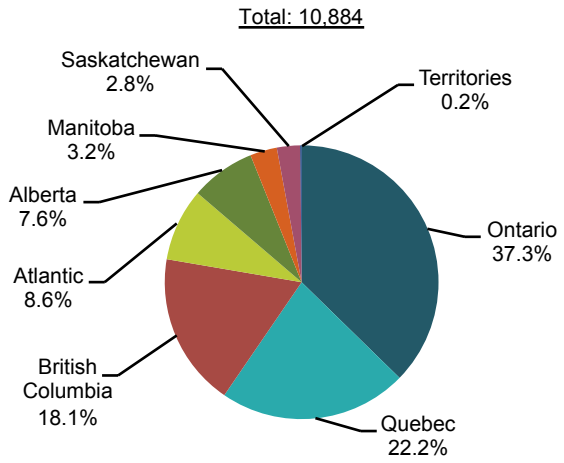

Source: Statistics Canada and AAFC calculations.

# The food and beverage processing industry has several establishments operating across Canadian provinces and in several sub-industries.

**The food and beverage processing industry has a presence in all provinces, with over half of establishments located in Ontario (37.3%) and Quebec (22.2%).**

Over a quarter of the establishments in both Ontario and Quebec were bakery and tortilla manufacturing establishments. British Columbia (18.1%), the Atlantic region (8.6%) and Alberta (7.6%) also had a high number of food and beverage processing establishments.

**Chart E1.4**
**Distribution of Food and Beverage Processing Establishments by Province and Region, 2016**

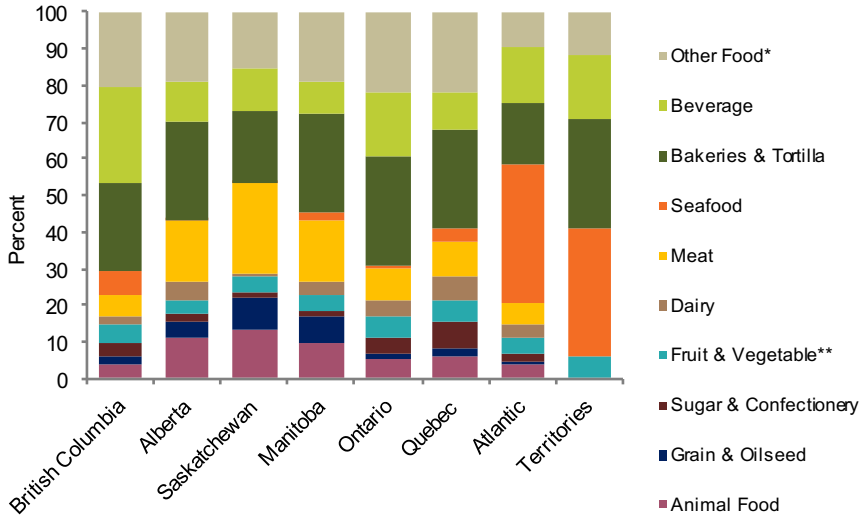



Source: Statistics Canada and AAFC calculations.

**The food and beverage processing establishments show a variation of food products across the provinces.**

With the exception of seafood, most of the products are produced in Ontario and Quebec. The majority of establishments in the seafood sub-industry are located in Atlantic Canada (57.4%) and British Columbia (21.0%). Over two-thirds of the beverage establishments are located in Ontario (39.6%) and British Columbia (29.5%).

**Chart E1.5**
**Food and Beverage Processing Establishments by Province and Region, and Sub-Industry, 2016**



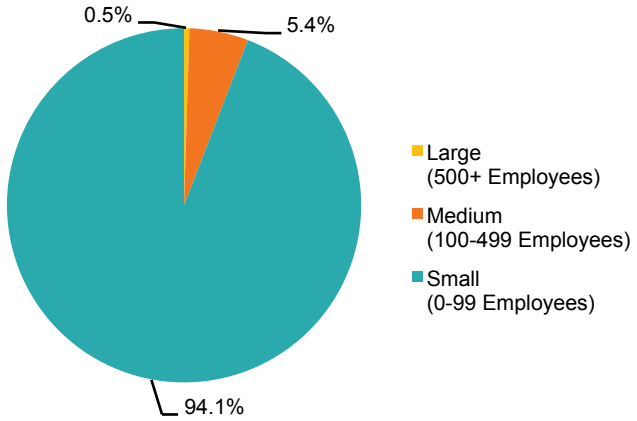

Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.
* Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.
** Fruit and vegetable preserving and specialty food manufacturing.

# The majority of food and beverage processing establishments in Canada are small in terms of number of employees.

**In 2016, the majority of food and beverage processing establishments in Canada were small operations in terms of employment size.**

Small operations (fewer than 100 employees) accounted for 94.1% of all food and beverage processing establishments in Canada. Only 0.5% of all food and beverage processing establishments were large operations (500 or more employees). Medium sized operations (100 to 499 employees) accounted for the remaining 5.4% of food and beverage processing establishments.

**Chart E1.6**
**Share of Food and Beverage Processing Establishments by Employment Size, 2016**

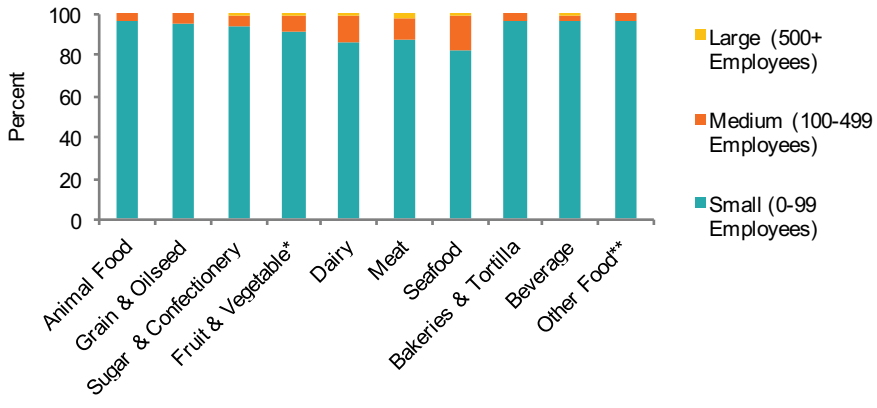



Source: Statistics Canada.
Note: Uses Innovation, Science and Economic Development Canada definition of small and medium-sized enterprises.

**Food and beverage processing establishments are predominantly classified as small operations with little variation across sub-industries.**

In 2016, dairy, meat, and seafood processing had a relatively larger percentage of medium-sized operations than the other sub-industries while meat and seafood processing had relatively more large-sized operations. Seafood processing had the highest share of medium establishments with 15.7%, and meat processing had the highest share of large operations, 2.5%.

**Chart E1.7**
**Share of Food and Beverage Processing Establishments by Employment Size and Sub-Industry, 2016**




Source: Statistics Canada.
Note: Uses Innovation, Science and Economic Development Canada definition of small and medium-sized enterprises.
* Fruit and vegetable preserving and specialty food manufacturing.
** Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.

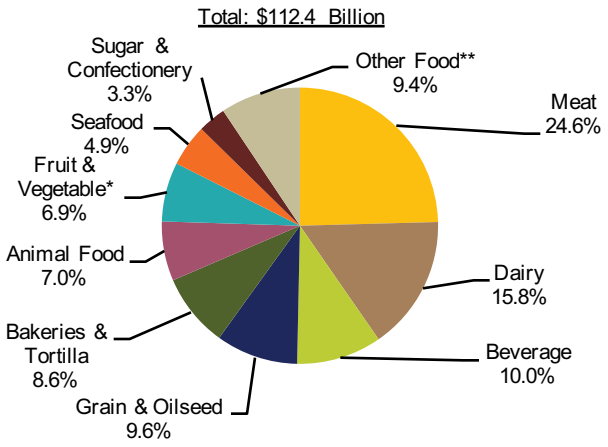
# The food and beverage processing industry produces a wide variety of products, and shipments have steadily increased.

**Canada's food and beverage processing shipments totaled $112.4 billion in 2016, over half of which were from the meat, dairy, and beverage sub-industries.**

Meat product shipments accounted for almost one-quarter (24.6%), while shipments of dairy products and beverages accounted for 15.8% and 10.0%, respectively, of total food and beverage processing shipments.

Shipments of the grain and oilseed milling and bakeries and tortilla manufacturing sub-industries made up 9.6% and 8.6%, respectively, of total food and beverage processing shipments.

**Chart E1.8**
**Distribution of Food and Beverage Processing Shipments by Sub-Industry, 2016**




Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.
* Fruit and vegetable preserving and specialty food manufacturing.
** Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.

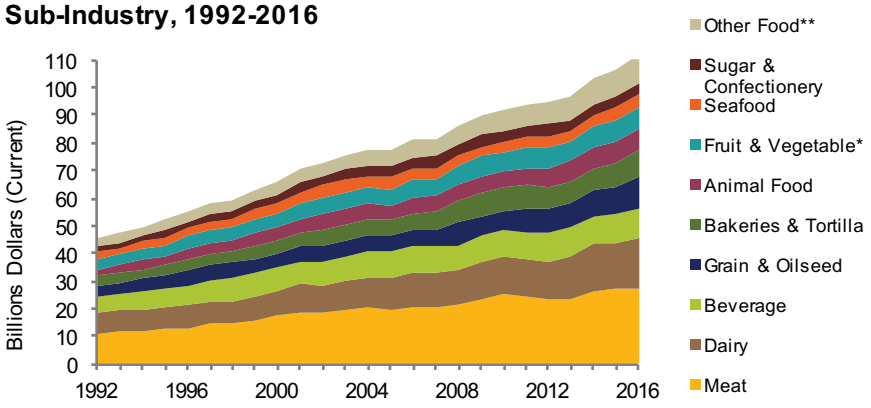
**Since 1992, the value of shipments of the food and beverage processing industry has consistently grown, except in 2005, reaching $112.4 billion in 2016.**

The value of shipments has more than doubled since 1992 for almost all sub-industries in the food and beverage processing industry.

Meat product shipments continue to be the largest of all food and beverage processing sub-industries over the 1992-2016 period.

Over the same period, the other food and grain and oilseed sub-industries experienced the highest growth rates of 234.4% and 204.9% respectively.

**Chart E1.9**
**Food and Beverage Processing Shipments by Sub-Industry, 1992-2016**



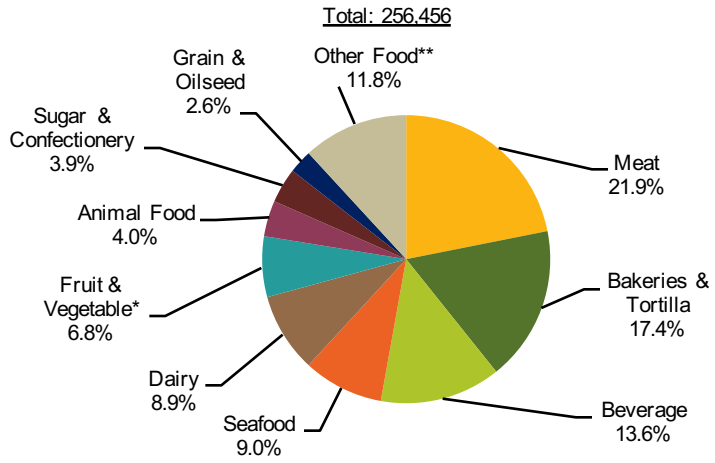

Source: Statistics Canada and AAFC calculations.
Note: Data is preliminary and subject to revisions.
* Fruit and vegetable preserving and specialty food manufacturing.
** Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.

# Employment in the food and beverage processing industry, which is spread across different sub-industries, has fluctuated and generally decreased over time.

**Over half of the employment in the food and beverage processing industry is accounted for by the meat, bakeries and tortilla, and beverage sub-industries.**

Meat processing accounted for the largest share of employment (21.9%) in the food and beverage processing industry. Bakeries and tortilla manufacturing followed with 17.4% and the beverage sub-industry contributed another 13.6% of the jobs.

**Chart E1.10**
**Food and Beverage Processing Employment by Sub-Industry, 2016**

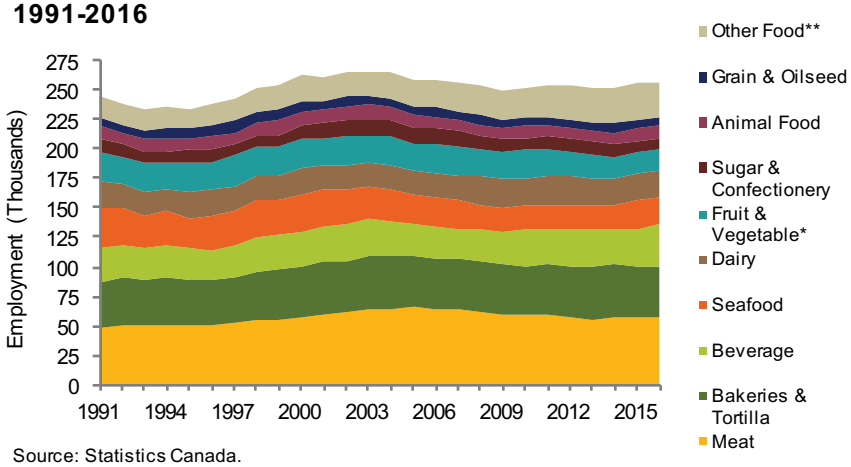



Source: Statistics Canada and AAFC calculations.
Note; See glossary for the definition of employment.
* Fruit and vegetable preserving and specialty food manufacturing.
** Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.

**Employment in the food and beverage processing sub-industries fluctuated over the 2001-2016 period and, collectively, experienced a 1.9% decrease from 261,318 to 256,456.**

Over this time period, there were significant employment increases in the other food category (50.2%), beverage (15.0%), and dairy (9.4%) sub-industries. However, these were offset by employment declines in the seafood (25.5%), fruit and vegetable (24.1%), sugar and confectionery (17.7%), and grain and oilseed (15.0%) sub-industries during the same time period.

**Chart E1.11**
**Food and Beverage Processing Employment by Sub-Industry, 1991-2016**




Source: Statistics Canada.
Note: See glossary for the definition of employment.
* Fruit and vegetable preserving and specialty food manufacturing.
** Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.

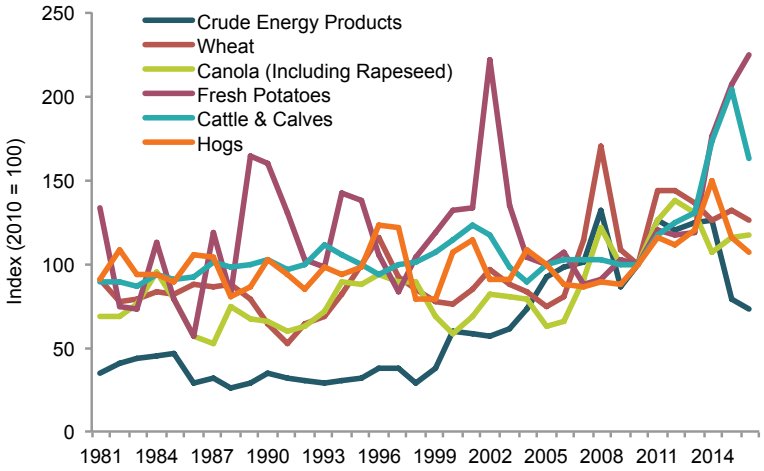
# The costs of raw material and labour have implications for the cost competitiveness of the food and beverage processing industry.

**Since 1981, the price of raw materials, such as agricultural commodities and energy, has increased by 59.9%, affecting the cost of material inputs.**

The Raw Material Price Index (RMPI), which measures price changes for raw materials purchased by industries in Canada as inputs for further processing, has been on a rising trend over the past several years with sharp increases in 2008 (21.1%) and 2011 (24.9%).

The RMPI increased in 2016 for canola (1.4%) and fresh potatoes (9.1%) and declined for crude energy products (8.0%), wheat (4.8%), cattle and calves (20.4%), and hogs (7.2%), yet all were still above the 1981-2016 average.

**Chart E1.12**
**Raw Material Price Index for Selected Commodities, 1981-2016**



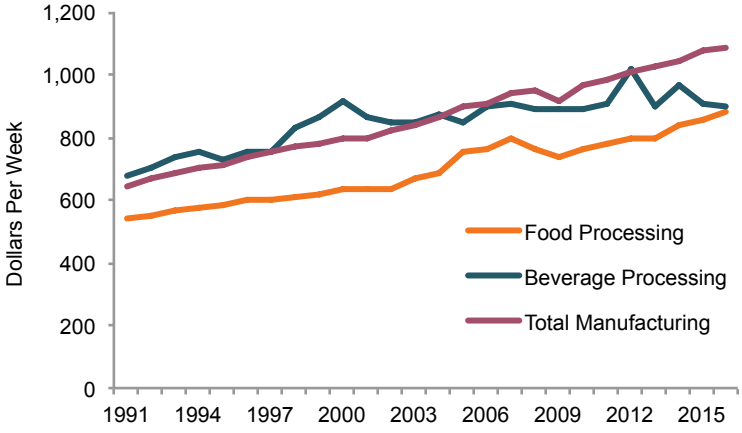

Source: Statistics Canada.

**Labour costs in both the food and beverage processing industries and across the manufacturing sector have steadily grown over the last quarter century, with the exception of 2009 with the economic recession.**

Since the 1990s, the average weekly earnings in the food processing industry have consistently remained below those found in the overall manufacturing sector and in the beverage processing industry.

After more than a decade of successive labour earnings gap increases between the total manufacturing sector and the food processing industry, the wage earnings gap narrowed slightly over the 2002-2007 period. During the 2008-2009 recession, average weekly wage earnings fell more dramatically in the food processing industry than in the overall manufacturing sector, but have since gradually recovered.

**Chart E1.13**
**Average Weekly Earnings to Labour in Food and Beverage Processing and Total Manufacturing, 1991-2016**




Source: Statistics Canada.

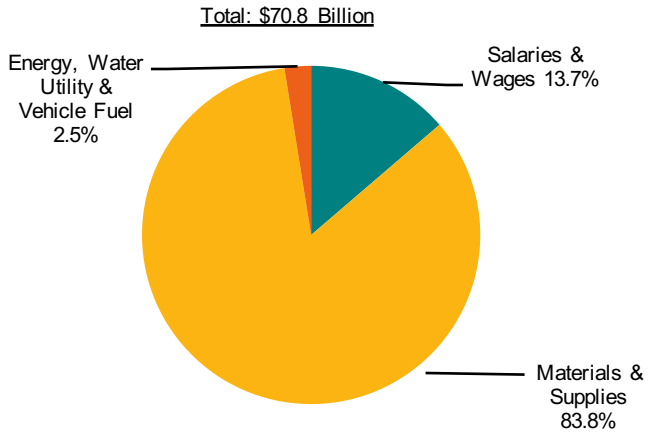
# Materials and supplies were the largest variable cost in the food processing industry.

**Although the cost of materials and supplies decreased slightly by 0.2% in 2015, relative to 2014 levels, it remained as the largest variable cost component in the food processing industry, accounting for 83.8% of variable input costs.**

Labour costs (salaries and wages) accounted for 13.7% of variable input costs in 2015, an increase of 1.8% relative to 2014 levels.

Energy, water utility, and vehicle fuel collectively accounted for another 2.5% of variable input costs, a decline of 2.0% from the previous year.

**Chart E1.14**
**Total Variable Input Costs in the Food Processing Industry, 2015**




Source: Statistics Canada and AAFC calculations.

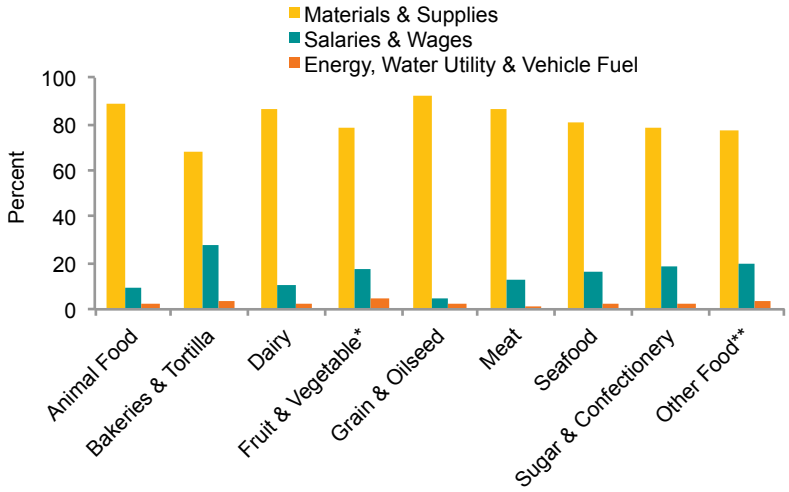
**The composition of the total variable input costs varied by sub industry.**

The cost of materials and supplies accounted for the highest share of variable costs for all sub-industries and ranged from a low of 68.4% for the bakeries and tortilla sub-industry to a high of 92.2% for the grain and oilseed sub-industry.

The share of salaries and wages in variable costs ranged from a high of 27.9% in bakeries and tortilla sub-industry to a low of 4.9% in grain and oilseed sub-industry.

The cost of energy, water utility, and vehicle fuel made up the smallest share of variable costs across all sub-industries and ranged from a low of 1.8% in the meat sub-industry to a high of 4.3% in the fruit and vegetable sub-industry.

**Chart E1.15**
**Distribution of Total Variable Costs by Food Processing Sub-Industry, 2015**




Source: Statistics Canada and AAFC calculations.
*Fruit and vegetable preserving and specialty food manufacturing.
** Includes snack food, coffee and tea, flavoured syrup and concentrates, seasoning and dressings, and all other food manufacturing.

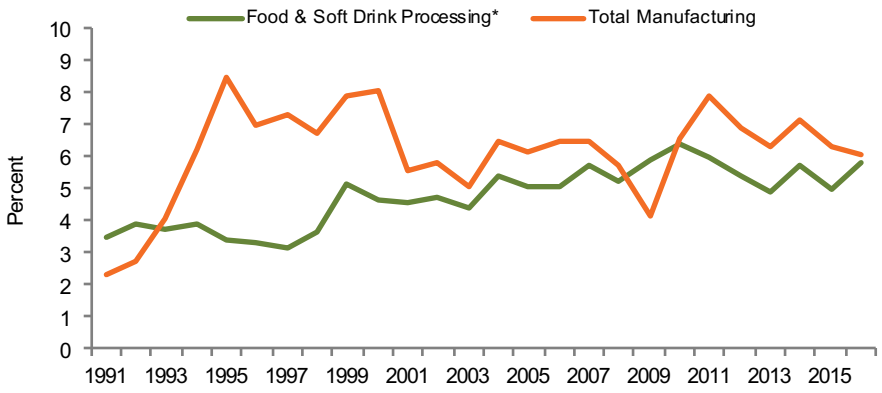
# Food and beverage processors continue to experience lower but stable profit margins and lower debt-to-equity ratio than other manufacturers.

**Profit margins in the processed food and soft drink industry increased to 5.8% 2016.**

Compared to the previous year, profit margins in the food and soft drink processing industry increased by 16.6% in 2016 while the overall manufacturing sector's profit margins declined by 4.4%.

In terms of profit margins, the food and soft drink processing industry was less impacted by the recession than the rest of the manufacturing sector.

**Chart E1.16**
**Profit Margins in Food and Soft Drink Processing and Total Manufacturing, 1991-2016**

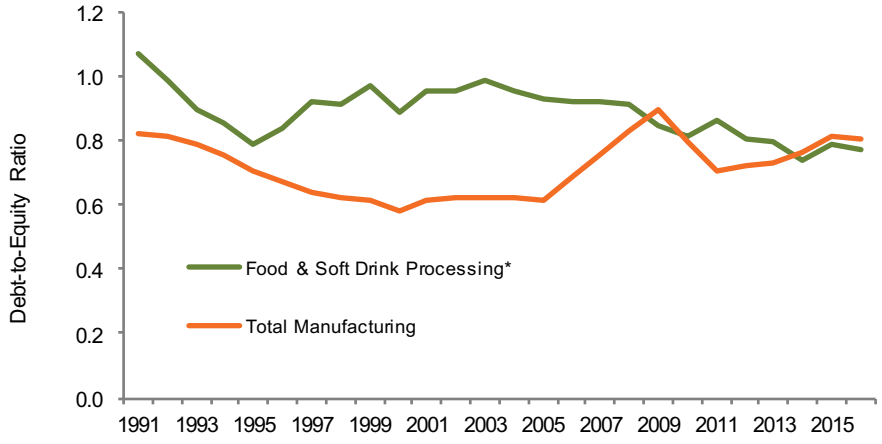



Source: Statistics Canada and AAFC calculations.
*Food & Soft Drink Processing includes all food processing sub-industries and, from the beverage processing sub-industry, only soft drink processing.

**An industry's financial health is reflected in its debt-to-equity ratio where lower ratios indicate better financial health. For the food and soft drink processing industry, this ratio decreased slightly to 0.77 in 2016 and remained well below the 25-year average of 0.88 and below the average for total manufacturing.**

The debt-to-equity ratio for the overall manufacturing sector decreased from 0.82 in 2015 to 0.81 in 2016, indicating that financial conditions in the manufacturing sector as a whole marginally improved.

**Chart E1.17**
**Debt-to-Equity Ratio in Food and Soft Drink Processing and Total Manufacturing, 1991-2016**




Source: Statistics Canada and AAFC calculations.
*Food & Soft Drink Processing includes all food processing sub-industries and, from the beverage processing sub-industry, only soft drink processing.

# Most of the real economic growth in the food processing industry has been due to input growth rather than productivity growth.

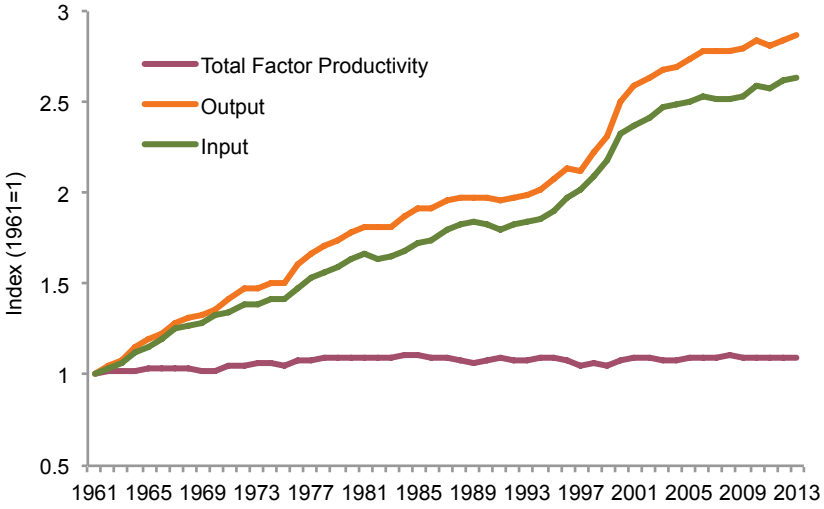
**While the food processing industry has experienced marginal productivity growth, as measured by total factor productivity (TFP), the industry's output has increased significantly since 1961.**

TFP growth is the growth in output that is not accounted for by the combined growth in all inputs.

Between 1961 and 2013, the real gross output of the food processing industry grew at an average annual rate of 2.1%, while combined inputs (labour, capital and intermediate inputs) grew by 1.9%. Over this same time period, productivity grew at an average rate of 0.2% per year.

For the Canadian food processing industry, input growth has been the primary driver of positive, steady growth in industry output for several decades as opposed to productivity growth.

**Chart E1.18**
**Input, Output, and Total Factor Productivity in the Food Processing Industry, 1961-2013**




Source: Statistics Canada and AAFC calculations.
Note: The above data show TFP as measured on a gross output basis.

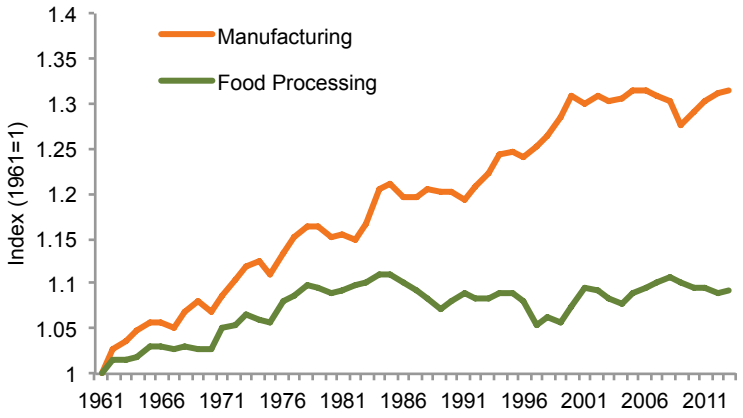
# Most of the real economic growth in the food processing industry has been due to input growth rather than productivity growth.

**The Canadian food processing industry has experienced lower productivity growth in comparison to all manufacturing industries.**

The annual productivity growth of the food processing industry averaged 0.2% over the 1961-2013 period while that of the overall manufacturing sector was 0.5% during the same period.

While the productivity growth in the food processing industry was slower than that of the overall manufacturing sector, the latter includes industries which have had substantial technological progress over the last 50 years, like the computer and electronic product manufacturing industry, which contributed to the higher annual productivity growth rate. The food processing industry is, by nature, material-intensive and has not had the level of technological advancement as other manufacturing industries.

**Chart E1.19**
**Total Factor Productivity in the Food Processing and Manufacturing Industries, 1961-2013**



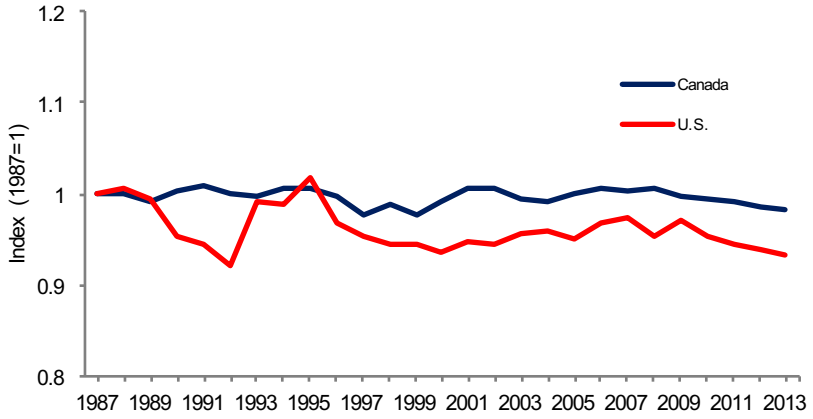

Source: Statistics Canada and AAFC calculations.
Note: The above data show TFP as measured on a gross output basis.

# The Canadian food processing industry has experienced substantial growth in private sector R&D expenditures but productivity growth has been slower yet consistently higher than in the U.S.

**Between 1987 and 2013, the Canadian food and beverage processing industry experienced stronger productivity growth in most years in comparison to that of the U.S. industry.**

However, both the Canadian and U.S. food and beverage processing industries suffered decreases in annual productivity growth over the 1987-2013 period, 0.1% and 0.2% respectively.

**Chart E1.20**
**Total Factor Productivity in the Food and Beverage Processing* Industries in Canada and the U.S., 1987-2013**



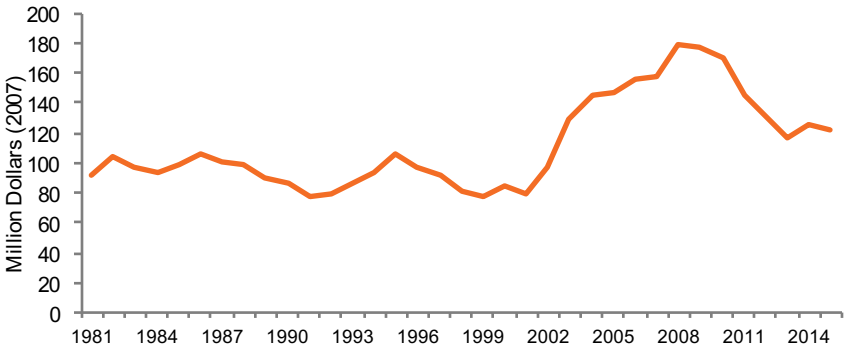

Source: Statistics Canada, United States Bureau of Labour Statistics, and AAFC calculations.
* Includes tobacco processing.

**Real private sector research and development (R&D) expenditures in the food processing industry were estimated to have reached $121.8 million in 2015, a slight decline (3.3%) from the previous year.**

Real private-sector R&D spending, over the 2001 to 2015 time period, averaged $138.5 million annually compared to an average spending of $92.1 million between 1981 and 2000.

Over the past decade, the food processing industry has benefited from innovation in various areas, including lean manufacturing or waste reduction, and new uses of by-products. Products are also being improved continually with the use of new ingredients (e.g. herbal ingredients) and innovative packaging (e.g. nutritional labelling) as processors benefit from innovation from other industries in the supply chain.

**Chart E1.21**
**Real Private Sector R&D Expenditures in Food Processing, 1981-2015**




Source: Statistics Canada and AAFC calculations.

# SECTION E2

## Food Retail and Foodservice

### Introduction:

The food retail and foodservice industries are vital participants in Canada's agriculture and agri-food system. Food retailers are constantly adapting to new consumer demands, a highly dynamic marketplace, and new competitors. This often means store and distribution channel restructuring to maintain or increase market share while at the same time forming alliances and networks along the supply chain to ensure that consumer demand for food safety, quality and other product attributes are met.

Foodservice establishments are also frequently modifying and updating their goods and services to meet changing consumer tastes and preferences. The restaurant industry which is already fiercely competitive now faces increasing competition from the food retail industry. The wide array of prepared foods and take-home meals that are available offer the same convenience that consumers could previously only get by dining out.

Notwithstanding this increased competition, commercial foodservice sales continued to climb, and reached $61.1 billion in 2015, an increase of 5.2% over 2014 levels.

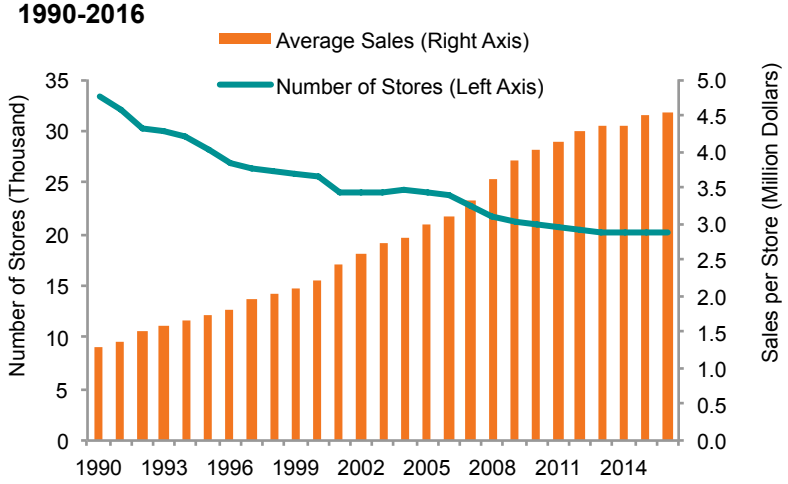
# Food retailers continued to consolidate their operations in 2016.

**Increased competition has led to significant store rationalization and consolidation over the past two decades, with a move to larger operations.**

In 2016, Canada's three top food retailers together had $83.8 billion in sales and 3,190 stores. The largest food retailer accounted for about 55.4% of sales and 34.4% of the total number of stores. The total number of stores has declined by 871 per year on average while the total sales increased by an average of 3.1% per year between 1990 and 2016.

The consolidation trend is expected to continue as supermarket chains compete with non-traditional food retailers for market share and profit margins.

**Chart E2.1**
**Number of Canadian Food Stores and Average Sales, 1990-2016**




Source: Canadian Grocer, Statistics Canada and AAFC calculations.
Note: 2016 figures are estimates.

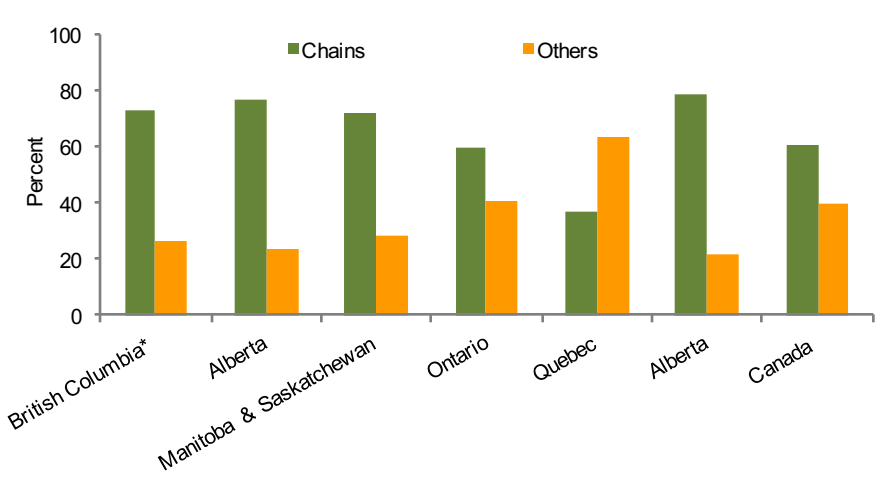
**Grocery store chains represent over 60% of food store sales in all provinces except Quebec.**

In 2015, food retail sales from food store chains, composed of supermarket and grocery store chains, represented 60.9% of all food retail sales.

The market share of food store chains varies from region to region. Food store chain sales are very important in the Atlantic region, with 78.6% of sales, and in Alberta with 76.4% of sales. However, they are much less important in Quebec, with only 36.4% of sales.

The share of sales from food store chains increased slightly in 2016 over the previous year, except in Quebec, where it decreased by 0.4%.

**Chart E2.2**
**Share of Canadian Food Store Sales, Chains and Others, by Region, 2015**



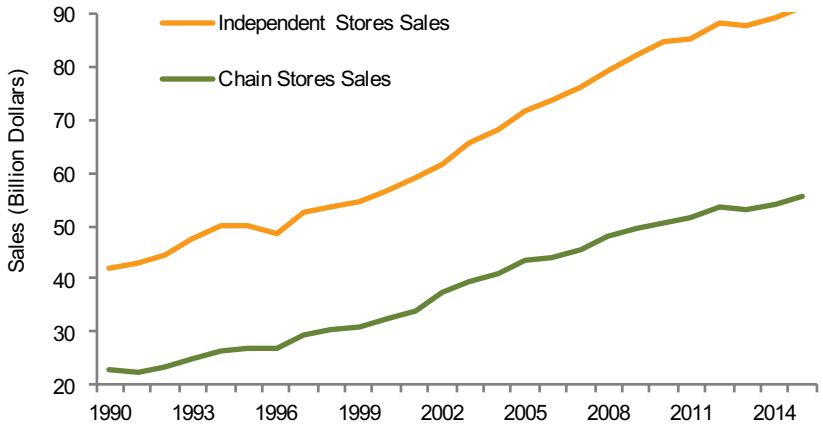

Source: Canadian Grocer Magazine, March 2017.
* Includes the Territories.

# Sales growth has been slightly faster for grocery store chains than for independent grocery stores.

**In 2015, chain store sales increased by 2.4% from the previous year whereas independent store sales increased by 1.5%.**

From 2010 to 2015, chain store sales increased by 8.7% whereas independent store sales increased by 6.1%.

**Chart E2.3**
**Grocery Store Sales, Chain Stores and Independent Stores, 1990-2015**



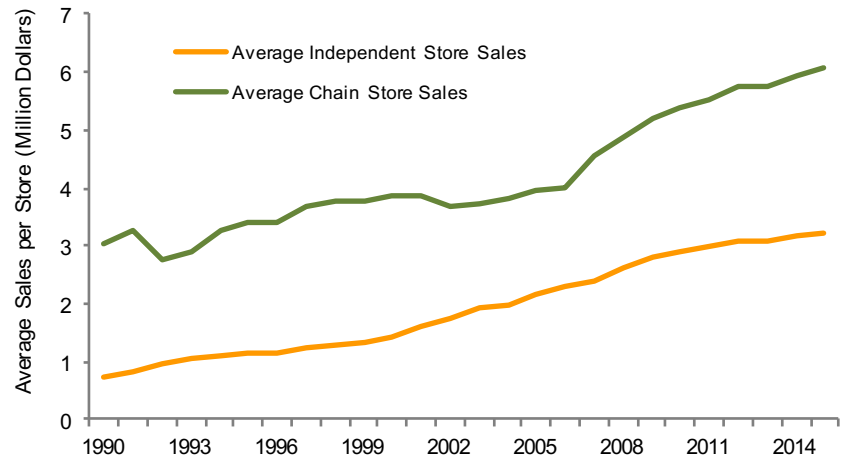

Source: Canadian Grocer, Statistics Canada and AAFC calculations.

**Over the last decade, average sales per store have been growing much faster for chain stores than for independent stores.**

In 2015, average sales per chain store increased by 2.1% from the previous year whereas average sales per independent stores increased by 1.7%.

Over the last decade, average chain store sales increased by 52.0% whereas average independent store sales have increased by 39.6%.

**Chart E2.4**
**Average Store Sales, Chain Stores and Independent Stores, 1990-2015**




Source: Canadian Grocer, Statistics Canada and AAFC calculations.

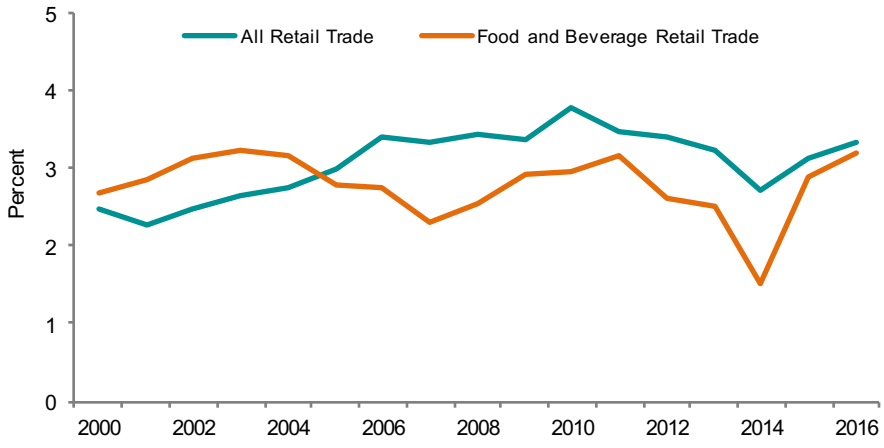
# Profit margins among food and beverage retailers have trended up in recent years.

**In 2016, the average profit margin of food and beverage retailers increased to 3.2%, to reach a second historical high since 2000.**

This was above the 2007-2016 annual average of 2.7%, but slightly below the average of 3.3% for all retailers in 2016.

Profit margins among food and beverage retailers trended down from 3.2% in 2011 to a low of 1.5% in 2014, and then reached a new high of 3.2% in 2016. Strong competition between food retailers has led to price deflation in 2014, which in turn has affected profit margin ratio of the food and beverage processors.

**Chart E2.5**
**Average Profit Margin Ratio for Food and Beverage Retailers, 2000-2016**




Source: Statistics Canada.

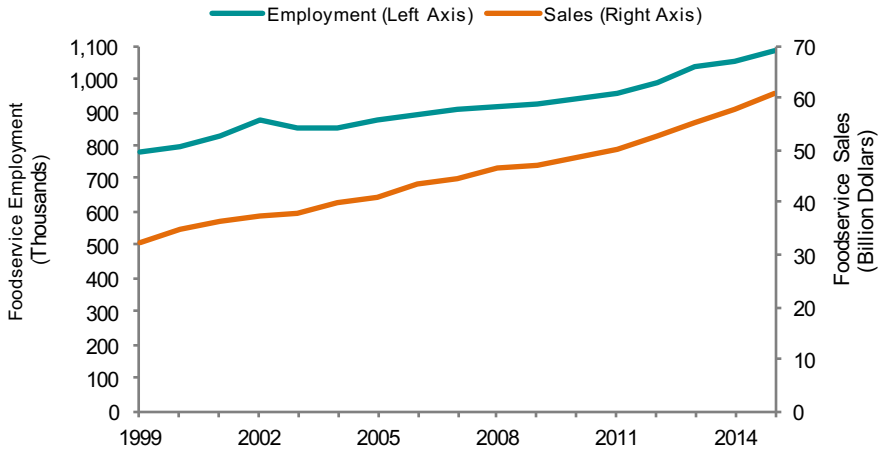
# Sales and profit margins of the foodservice industry continue to trend up.

**Commercial foodservice sales have increased over the past two decades.**

Commercial foodservice sales were $61.1 billion in 2015, representing a 5.2% increase from the previous year. In 2015, employment in foodservice was 1,083,515 – 6.6% higher than in 2014.

From 2010 to 2015, commercial foodservice sales grew by 25.2% whereas employment in the sector, increased by 15.4%.

**Chart E2.6**
**Commercial Foodservice Sales and Employment, 1999-2015**

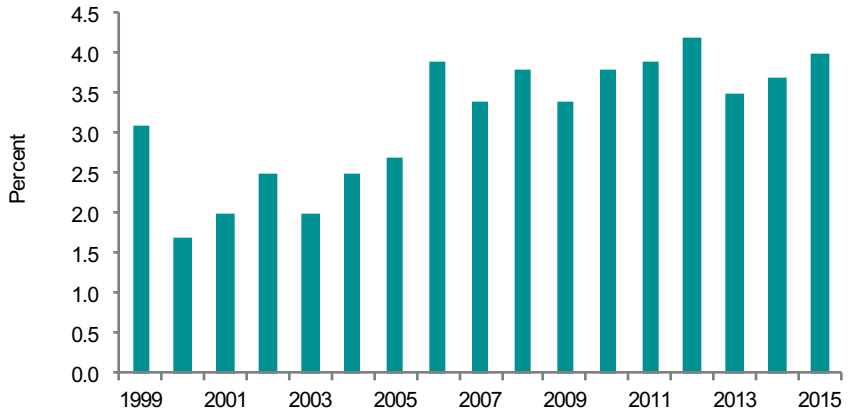



Source: Statistics Canada.

**In 2015, profit margins among Canada's foodservice and drinking establishments remained relatively strong, at 4%, despite a slight decline in 2013.**

Profit margins among foodservice and drinking establishments have generally trended upward over the last decade, beginning at a low of 1.7% in 2000, increasing to 3.9% in 2006, and then peaking at 4.2% in 2012.

**Chart E2.7**
**Profit Margins for Foodservice and Drinking Establishments, 1999-2015**



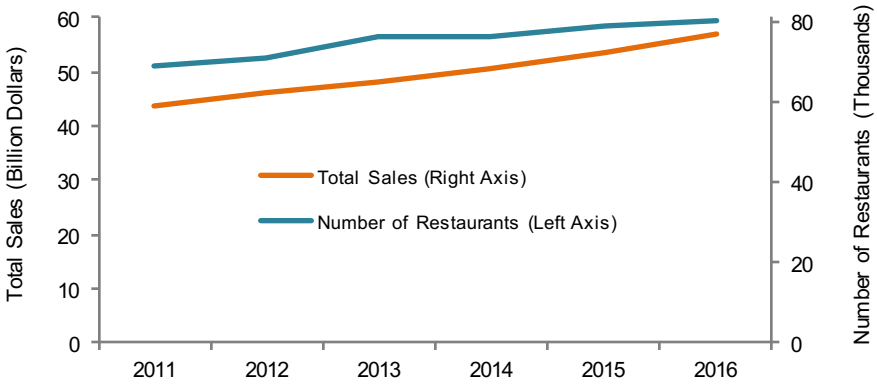

Source: Statistics Canada.

# Industry restructuring has also led to a decrease in the number of restaurants, but an increase in restaurant sales over time.

**Total restaurant sales were $57.1 billion in 2016, representing a 6.6% increase from the previous year.**

From 2011 to 2016, total restaurant sales increased by 30.7% whereas food retail sales increased by 7.7%. During the same period the number of restaurants increased by 17% whereas the number of food stores decreased by 2.3%.

**Chart E2.8**
**Number of Restaurants* and Total Sales, 2011-2016**

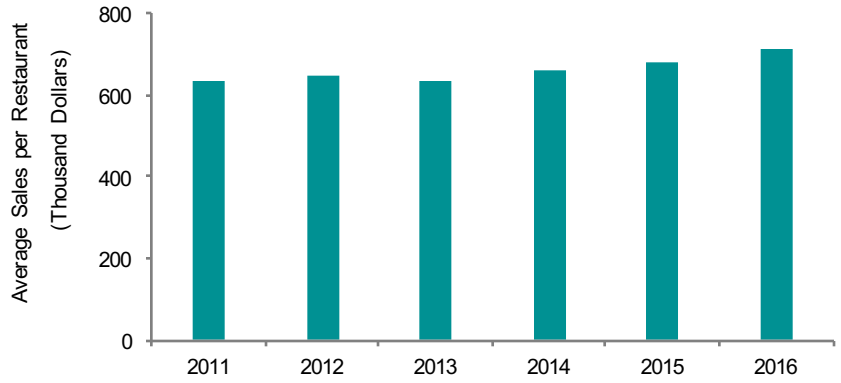



Source: Statistics Canada and AAFC calculations.
* Includes full service restaurants and limited-service eating places.

**Average restaurant sales have increased by 11.7% from 2011 to 2016 partly due to a faster increase in restaurant sales than in the number of establishments.**

Average restaurant sales remained stable from 2011 to 2013 and increased by 4.7% from 2013 to 2014 while for the same year the number of restaurants increased by 0.5%. From 2015 to 2016, average restaurant sales increased again by 4.7%.

**Chart E2.9**
**Average Sales per Restaurant*, 2011-2016**



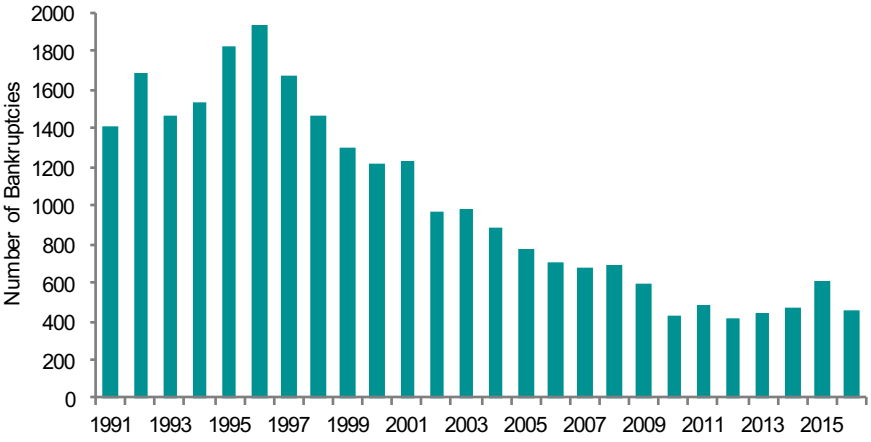

Source: Statistics Canada and AAFC calculations.
* Includes full service restaurants and limted-service eating places.

# In part, restructuring has resulted in historically low restaurant bankruptcy rates in recent years.

**Restaurant bankruptcies were down in 2016 and remain at historically low levels.**

The number of commercial restaurant bankruptcies fell from a high of 1,933 in 1996 to a record low of 415 in 2012. In 2016, bankruptcies decreased by 3.6% from the previous year to 459. This was below the 2010-2015 average of 476 bankruptcies per year.

**Chart E2.10**
**Commercial Restaurant Bankruptcies, 1991-2016**




Source: Canadian Restaurant and Foodservice Association, Quarterly InfoStats. & Industry Canada, Office of Superindentent

# SECTION F

## Household Food Expenditures, Food Prices and Food Consumption Patterns

# SECTION F

## Household Food Expenditures, Food Prices and Food Consumption Patterns

### Introduction:

Spending on food — both in stores and in restaurants — rose in 2016 but much less than in 2015. The inflation rate of retail food prices increased but was below the overall inflation rate, for the first time since 2010.

Canadian household expenditures on food, as a percentage of total household expenditures, remain low relative to most other developed countries.

At the grocery store, Canadian consumers continued to look beyond staple foods to products with attributes reflecting their diverse preferences and values.

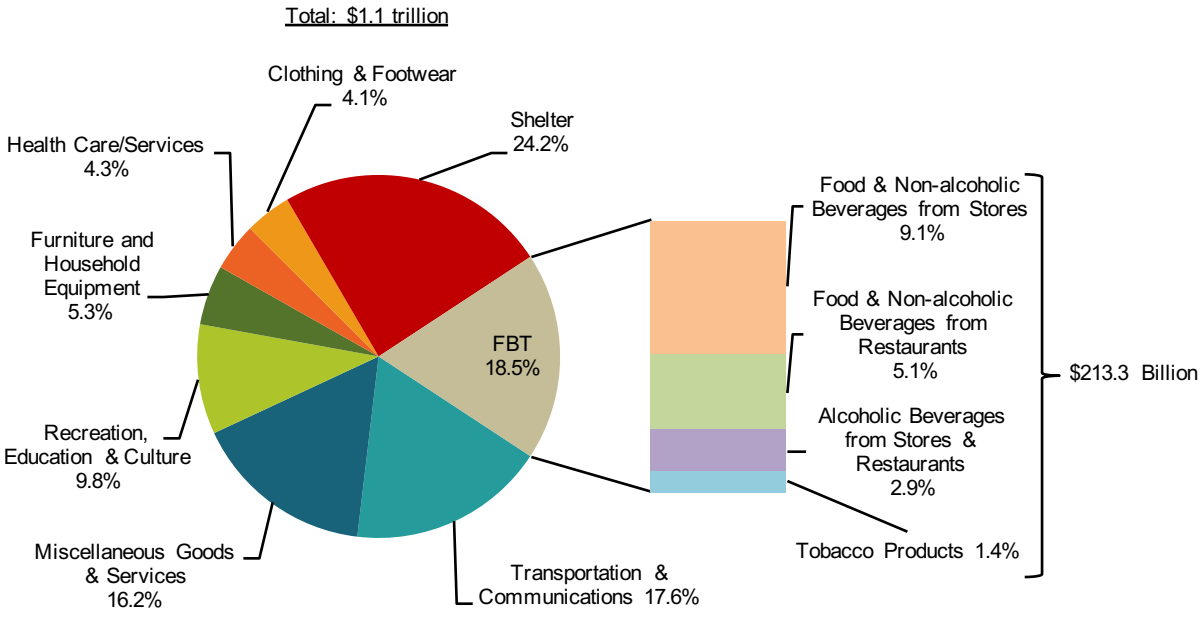
# Expenditures on food, beverages and tobacco products made up the second-largest household expenditure category in 2016.

**Canadian household spending on food, beverages and tobacco (FBT) products made up an 18.5% share, or $213.3 billion, of total Canadian household spending on goods and services in 2016 of $1.1 trillion. The share of 18.5% is higher than that of the previous year which was 18.4%.**

Of the total spent on goods and services, food and non-alcoholic beverages purchased from stores accounted for 9.1%, or $105.5 billion in 2016. In 2015, food and non-alcoholic beverages purchased from stores accounted for 9.2%, or $102.2 billion. Spending on food purchased in restaurants accounted for 5.1%, or $58.6 billion in 2016. Spending on alcoholic beverages and tobacco products accounted for 2.9% and 1.4%, in 2016, totaling $49.3 billion.

The largest household expenditure in 2016 was on shelter, at $278.6 billion, representing 24.2% of all spending on goods and services. Other categories which represented sizeable shares of household expenditures included transportation and communication, with 17.6%; miscellaneous goods and services, with 16.2%; and recreation, education and culture, with 9.8%.

**Chart F.1**
**Distribution of Household Expenditures on Goods and Services, 2016**



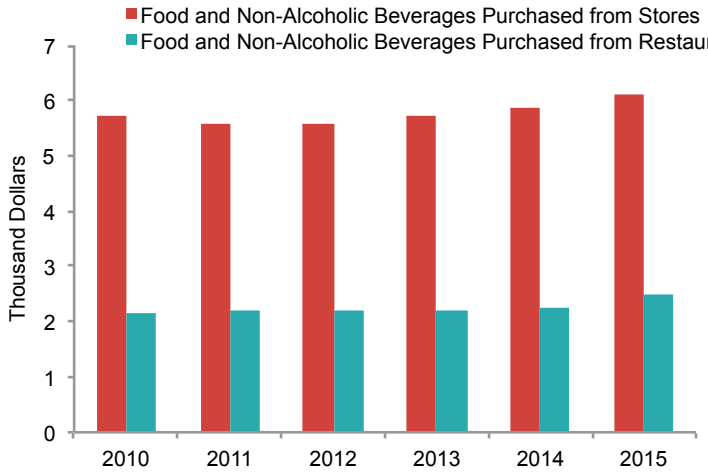

Source: Statistics Canada and AAFC calculations.
Note: Percentages may not add up to 100% due to rounding.

# Canadian households allocate their food and beverage expenditures across a broad range of food products.

**Average spending on food and non alcoholic beverages by households increased by 9.9%, from $7,850 in 2010 to $8,629 in 2015.**

Average household spending on food and non-alcoholic beverages from stores increased from $5,709 in 2010 to $6,126 in 2015, a 7.3% increase. Average household spending on food from restaurants increased by 16.9% from $2,141 in 2010 to $2,502 in 2015.

**Chart F.2**
**Average Expenditures on Food and Non-Alcoholic Beverage at Stores and Restaurants by Canadian Households, 2010-2015**



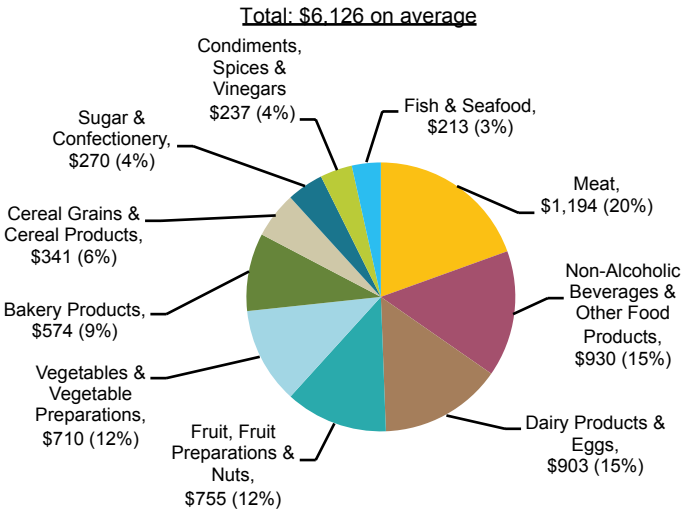

Source: Statistics Canada and AAFC calculations.

**Expenditures on food and non-alcoholic beverages purchased from stores averaged $6,126 per household in 2015, a 4.2% increase over 2014. More than two-thirds of the average total household food expenditure is purchased from stores (71%).**

The largest share of food expenditures from stores was meat (20%). This was followed by non-alcoholic beverages and other food products (15%) such as oils and fats and prepared meals, and dairy products and eggs (15%).

Food expenditure shares from stores were lowest for fish and seafood (3%), condiments, spices and vinegars (4%) and sugar and confectionery (4%).

**Chart F.3**
**Average Value and Distribution of Canadian Household Expenditures on Food and Non-Alcoholic Beverages from Stores, 2015**




Source: Statistics Canada and AAFC calculations.

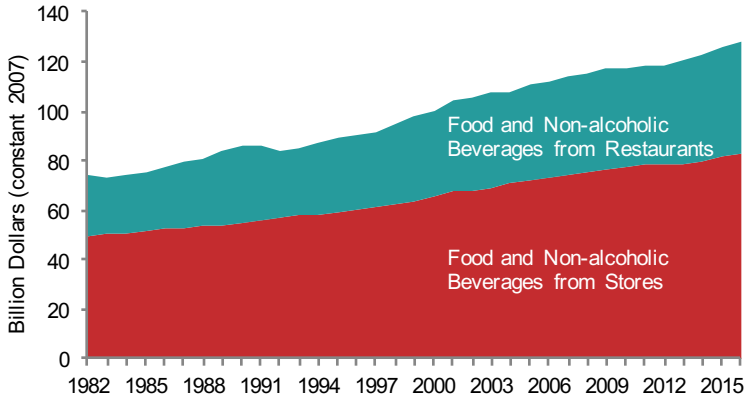
# Expenditures on food and non-alcoholic beverages increased marginally in 2016 but still represent a small proportion of all household spending.

**Real (inflation adjusted) spending on food and non-alcoholic beverages increased by 1.6%, from $125.7 billion in 2015 to $127.7 billion in 2016.**

Real household spending on food and non-alcoholic beverages from stores increased from approximately $81.5 billion in 2015 to $82.3 billion in 2016, a 0.9% increase. Real household spending on food and non-alcoholic beverages from restaurants, on the other hand, increased by 2.8% from $44.2 billion in 2015 to $45.4 billion in 2016.

Although real household expenditures on food and non-alcoholic beverages have increased over the past 34 years, its expenditure share has remained relatively constant. Since 1982, Canadians have consistently spent approximately one third (34%) of their annual household food and non-alcoholic beverage expenditures at restaurants, and two thirds (66%) at stores.

**Chart F.4**
**Real Household Expenditures on Food and Non-Alcoholic Beverages, 1982-2016**

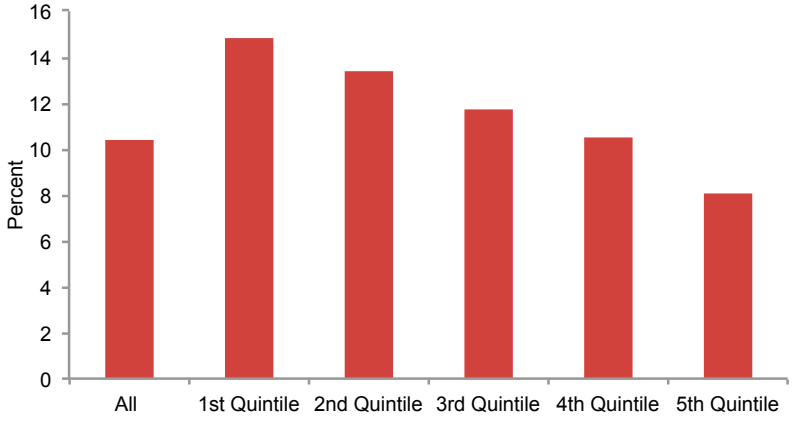



Source: Statistics Canada and AAFC calculations.
Note: Does not include expenditures on alcoholic beverages and tobacco.

**Of the average household expenditures allocated to goods and services in 2015, food and non-alcoholic beverage expenditures accounted for 10.4%.**

This, however, varied by income quintile. Food and non-alcoholic beverage expenditures accounted for 8.1% of average household spending on goods and services among Canadian households in the top 20.0% income group (the fifth quintile) and 14.8% among the lowest income households (the first quintile).

**Chart F.5**
**Average Share of Household Expenditures on Food and Non-Alcoholic Beverages by Income Quintile in Canada, 2015**




Source: Statistics Canada and AAFC calculations.
Note: Does not include expenditures on alcoholic beverages or tobacco.

# Household expenditure shares on food and non-alcoholic beverages from stores in Canada compares well with those of OECD countries.

**Canadians spent a smaller share of household expenditures on food and non-alcoholic beverages from stores in 2015 than many other OECD countries.**

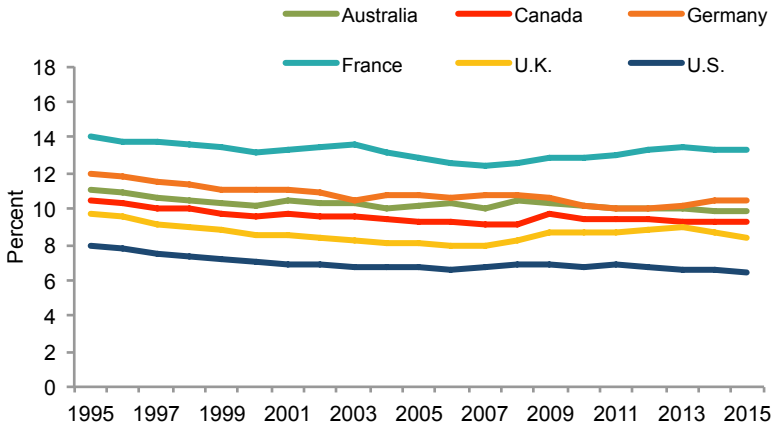
Over the past 20 years, an average of 10% of Canadians' household expenditures have been on food and non-alcoholic beverages from stores.

Among selected OECD countries in 2015, households in France spent the largest share (13.3%) of their household expenditures on food and non-alcoholic beverages from stores, followed by Germany (10.5%), Australia (9.8%), Canada (9.3%) and the U.K. (8.4%). Households in the U.S. spent the smallest share of their expenditures on food and non-alcoholic beverages from stores (6.4%).

However, it is important to note that consumers budget their spending differently within the selected OECD countries being compared. Therefore, variation in household expenditure shares on groceries is to be expected given the relative availability of goods and services and differences in cultural tastes.

On average though, households in developed economies have high standards of living and allocate a relatively small percentage of their household expenditures to food.

**Chart F.6**
**Household Expenditures on Food and Non-Alcoholic Beverages from Stores in Selected OECD Countries, 1995-2015**




Source: OECD.
Note: Does not include expenditures on food and non-alcoholic beverages from restaurants.

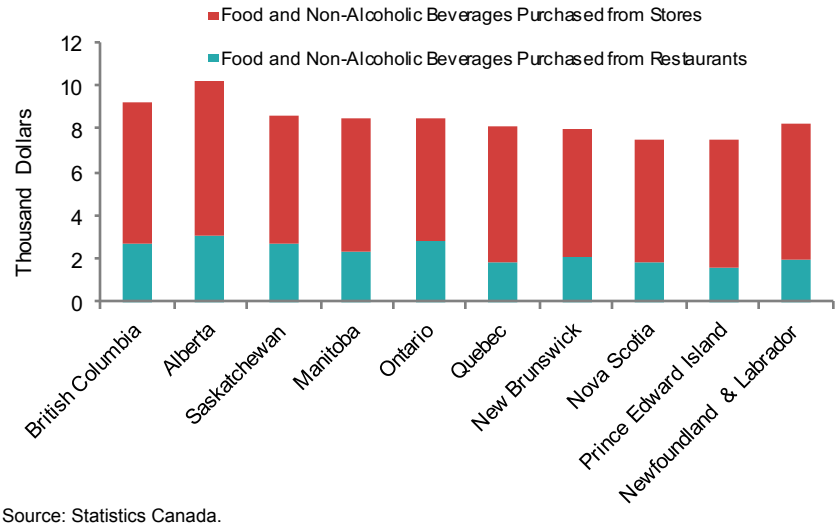
# Average household expenditures on food and non-alcoholic beverages vary substantially by province.

**Canadian households spent an average of $8,629 on food and non alcoholic beverages in 2015.**

Households in Alberta had the highest food expenditures in 2015, spending an average of $10,171, followed by British Columbia ($9,168). Nova Scotia had the lowest average household food expenditure ($7,478 in 2015), followed by Prince Edward Island ($7,546) and New Brunswick ($8,011).

There are variations across provinces in food purchases from stores versus restaurant meals. In 2015, households in Alberta, and Ontario spent a larger share of their food expenditures on restaurant meals than in all other provinces, whereas households in Atlantic Canada spent the least on restaurant meals.

**Chart F.7**
**Average Value of Household Expenditures on Food and Non-Alcoholic Beverages by Province, 2015**




Source: Statistics Canada.

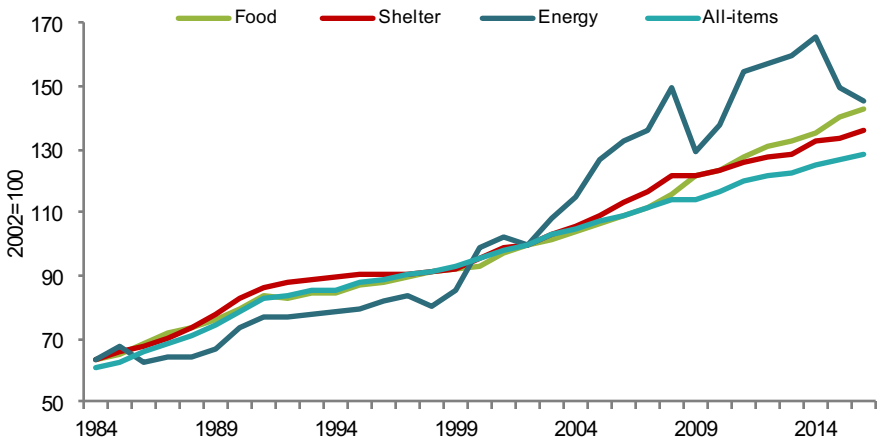
# Retail food price inflation increased slightly in Canada in 2016 but less than in previous years.

**The retail price inflation rates for food, shelter and energy increased slightly in 2016. This contributed to increased overall price inflation of 1.4% in 2016, which was higher than the 1.1% increase in 2015.**

The retail price inflation rate for food, however, was lower than that of shelter but higher than energy. In 2016, retail food prices rose by 1.5%, after rising by 3.7% in 2015. Energy prices decreased by 3.0% in 2016, after decreasing by 9.6% in the previous year. The cost of shelter rose by 1.6% in 2016.

Over the past decade, the retail price inflation for food has generally tracked the All-Items inflation rate and has been far less volatile than that of energy.

**Chart F.8**
**Consumer Price Indices (CPI) for Food, Shelter, Energy and All Items, 1984-2016**



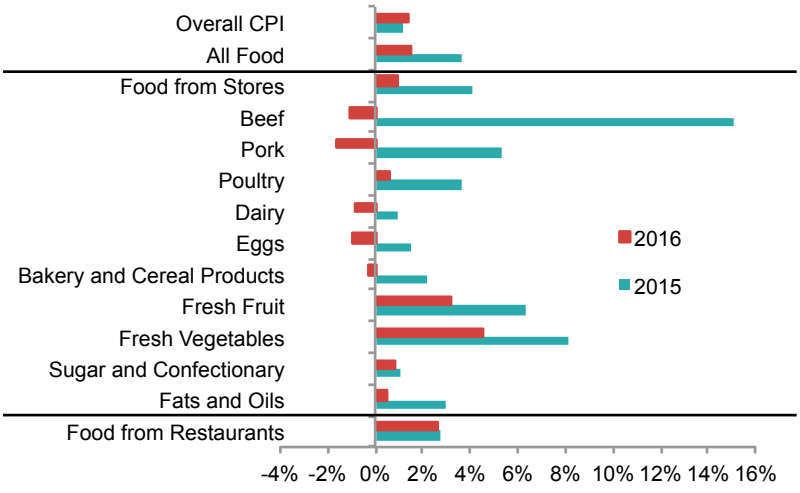

Source: Statistics Canada.

**Retail food price increases were mitigated in part by decreased prices for pork (-1.6%) and beef (1.1%) in 2016.**

In addition to beef and pork, retail prices for dairy, eggs, and bakery and cereal products declined in 2016 relative to 2015. Retail prices for fresh fruits and vegetables, however, increased in 2016 but at a substantially less rate relative to 2015.

Prices rose faster for food from restaurants (2.6%) than for food from stores (1.0%) in 2016.

**Chart F.9**
**Canadian Retail Food Price Inflation by Category, 2015 and 2016**




Source: Statistics Canada and AAFC calculations.

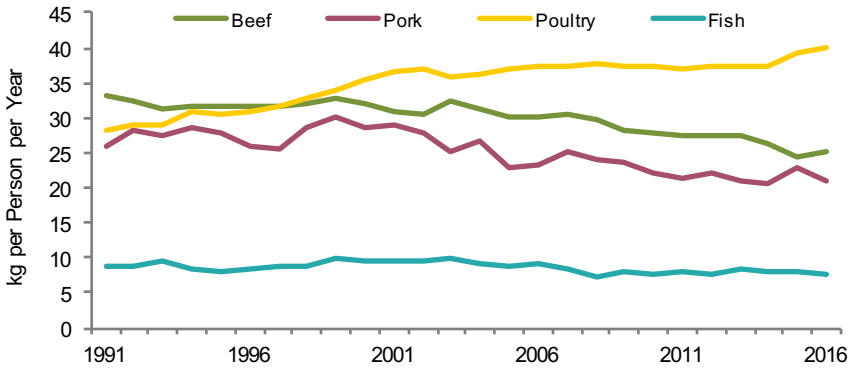
# Availability of red meats and dairy products in Canada has declined slightly over time while that of poultry has continued to increase.

**Food availability is used as a proxy for food consumption and is measured as the total weight of all food made available for human consumption by the food supply chain.**

Beef availability reversed its recent downward trend and increased by 2.8%, reaching 25.0 kilograms per person in 2016. Pork availability trended downward after rebounding in 2015 to decrease by 9.2%, to reach 20.9 kilograms per person in 2016.

The availability of poultry has exceeded that of beef, pork and fish since 1997. Per capita poultry availability was 39.9 kilograms per person in 2016, an increase of 1.9% from the previous year.

**Chart F.10**
**Estimated Per Capita Availability of Beef, Pork, Poultry and Fish, 1991-2016**



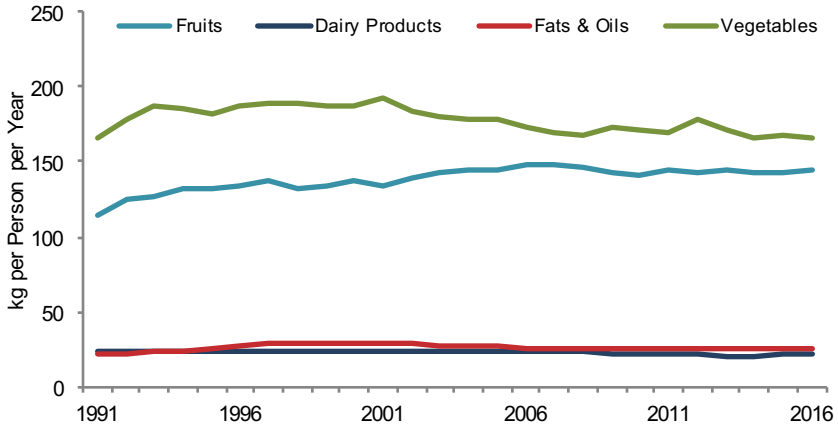

Source: Statistics Canada and AAFC calculations.
Note: Represents food available for consumption and not actual quantities of food consumed. Does not adjust for losses, such as waste and/or spoilage in stores, households, private institutions or restaurants or losses during preparation.

**In 2016, availability of fruit products, dairy products and fats and oils increased while availability of vegetable products decreased slightly.**

Availability of fruit products increased by 1.0% to 143.8 kilograms per person in 2016.

Availability of dairy products increased by 0.9% to 21.6 kilograms per person, while that for fats and oils increased by 1.9% to 25.4 kilograms per person. Vegetable product availability decreased by 0.9% in 2016 reaching 166.4 kilograms per person and has generally declined in the previous 10 years.

**Chart F.11**
**Estimated Per Capita Availability of Fruits, Dairy Products, Fats and Oils, and Vegetables, 1991-2016**




Source: Statistics Canada and AAFC calculations.
Note: Represents food available for consumption and not actual quantities of food consumed. Does not adjust for losses, such as waste and/or spoilage in stores, households, private institutions or restaurants or losses during preparation.

# SECTION G

## Government Expenditures and Support

# SECTION G

## Government Expenditures and Support

### Introduction:

Government (federal and provincial) expenditures measure how much the government spends on the agriculture and agri-food sector. They cover an array of activities such as program payments to producers, research, innovation, safety and control measures, and rural and market development. These expenditures vary greatly across provinces.

Although government expenditures have declined over the past decades, they remain at historically high levels. Expressed in dollar terms, government expenditures in support of the agricultural and agri-food sector are expected to reach $5.4 billion in 2016-17 fiscal year. As a share of agricultural GDP, government expenditures are estimated to be 24.2% in 2016-17.

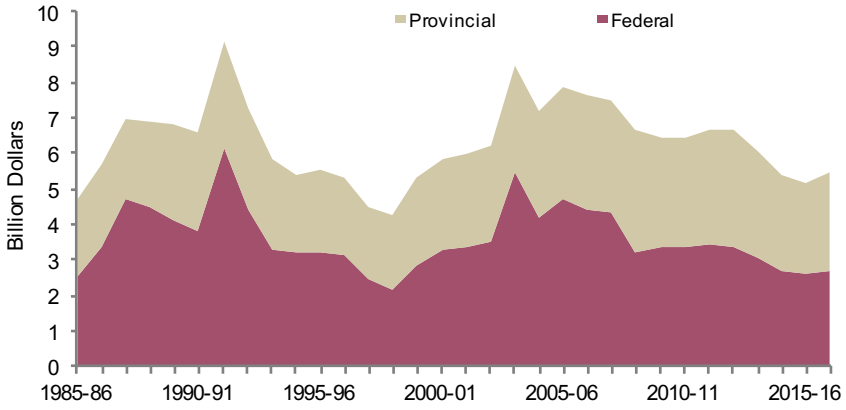
Agricultural policies in Canada and other countries have evolved over time, and changes have been made to not only decrease the level of support, but also modify the type of support.

# Government expenditures in support of the agriculture and agri-food sector have slowly declined after reaching a peak in 2003-04.

**The federal government has provided, on average $3.6 billion per year over the past three decades in support of the agriculture and agri-food sector. The provincial governments have provided on average, $2.7 billion per year over the same time period.**

Government expenditures have been on a declining trend since 2003-04. However, both federal and provincial expenditures are expected to slightly increase in 2016-17. The federal share is expected to decrease from 50.5% in 2015-16 to 49.3% in 2016-17, which is well below the average for the last three decades (56.9%).

**Chart G.1**
**Total Government Expenditures (Federal and Provincial) in Support of the Agriculture and Agri-Food Sector, 1985-1986 to 2016-17**

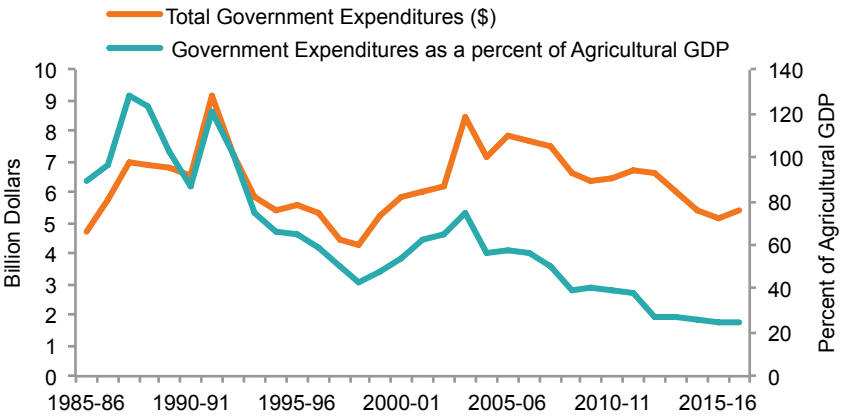



Source: AAFC.
Note: 2016-17 figures are estimates.

**Government expenditures in support of the agriculture and agri-food sector are estimated at $5.4 billion in 2016-17, 24.2% of agricultural GDP.**

Throughout most of the 1990s, government expenditures declined, both in dollar terms and as a share of agricultural GDP. However, both indicators began to increase in 1998-99, peaking in the 2003-04 fiscal year as a result of programs stemming from the 2003 Bovine Spongiform Encephalopathy (BSE) crisis. Since 2003, both government expenditures (in dollars) and as a share of the agricultural GDP have been on a declining trend.

**Chart G.2**
**Total Government Expenditures in Support of the Agriculture and Agri-Food Sector, and as a Share of Agricultural GDP, 1985-86 to 2016-17**




Source: AAFC.
Note: 2016-2017 figures are estimates.

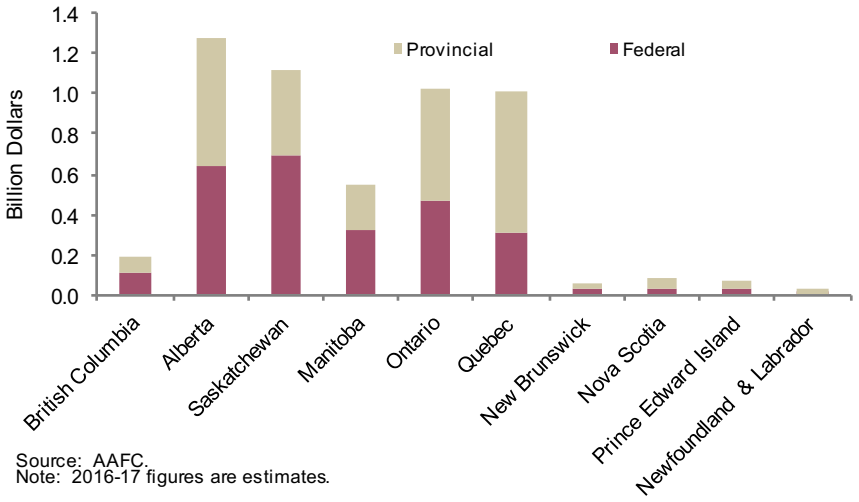
# Government expenditures in support of the agriculture and agri-food sector vary considerably by province.

**In the 2016-17 fiscal year, the total of all government expenditures in support of the agriculture and agri-food sector varied from $32 million in Newfoundland and Labrador to almost $1.3 billion in Alberta.**

The share of federal expenditures is higher than that of provincial expenditures in British Columbia, Saskatchewan, Manitoba, New Brunswick and Prince Edward Island.

Saskatchewan has the highest share of federal expenditures with respect to total expenditures (61.8%) while, Newfoundland and Labrador has the highest share of provincial expenditures (69.5%).

**Chart G.3**
**Total Government Expenditures (Federal and Provincial) in the Agriculture and Agri-Food Sector by Province, 2016-17**

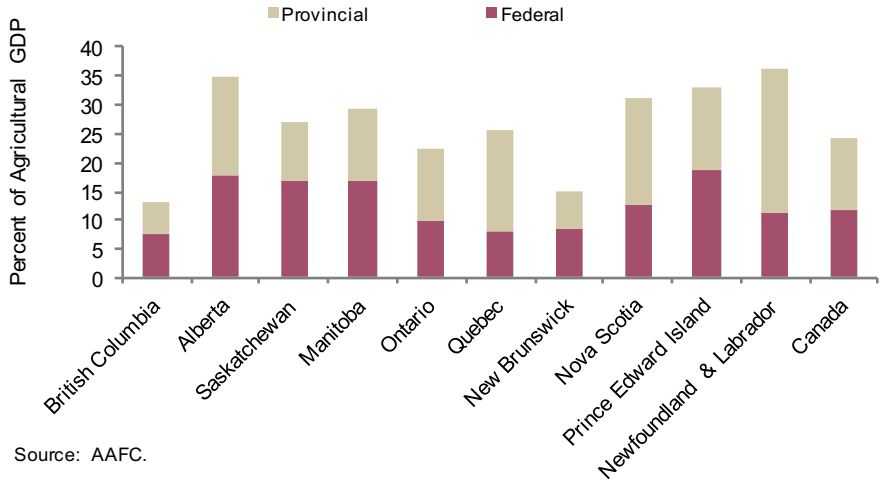



Source: AAFC.
Note: 2016-17 figures are estimates.

**Total government expenditure in support of the agriculture and agri-food sector as a share of GDP varies from province to province.**

Total government expenditures in support of the agriculture and agri-food sector, expressed as a percentage of agricultural GDP, was lowest in British Columbia at 13.2% and highest in Newfoundland and Labrador at 36.5% in 2016-17.

**Chart G.4**
**Total Government Expenditures in the Agriculture and Agri-Food Sector as a Share of Agricultural GDP, Canada and by Province, 2016-17**




Source: AAFC.

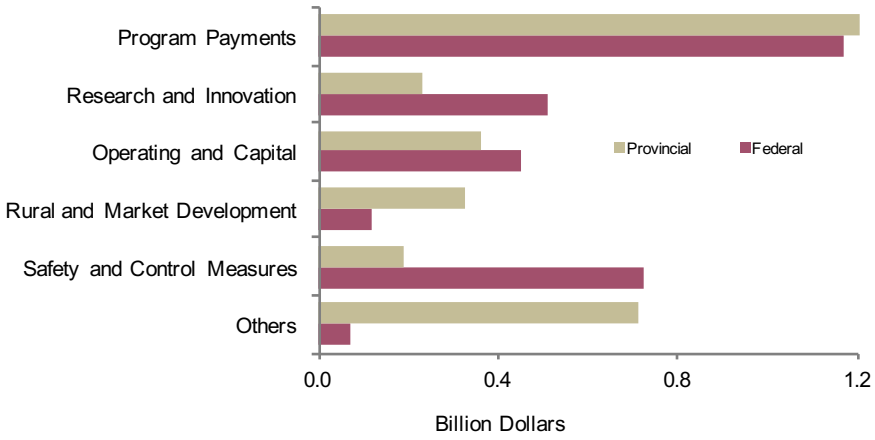
# Program payments to producers account for the largest share of government expenditures in support of the agriculture and agri-food sector.

**For the 2016-17 fiscal year, program payments to producers are estimated to exceed $1 billion for the federal and the provincial governments. This represents 39.2% of the total government expenditures.**

At the federal level, expenditures in safety and control measures, and research and innovation account for the second and third largest expenditures ($1.2 billion).

The distribution of provincial expenditures differs from the federal level. Other expenditures, including tax, extension and education spending, were modest at the federal level ($69 million), but much higher provincially ($711 million).

**Chart G.5**
**Federal and Provincial Government Expenditures in Support of the Agriculture and Agri-Food Sector by Major Category, 2016-17**



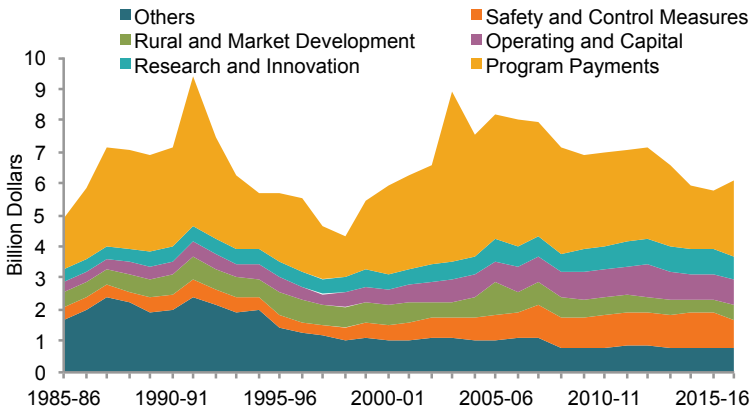

Source: AAFC.
Note: 2016-17 figures are estimates.

**The composition of support has changed over time, but program payments continue to be the most important component of support to the agriculture and agri-food sector.**

The largest shares of expenditures in 2016-17 were in program payments (39.2%) and safety and control measures (15.1%).

The level and share of expenditures for program payments are expected to increase in 2016-17, while they are expected to decline for safety and control measures.

**Chart G.6**
**Federal and Provincial Government Expenditures in Support of the Agriculture and Agri-Food Sector by Major Category, 1985-86 to 2016-17**




Source: AAFC.
Note: 2016-17 figures are estimates.

# In dollar terms, Canadian public research expenditures have increased over time but their share of gross farm receipts has decreased.

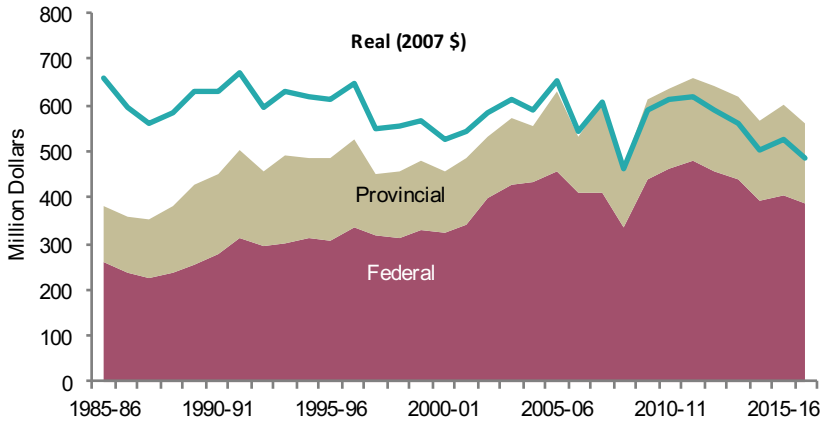
**Public funding of research in support of the agriculture and agri-food sector is estimated to be $557 million in the fiscal year 2016-17.**

Federal research spending is expected to decrease from $404.5 million in 2015-16 to $387.7 million in 2016-17 while the provincial spending is also expected to decrease from $195.2 million in 2015-16 to $169.6 million in 2016-17.

In constant 2007 dollars, total public research expenditures declined from $590.2 million in 2012-13 to $483.8 million in 2016-17, but have been increasing since then.

The share of federal research expenditures has been consistently larger than that of provincial governments, averaging 69% and 31% respectively between 1985-86 and 2016-17.

**Chart G.7**
**Public R&D Spending in Support of the Agriculture and Agri-food Sector, Canada 1985-1986 to 2016-2017**

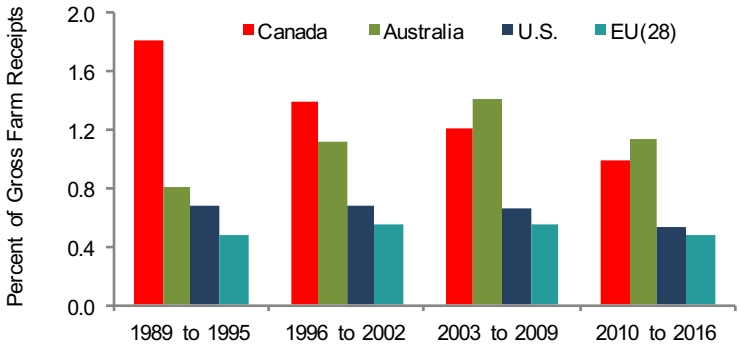



Source: Statistics Canada and AAFC calculations.
Notes: (1) 2016-2017 figures are estimates.(2) Real government expenditures on R&D in agriculture and agri-food have been deflated to 2007 dollars.

**Canada's public research and development (R&D) spending in the agricultural sector, as a share of gross farm receipts (GFR), has continued to decrease. It is currently lower than that of Australia, but higher than that of the U.S. and the EU(28).**

During the 2010 to 2016 period, Canada's public agriculture R&D spending averaged 1.0% as a share of GFR, a decrease from the average of 1.2% over the 2003 to 2009 period.

**Chart G.8**
**Public R&D Spending in Support of the Agriculture and Agri-Food Sector as a Share of Gross Farm Receipts for Selected Countries, 1989 to 2016**




Source: OECD.
Note: This chart uses the GSSE sub-category, H1. Agricultural knowledge generation.

# Total support to Canadian producers has declined in recent years, in part due to higher commodity prices.

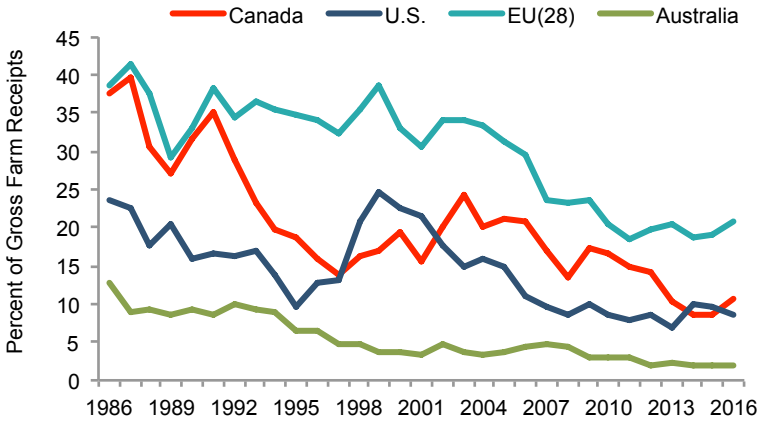
**In 2016, the Producer Support Estimate (PSE) for Canada was 11% of Gross Farm Receipts (GFR).**

PSE is the sum of transfers from policies that provide payments to producers (budgetary transfers) and that maintain domestic prices for farm goods at levels higher than those at the country's borders (market price support - MPS).

Policy reforms, combined with strong global prices were responsible for lowering producer support estimates in Canada, Australia, the EU and the U.S. during the 1986 to 2016 period.

In 2015, Canada's PSE as a percentage of GFR reached its lowest level and was also lower than that of the U.S. (10%). Canada's PSE increased in 2016 to 11% and was again above that of the U.S. (9%).

**Chart G.9**
**Percentage of Producer Support Estimates (PSE) in Selected OECD Countries, 1986-2016**




Source: OECD.

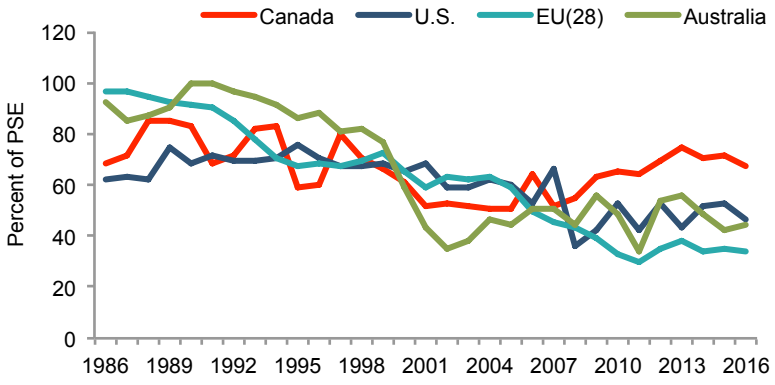
**Potentially most distorting support to production and trade is still an important component of the support to producers in some OECD countries.**

Potentially most distorting support is from policies that can influence producers' decisions on what to produce.

Even though agricultural support levels in selected OECD countries have declined over time, potentially most distorting support still represented 67% of support to producers in Canada, 34% in the EU(28), 46% in the U.S. and 44% in Australia in 2016.

In Canada, MPS for dairy is the major component of this type of support. This support has been on a declining trend in EU(28) due to the reduction of price support.

**Chart G.10**
**Potentially Most Distorting Support, Selected OECD Countries, 1986-2016**




Source: OECD.

# While there was a real shift in potentially least distorting support in the EU(28) and the U.S., there is no real trend in Canada.

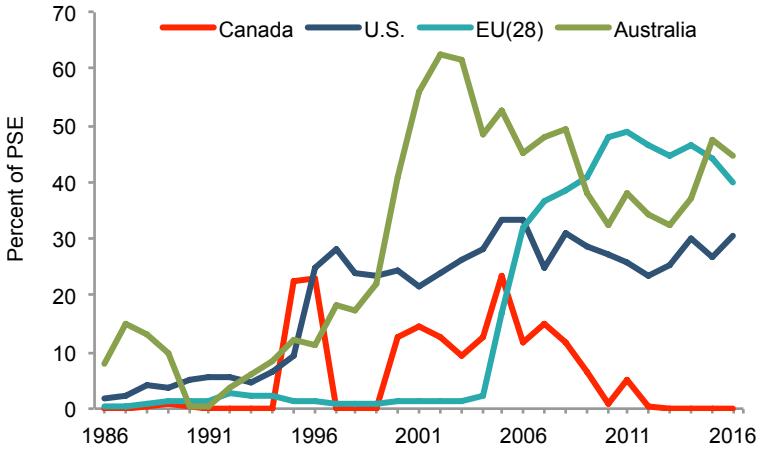
**Potentially least distorting support has increased over time in the EU(28) and U.S. but still represents less than 50% of support to producers in those countries in 2016.**

Potentially least distorting support is from policies that have less influence on producers' decision since these policies are not linked to the production of a commodity.

Since 1986, potentially least distorting support has been on an increasing trend in the EU(28), and the U.S.

The least distorting support in the EU(28) is related to the Single Payment Scheme which removed the link between subsidies and production of a specific commodity. In the U.S., the introduction in 1996 of programs with payments based on historical production of the whole farm, explains the increase in potentially least distorting support. There is no real trend in Canada for this type of support since it is related only to Ad Hoc Programs.

**Chart G.11**
**Potentially Least Distorting Support, Selected OECD Countries, 1986-2016**



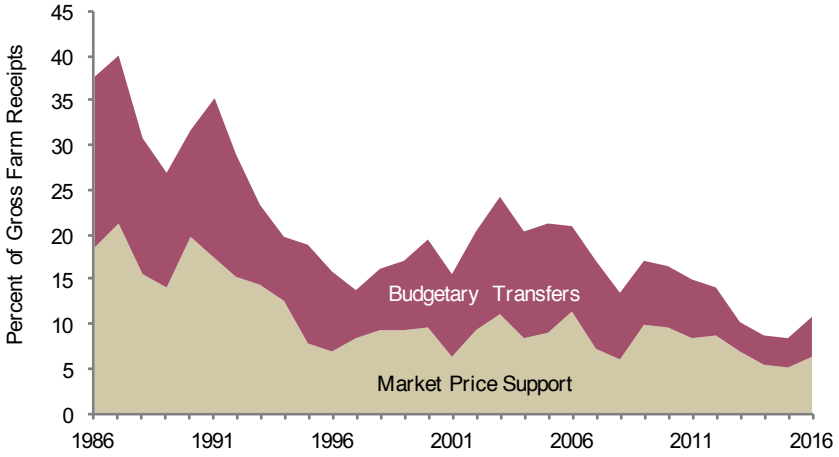

Source: OECD.

# Although MPS is still an important type of support in Canada, it has become less important in the EU(28).

**In 2016, 60% of the total support to producers in Canada was provided through MPS compared with an average of 40% over the 1986-2016 period.**

The removal of transportation subsidies to railways and fiscal deficit reduction explains the drop in the level of support in the 1990s in Canada. A gradual decrease in budgetary transfers relative to GFR in the last 10 years can be explained by favourable market conditions, the reduction of payments from business risk management programs, and increasing farm receipts. Fluctuations in MPS in recent years have been due mostly to changes in the domestic and world market prices, not policies.

**Chart G.12**
**Composition of Support to Producers (PSE) in Canada, 1986-2016**



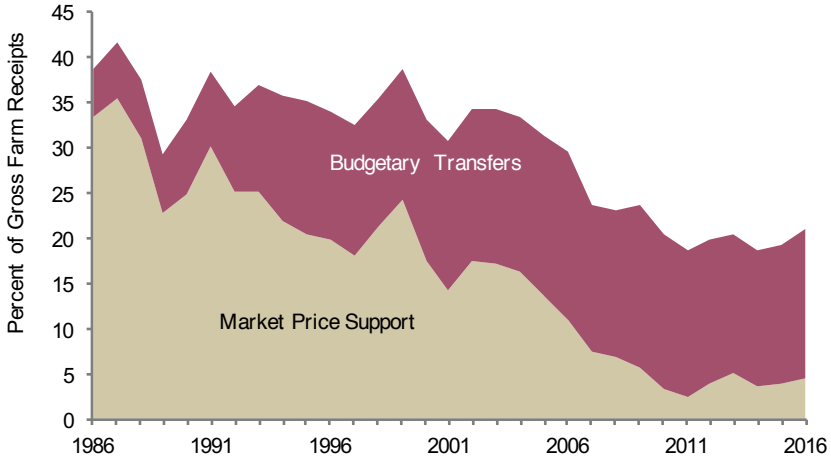

Source: OECD.

**In 2016, 78% of total support to producers in the EU(28) was provided through budgetary transfers, compared to an average of 50% over the 1986-2016 period.**

In 1986, 87% of all support to producers in the EU(28) was provided through MPS, compared to just 22% in 2016.

Significant reforms to the Common Agricultural Policy (CAP) caused increased payments to producers through budgetary transfer while decreasing the level of MPS.

**Chart G.13**
**Composition of Support to Producers (PSE) in the EU(28), 1986-2016**




Source: OECD.

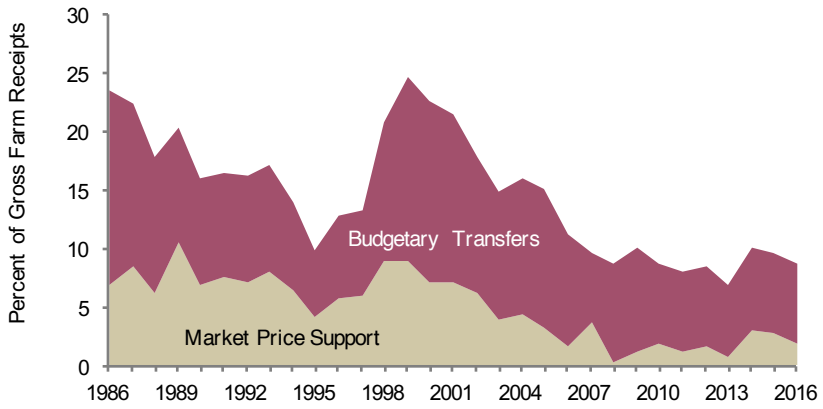
# Over time, MPS has declined and accounts for a very small share of total support in the U.S. and Australia.

**In 2016, 79% of the total support to producers in the U.S. was provided through budgetary transfers, compared to an average of 69% over the 1986-2016 period.**

In the U.S., both MPS and budgetary transfers, expressed as a percentage of GFR, were on a declining trend over the 1986-2016 period. Since 2002, the decline in the U.S. PSE has been primarily due to higher world commodity prices which resulted in lower levels of MPS.

The increase in the 2014 PSE as a share of GFR was due to new Farm Bill funding with carried over expenditures from the previous one.

**Chart G.14**
**Composition of Support to Producers (PSE) in the U.S., 1986 to 2016**



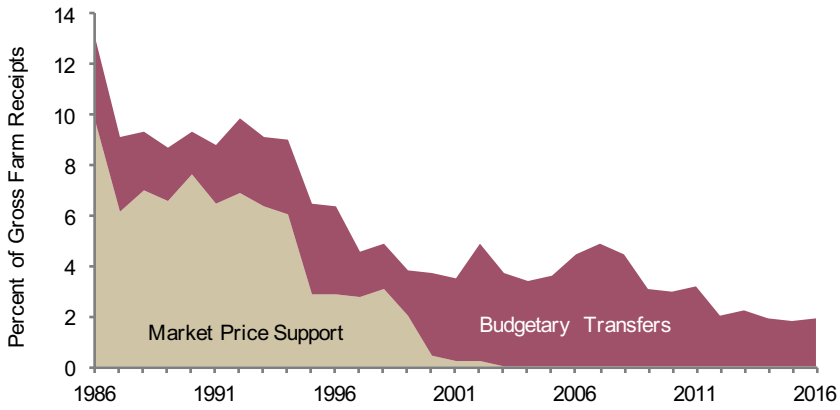

Source: OECD.

**In 2016, 100% of total support to producers in Australia was provided through budgetary transfers compared to an average of 70% over the 1986-2016 period.**

After successive reforms in the dairy sector in Australia in the 1980s and 1990s, MPS as a percentage of GFR declined over time and has been zero since 2003.

Budgetary transfers increased to 5% in 2007 but have been declining since then to 2% in 2016. The increase in budgetary transfers can be explained by the introduction of the Dairy Structural Adjustment Package to help producers deal with severe long-lasting declines in farm income due to rare and severe events.

**Chart G.15**
**Composition of Support to Producers (PSE) in Australia, 1986 to 2016**




Source: OECD.

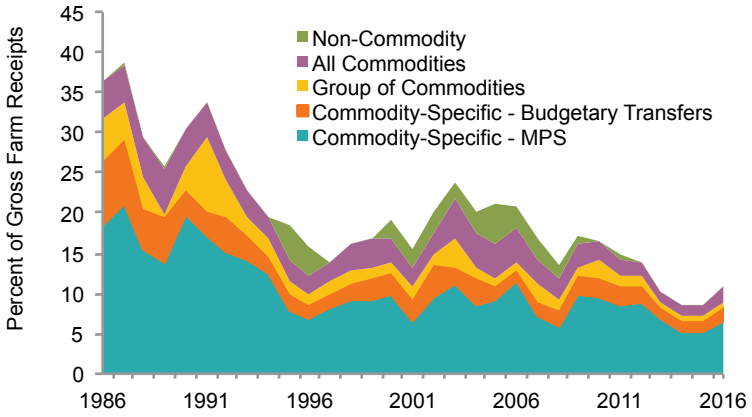
# Commodity-specific support has declined over the years for Canada and the EU. In contrast to Canada, EU producers have received more non-commodity support in recent years.

**Commodity-specific support has always been the most important type of support to producers in Canada.**

From 1986 to 2016, support for specific commodities in Canada represented 67% of total support to producers. During the same period, MPS represented, on average, 53% of all the commodity-specific support.

Most recently, commodity-specific support from budgetary transfers is mainly the result of Agri-Insurance and some provincial programs such as the Ontario Risk Management Program and Farm Income Stabilization Insurance (ASRA)

**Chart G.16**
**Support to Producers Based on the Degree of Commodity Specificity, Canada, 1986-2016**



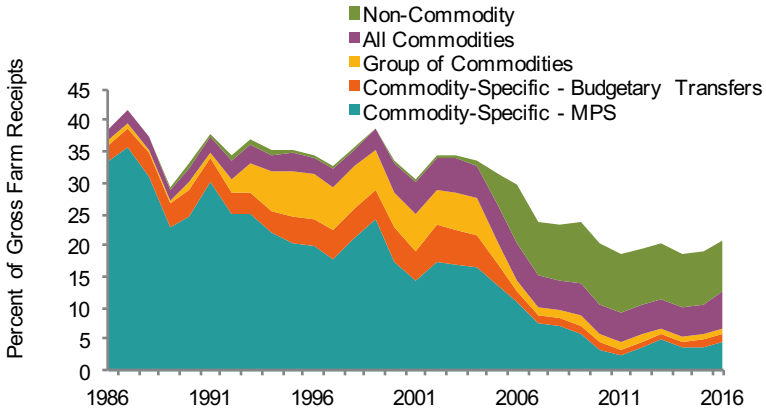

Source: OECD.
Note: PSE can be broken down into separate indicators of support based on the ways in which payments are delivered to producers with regard to the degree of commodity specificity. See glossary for a definition of each indicator.

**Commodity-specific support has been decreasing over the years in the EU, while non-commodity support has been rising.**

From 1986 to 2016, commodity-specific support in the EU(28) on average represented 59% of total support to producers, whereas non-commodity support was 40% of total support in 2016.

With the introduction of the Single Payment Scheme in the EU in 2003, there was a real shift from commodity specific support to non-commodity support.

**Chart G.17**
**Support to Producers Based on the Degree of Commodity Specificity, EU(28), 1986-2016**




Source: OECD.
Note: PSE can be broken down into separate indicators of support based on the ways in which payments are delivered to producers with regard to the degree of commodity specificity. See glossary for a definition of each indicator.

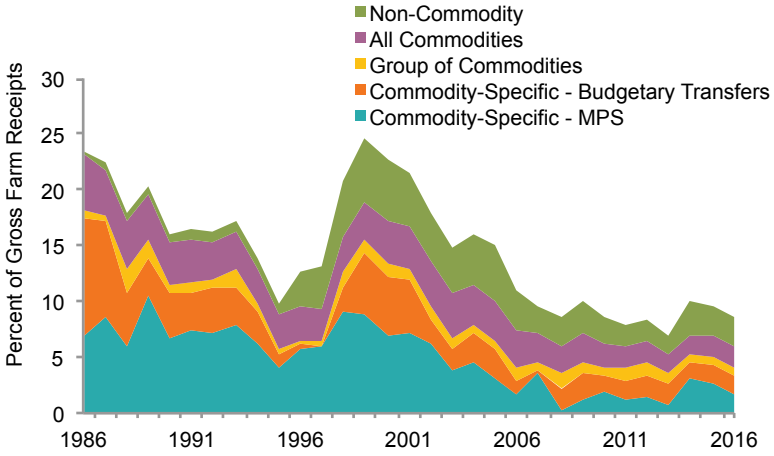
# Commodity-specific support has also declined over time in the U.S. and Australia.

**Commodity-specific and non-commodity support are the most important types of support to producers in the U.S.**

From 1986 to 2016, support for specific commodities in the U.S. represented approximately 51% of total support to producers, while non-commodity specific support represented 20% of support in the same period. In 2016, commodity specific support and non-commodity support represented 39% and 30% of total support respectively. On average, commodity-specific support for grains and oilseeds in United States are higher than in Canada.

With the introduction of the Production Flexibility Contracts in 1996, which replaced the Deficiency Payments Program, the U.S. started to shift to non-commodity types of support.

**Chart G.18**
**Support to to Producers Based on the Degree of Commodity Specificity, U.S., 1986-2016**



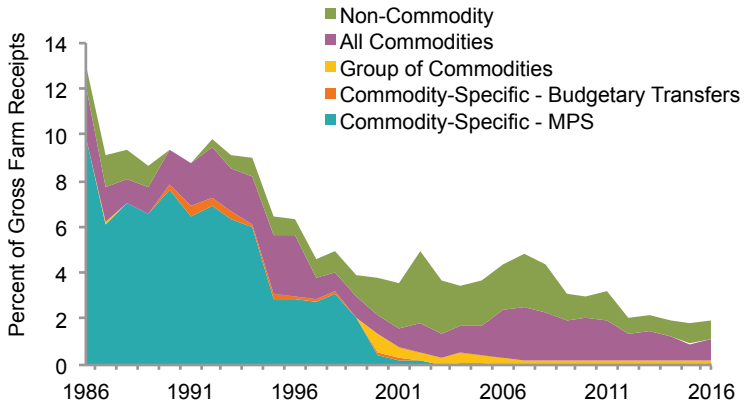

Source: OECD.
Note: PSE can be broken down into separate indicators of support based on the ways in which payments are delivered to producers with regard to the degree of commodity specificity. See glossary for a definition of each indicator.

**Commodity-specific support has decreased to almost zero over the years in Australia, while non-commodity support has become the most important type of support in the first half of the 2000s.**

From 1986 to 2016, commodity-specific support in Australia averaged 32% of total support to producers. In 2016, non-commodity support was 45% of total support while commodity-specific support was 2%. In the same year, all commodity support averaged 47% of total support.

Reforms in the dairy sector have shifted support from commodity-specific to non-commodity specific support. Since 2009, support to all commodities is the most important type of support in Australia.

**Chart G.19**
**Support to Producers Based on the Degree of Commodity Specificity, Australia, 1986-2016**




Source: OECD.
Note: PSE can be broken down into separate indicators of support based on the ways in which payments are delivered to producers with regard to the degree of commodity specificity. See glossary for a definition of each indicator.

# GLOSSARY

## SECTION A1: TRENDS IN CANADIAN AGRICULTURE

**Primary Agriculture:** A farm, ranch or other agricultural operation (nurseries, mushroom houses, feedlots, etc.) producing agricultural products for sale.

**Check-offs:** Producer association check-offs are common sources of funding for R&D innovation, promotion and development of agricultural commodities. Check-offs usually involve an annual assessment of marketings or sales, where the revenue is pooled by the grower organization and a percentage or fixed amount levy is collected for these purposes.

**Farm Operator:** A farm operator is any person responsible for the management decisions made for an agricultural operation. Beginning with the 1991 Census of Agriculture, a farm can be designated to have up to three farm operators.

**Incorporated Farm:** An incorporated farm is a legal business entity separate from the individuals who own, manage or operate the business. The owners or shareholders are not personally liable for any of the debts of the company, other than the value of their investments in the company due to the legal independence of the business.

**Partnerships:** A type of business entity where the business partners share the profits or losses and where there is no legal distinction between the owners and the business. All partners manage the business and are personally liable for its debts except in the case of a limited partnership, where certain partners may relinquish their ability to manage the business in exchange for limited liability in the debts.

**Sole Proprietorship:** Sole proprietorship is a type of business entity, owned by one person, where there is no legal distinction between the owner and the business.

**Total Factor Productivity (TFP) Growth:** Total factor productivity (TFP) is the ratio of an index of total output to an index of total input. TFP growth is the rate of increase or decrease in that ratio. For Canadian agriculture, data for crops and livestock are used to compute the output index, while data on capital, land, labour and intermediate inputs are used to compute the input index.

## SECTION A2: BIOPRODUCT PRODUCTION AND DEVELOPMENT IN CANADA

**Biomass:** The term biomass refers to materials sourced from forestry, agricultural (plant, livestock products or by-products) marine, and aquaculture materials, as well as from industrial and municipal wastes.

**Bioproducts:** Bioproducts are products (other than food, feed, or medicine) made from renewable biological inputs (often referred to as biomass). The term includes new bio-based products as well as those traditional products which have been adapted to replace non-renewable inputs. Conventionally-made industrial products (such as lumber) are excluded.

## SECTION B: GDP AND EMPLOYMENT

**Agriculture and Agri-Food Sector:** The agriculture and agri-food sector is composed of all industries whose primary role is to produce food and agricultural products. It encompasses primary agriculture and food and beverage processors.

**Canadian Agriculture and Agri-Food System:** The Canadian agriculture and agri-food system is a value chain of industries focused on producing agricultural and food products. It includes agricultural input and service suppliers, primary agriculture, food and beverage processors, food retailers and /wholesalers, and foodservice establishments.

**Constant Prices:** Constant prices refers to a value from which the effect of a general price inflation has been removed.

**Employment:** Data on employment in Section B is from Statistics Canada's Labour Force Survey which provides estimates of the number of employed persons, with multiple jobholders counted only once. The data is collected from a survey of households.

**Gross Domestic Product (GDP):** The GDP for a country or province is the total unduplicated value of the goods and services produced in a country or province during a given period.

## SECTION C: INTERNATIONAL TRADE

**Agriculture and Agri-Food Exports:** Agriculture and agri-food exports include the export of agriculture commodities, food (excluding fish and fish products), non-alcoholic beverages (including bottled water), alcoholic beverages, tobacco products, and floriculture and nursery.

**Agriculture and Agri-Food Imports:** Agriculture and agri-food imports include the import of agriculture commodities, food (excluding fish and fish products), non-alcoholic beverages (including bottled water), alcoholic beverages, tobacco products and floriculture and nursery.

**Estimated share of Canadian Primary Production that is Exported Directly as primary agricultural products:** This is the ratio of primary agricultural exports to total farm market receipts

**Estimated share of Canadian Primary Production that is Exported Indirectly as processed agri-food products:** This is estimated as the ratio of the proportion of primary agriculture products in food processing exports to total farm market receipts. The ratio of the proportion of primary agriculture products in food processing exports is estimated as farm market receipts multiplied by, share of primary agriculture sold to food processing that is exported.

**Intra-Regional Trade:** Trade between two regions in a given location. For example trade between Canadian provinces or the European Union member countries.

**Primary Agriculture Product Trade:** Uses the North American Industrial Classification System coding structure as the basis, defines primary agriculture as codes 111 and 112.

**Processed Agri-Food Product Trade:** Uses the World Trade Organization definition of agricultural trade and the North American Industrial Classification System coding structure as the basis, and defines processed agri-food products as codes 311 and 3121, excluding most products from Seafood Product Preparation and Packaging (NAICS 3117) and including certain processed agricultural products produced by non-food and beverage manufacturing industries.

**Enterprise:** The business unit for which consolidated financial statements are maintained.

## SECTION D: PRIMARY AGRICULTURE

**Average Net Operating Income:** Average net operating income is income level derived by dividing total net operating income by the number of farms.

**Crop Year:** A crop year is a twelve-month period used for collecting data on a particular crop — generally corresponding to the natural planting and marketing cycle for that crop. Usually, a crop year begins in a month other than January.

**Direct Payments:** Direct payments include the amounts paid under government agricultural programs and agricultural programs funded by the private sector. These include insurance programs funded totally by premiums paid by producers. Only those payments related to current agricultural production and paid directly to individuals involved in agricultural production are included.

**Farm Cash Receipts:** Farm cash receipts include revenues from the sale of agricultural commodities, program payments from government agencies, and payments from private crop and livestock insurance programs. Receipts are recorded in the calendar year when the money is paid (cash basis) to farmers.

**Farm Market Receipts:** Farm market receipts are farm cash receipts minus program payments.

**Farm Net Worth:** Farm net worth is measured as the total assets of the farm evaluated at current market value less total liabilities.

**Farm Net Operating Expenses:** Farm operating expenses represent business costs incurred by farm operators for goods and services used in the production of agricultural commodities. All expense information is on a calendar year basis. If direct rebates are paid to farmers to reduce the cost of particular inputs, then the net expense estimates are used in the preparation of net income. As the objective is to produce provincial estimates of net income, flows from one farm to another are excluded from the estimates. The province can be viewed as one large farm.

**Net Cash Income:** Net cash income measures farm business cash flow (farm cash receipts minus operating expenses) generated from the production of agricultural goods. Net cash income represents the amount of money available for debt repayment, investment or withdrawal by the owner.

**Net Market Income:** Net market income is the sum of total operating revenues less total operating expenses minus net program payments.

**Net Operating Income:** Net operating income is the difference between gross farm revenues and total farm cash expenses.

**Net Value Added:** Net value added measures agriculture's contribution to the national economy's production of goods and services created in a particular year. It is derived by calculating the total value of agricultural sector production, including program payments, and subtracting the related costs of production (expenses on inputs, business taxes and depreciation). Net value added is distributed to the various factors of production, including rent to non-operator landlords, interest to lenders and wages to non-family members.

**Supply Management:** Supply management is a marketing system where producers control the production/supply of a particular commodity. The basis for supply management is to make sure domestic demand is met, while ensuring a reasonable return for producers and stable prices for consumers.

## SECTION E: POST FARM GATE

**Capital Stock:** Fixed capital is comprised of buildings, engineering structures and machinery and equipment. Total investment in fixed capital is made up of purchases needed to offset depreciation (replacement needs) and purchases to expand the capital stock. When replacement needs exceed investment, the capital stock falls, since the existing stock is not being maintained. When investment exceeds replacement needs, the stock increases.

**Chain Stores:** Food retailers are divided into chain stores and non-chain stores. Chain stores are defined as operating in four or more locations in Canada (within the same industry group and under the same legal ownership).

**Debt-to-Asset Ratio:** Debt-to-asset ratio at the farm level is total debt divided by total assets.

**Debt-to-Equity Ratio:** Debt-to-equity ratio at the industry level is total debt divided by total equity.

**Employment:** Data on employment in Section E is based on the Survey of Employment, Payrolls and Hours which provides estimates of the number of jobs, with multiple jobholders counted for each non-farm payroll job. The data is collected from administrative data using a survey of businesses.

**Real Prices:** Real (constant) price refers to a value from which the overall effect of a general price inflation has been removed.

**Value-Added Production:** Value-added production refers to products that have undergone some processing

## SECTION F: HOUSEHOLD FOOD EXPENDITURES, FOOD PRICES AND FOOD CONSUMPTION PATTERNS

**Alcoholic Beverages:** This includes those purchased from stores and restaurants. Also included are expenditures on supplies and fees for self-made beer, wine or liquor. Purchases of alcoholic beverages may be under-reported.

**Constant Prices:** Constant prices refer to a value from which the overall effect of general price inflation has been removed.

**Food and Non-Alcoholic Beverages Purchased from Stores:** Food purchased from stores includes supermarkets, food specialty stores (butcher shops, fresh produce stores, bakeries, fish markets, delicatessens, health food stores, markets or stands, and direct purchases from producers and frozen food suppliers, outdoor farmers' markets and stands, and all other non-service establishments), convenience stores, and other (any other type of store that sells food items, such as department stores, club-type stores, drug stores, etc.).

**Food Away From Home:** Includes food purchased from restaurants including table-service restaurants, fast-food restaurants, cafeterias and other (refreshment stands, snack bars, vending machines, chip wagons, caterers and mobile canteens). They are usually found at supermarkets, theatres, exhibitions, sports events, parks, etc.

**Household Expenditures on Goods and Services:** Shows the expenses incurred for food, shelter, household furnishings and equipment, clothing, transportation, communications, health care and services, recreation, education and culture, tobacco products and alcoholic beverages, games of chance, and a miscellaneous group of items.

**Personal Expenditure on Consumer Goods and Services:** Household spending on new consumer goods and on consumer services, plus any mark-up on used goods. Real personal spending is personal expenditures adjusted for inflation.

**Quintiles:** Quintiles are ranking households in ascending order of total household income and organized into five groups of equal numbers.

## SECTION G: GOVERNMENT EXPENDITURES AND SUPPORT

**Budgetary Transfers:** Budgetary expenditures from governments providing direct payments to agricultural producers.

**Government Expenditures:** Government spending (federal and provincial) on agriculture and food processing in a year, both direct and indirect, paid to individuals, agencies or associations.

**Gross Farm Receipts (GFR):** This is the value of commodity production plus direct transfers received by producers in a current year.

**Indicators of Support Based on the Degree of Commodity Specificity:** Support to producers can be broken down in four separate indicators of support based on the way payments are delivered to producers with regard to the degree of commodity specificity. Commodity-specific support requires the production of that designated commodity to receive payments. Group of commodities requires that the producer may produce from a set of allowable commodities to receive payment. All commodities mean that there is no restriction on the commodity produced but it requires the production of commodities. Non-commodity means that there is no requirement to produce a commodity to receive a payment. These supports are expressed as a share of PSE (adding to 100%) or as a share of Gross Farm Receipts (GFR) (adding to %PSE).

**Market Price Support (MPS):** These are transfers to agricultural producers from policy measures that create a gap between domestic market prices and border prices of a specific agricultural commodity.

**Operating and Capital Expenditures:** Include government expenditures on general administration and management, and on policy information and statistical services

**Other Expenditures:** Include government expenditures on food aid and international assistance, extension, and education as well as social program payments and tax expenditures.

**Potentially Most Distorting Support:** These are supports from policies that are based on commodity output and variable input use without input constraints.

**Potentially Least Distorting Support:** These are from policies that are not linked to the production of commodities.

**Program Payment Expenditures:** Include payments for income support and stabilization programs, ad hoc and cost reduction programs, agri-insurance and financing assistance programs.

**Producer Support Estimate (PSE):** A yearly measure of policy support to farm producers. It is the sum of market price support and budgetary payments to producers, expressed as a percentage of the gross farm receipts.

**Research Expenditures:** Include administration and capital expenditures incurred by the government to perform research and inspection activities, as well as grants and contributions issued by the government for work on these activities.

**Total Government Expenditures:** Total spending from both the Federal and Provincial governments.

# AAFS INDUSTRY DEFINITIONS

Unless otherwise noted, component stages of the agriculture and agri-food system are defined according to the North American Industrial Classification System (NAICS). A detailed listing of included industries for each component stage of the system is provided below.

**Input and Service Suppliers**

Agricultural input and service suppliers are composed of the following industries as defined by NAICS:

At the 4-digit level

| | |
|---|---|
| 1151 | Support Activities for Crop Production |
| 1152 | Support Activities for Animal Production |
| 3253 | Pesticide, Fertilizer and Other Agricultural Chemical Manufacturing |
| 4171 | Farm, Lawn and Garden Machinery and Equipment Merchant Wholesalers |
| 4183 | Agricultural Supplies Merchant Wholesalers |

At the 5-digit level

| | |
|---|---|
| 33311 | Agricultural Implement Manufacturing |

**Primary Agriculture**

Primary agriculture is composed of the following industries as defined by NAICS:

At the 3-digit level

| | |
|---|---|
| 111 | Crop Production |
| 112 | Animal Production and Aquaculture |

At the 4-digit level

| | |
|---|---|
| 1100 | Farming not elsewhere classified |

Crop Production and Animal Production and Aquaculture include the following industries:

At the 4-digit level:

| | |
|---|---|
| 1111 | Oilseed and Grain Farming |
| 1112 | Vegetable and Melon Farming |
| 1113 | Fruit and Tree Nut Farming |
| 1114 | Greenhouse, Nursery and Floriculture Production |
| 1119 | Other Crop Farming |
| 1121 | Cattle Ranching and Farming |
| 1122 | Hog and Pig Farming |
| 1123 | Poultry and Egg Production |
| 1124 | Sheep and Goat Farming |
| 1125 | Aquaculture |
| 1129 | Other Animal Production |

**Food and Beverage Processing**

Food and beverage processing is composed of the following industries as defined by NAICS:

At the 3-digit level

311 Food Manufacturing

At the 4-digit level

3121 Beverage Manufacturing

Food Manufacturing includes the following industries:

At the 4-digit level:

3111 Animal Food Manufacturing
3112 Grain and Oilseed Milling
3113 Sugar and Confectionery Product Manufacturing
3114 Fruit and Vegetable Preserving and Specialty Food Manufacturing
3115 Dairy Product Manufacturing
3116 Meat Product Manufacturing
3117 Seafood Product Preparation and Packaging
3118 Bakeries and Tortilla Manufacturing
3119 Other Food Manufacturing

Beverage Manufacturing includes the following industries :

At the 5-digit level

31211 Soft Drink and Ice Manufacturing
31212 Breweries
31213 Wineries
31214 Distilleries

**Food Retail and Wholesale**

Food retail and wholesale is composed of the following industries as defined by NAICS:

At the 3-digit level

411 Farm Product Merchant Wholesalers
413 Food, Beverage and Tobacco Merchant Wholesalers
445 Food and Beverage Stores

**Foodservice**

Foodservice is composed of the following industries as defined by NAICS:

At the 3-digit level

722 Food Services and Drinking Places

At the 4-digit level

4542 Vending Machine Operators

# DATA SOURCES AND REFERENCES

## SECTION A1: TRENDS IN CANADIAN AGRICULTURE

A1.1 Statistics Canada, Census of Agriculture.
A1.2 Statistics Canada, Census of Agriculture.
A1.3 Statistics Canada, Census of Agriculture.
A1.4 AAFC Productivity Account for Canadian Agriculture.
A1.5 GE Database, (2016 Farm Income Databook).


1. Bishop, C. A. (2011). "Indigenous People: Eastern Woodlands." The Canadian Encyclopedia. Retrieved from http://www.thecanadianencyclopedia.ca/en/article/aboriginal-people-eastern-woodlands/

2. Carter, S. (1989). "Two Acres and a Cow: 'Peasant' Farming for the Indians of the Northwest, 1889-97." The Canadian Historical Review, 70(1), pp. 27-52. Retrieved from http://www.utpjournals.press/doi/abs/10.3138/CHR-070-01-02

3. Gagnon, E. (n.d.). "Settling the West: Immigration to the Prairies from 1867 to 1914." Canadian Museum of Immigration at Pier 21. Retrieved from https://www.pier21.ca/research/immigration-history/settling-the-west-immigration-to-the-prairies-from-1867-to-1914

4. Dick, L. & Taylor, J. (2007). "History of Agriculture to the Second World War." The Canadian Encyclopedia. Retrieved from http://www.thecanadianencyclopedia.ca/en/article/history-of-agriculture/

5. Parson, H. E. (1999). "Regional Trends of Agricultural Restructuring in Canada." Canadian Journal of Regional Science, XXII:3, 343-356. Retrieved from http://cjrs-rcsr.org/archives/22-3/Parson.pdf

6. Statistics Canada. (2017). "A Portrait of a 21st Century Agricultural Operation." Publication 95-640-X. Retrieved from http://www.statcan.gc.ca/pub/95-640-x/2016001/article/14811-eng.pdf

7. MacLachlan, I. (1996). "The Historical Development of Cattle Production in Canada." Retrieved from https://www.uleth.ca/dspace/bitstream/handle/10133/303/Historical_cattle_Canada.pdf;sequence=3

8. Breen, D. H. (2009). "Ranching History." The Canadian Encyclopedia. Retrieved from http://www.thecanadianencyclopedia.ca/en/article/ranching-history/

9. Agriculture and Agri-Food Canada. (2015). "Canadian Dairy Genetics." Retrieved from http://www.agr.gc.ca/eng/industry-markets-and-trade/buying-canadian-food-products/canadian-dairy-genetics/?id=1425928406920

10. Statistics Canada. (2011). "Canada Year Book." Publication 11-402-X. Retrieved from http://www.statcan.gc.ca/pub/11-402-x/2011000/chap/ag/ag-eng.htm

11. Statistics Canada. (2011). "Snapshot of Canadian Agriculture." Publication 95-640-X. Retrieved from http://www.statcan.gc.ca/pub/95-640-x/2011001/p1/p1-02-eng.htm#VI

12. Canfax Research Services. (September 2016). "CRS Special Edition: The Price Cycle and Evolving Cycle Drivers." Fact Sheet. Retrieved from http://www.canfax.ca/samples/The%20Price%20Cycle%20and%20Evolving%20Cycle%20Drivers.pdf

13. Agriculture and Agri-Food Canada. (2013). "An Overview of the Canadian Agriculture and Agri-Food System." p. 71.

14. Hedley, D. D. (2015). "The Evolution of Agricultural Support Policy in Canada." CAES Fellows Paper. Retrieved from https://caes.usask.ca/meetings/the-evolution-of-agricultural-support-policy-in-canada.pdf

## SECTION A2: BIOPRODUCT PRODUCTION AND DEVELOPMENT IN CANADA

A2.1-A2.12 Statistics Canada, 2015 Bioproducts Production and Development Survey.

## SECTION B: GDP AND EMPLOYMENT

B.1 AAFC calculations based on Statistics Canada data.

B.2-B.4 Statistics Canada. *Table 379-0031 - Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), monthly (dollars), CANSIM (database); Statistics Canada. Table 301-0008 - Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual*, CANSIM (database); Statistics Canada, special tabulation based on Labour Force Survey; AAFC calculations.

B.5-B.6 Statistics Canada. *Table 379-0030 - Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories, annual (dollars),* CANSIM (database) and AAFC calculations.

B.7-B.11 Statistics Canada, special tabulation based on Labour Force Survey; AAFC calculations.

B.12 Statistics Canada. *Table 285-0002 - Job Vacancy and Wage Survey (JVWS), job vacancies, job vacancy rate and average offered hourly wage by North American Industry Classification System (NAICS), unadjusted for seasonality, quarterly (number unless otherwise noted),* CANSIM (database).

B.13 Immigration, Refugees and Citizenship Canada, Special Request; AAFC calculations.

## SECTION C: INTERNATIONAL TRADE

C.1-C.2 Global Trade Tracker; AAFC calculations.

C.3 AAFC calculations based on various products from Statistics Canada.

C.4 AAFC calculations based on various products from Statistics Canada.

C.5-C.16 Statistics Canada, Canadian International Merchandise Trade Database via AAFC's Trade Data Retrieval Service; AAFC calculations.

C.17 Statistics Canada. *Table 228-0073 - Trade by Exporter Characteristics - Goods; value of domestic exports and number of exporting enterprises, by enterprise employment size and the North American Industry Classification System (NAICS), Canada, annual (dollars unless otherwise noted)*, CANSIM (database); AAFC calculations.

C.18 Statistics Canada. *Table 228-0071 - Trade by Exporter Characteristics - Goods; value of domestic exports and number of exporting enterprises, by the North American Industry Classification System (NAICS) and number of partner countries, Canada, annual (dollars unless otherwise noted),* CANSIM (database); AAFC calculations.

## SECTION D: PRIMARY AGRICULTURE
## SECTION D1: FARM PERFORMANCE

D1.1-D1.2 Statistics Canada. *Table 002-0001 - Farm cash receipts, annual (dollars),* CANSIM (database).

D1.3-D1.4 Statistics Canada. *Table 002-0001 - Farm cash receipts, annual (dollars),* CANSIM (database); AAFC calculations.

D1.5 Statistics Canada. T*able 002-0001 - Farm cash receipts, annual (dollars),* CANSIM (database); Statistics Canada. *Table 001-0041 - Supply and disposition of grains in Canada as of March 31, July 31, August 31 (soybeans only) and December 31, occasional (metric tonnes),* CANSIM (database); Statistics Canada. *Table 001-0042 - Supply and disposition of corn in Canada and selected provinces as of March 31, August 31 and December 31, occasional (metric tonnes),* CANSIM (database); AAFC calculations.

D1.6 United States Department of Agriculture, National Agricultural Statistics Service; Statistics Canada; AAFC, Red Meat Market Information.

D1.7-D1.9 Statistics Canada, Taxation Data Program; AAFC calculations.

D1.10 Statistics Canada. Table 002-0025 - Total and average off-farm income by source and total and average net operating income of farm families by farm type, unincorporated sector, annual (dollars unless otherwise noted), CANSIM (database); Statistics Canada. Table 206-0011 - Market income, government transfers, total income, income tax and after-tax income, by economic family type, Canada, provinces and selected census metropolitan areas (CMAs), annual, CANSIM (database); AAFC calculations.

D1.11 Statistics Canada. *Table 002-0001 - Farm cash receipts, annual (dollars),* CANSIM (database); Statistics Canada. Table 002-0009 - Net farm income, annual (dollars), CANSIM (database); AAFC calculations.

D1.12 Statistics Canada. *Table 002-0004 - Agriculture value added account, annual (dollars)*, CANSIM (database).

D1.13 Statistics Canada, special tabulation based on Farm Financial Survey; AAFC calculations.

D1.14 Statistics Canada. *Table 002-0072 - Farm financial survey, financial structure by farm type, average per farm (gross farm revenue equal to or greater than $25,000), occasional (dollars unless otherwise noted),* CANSIM (database); AAFC calculations.

## SECTION D2: FARM INPUTS

D2.1-D2.2 Statistics Canada. *Table 002-0005 - Farm operating expenses and depreciation charges, annual (dollars),* CANSIM (database).

D2.3 Statistics Canada. *Table 002-0009 - Net farm income, annual (dollars),* CANSIM (database); AAFC calculations.

D2.4 Alberta Agricultural Input Monitoring System (AIMS), Alberta Agriculture and Forestry, Economics and Competitiveness Branch, Statistics and Data Development Section; the United States Energy Information Administration.

D2.5 Quorom Coproration; Kent Group Ltd.

## SECTION E: POST FARM GATE

## SECTION E1: FOOD AND BEVERAGE PROCESSING

E1.1 Statistics Canada. Table 301-0008 - *Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual,* CANSIM (database).

E1.2 Statistics Canada, Table 379-0031 - *Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), monthly (dollars),* CANSIM (database); Statistics Canada. *Table 301-0008 - Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual,* CANSIM (database); AAFC calculations.

E1.3 Statistics Canada. *Table 281-0024 - Survey of Employment, Payrolls and Hours (SEPH), employment by type of employee and detailed North American Industry Classification System (NAICS), annual (persons),* CANSIM (database); AAFC calculations.

E1.4 Statistics Canada, special request; AAFC calculations.

E1.5 Statistics Canada, special request; AAFC calculations.

E1.6 Statistics Canada, special request; AAFC calculations.

E1.7 Statistics Canada, special request; AAFC calculations.

E1.8-E.1.9 Statistics Canada. *Table 304-0014 - Manufacturers' sales, inventories, orders and inventory to sales ratios, by North American Industry Classification System (NAICS), Canada, monthly (dollars unless otherwise noted),* CANSIM (database); AAFC calculations.

E1.10-E1.11 Statistics Canada. *Table 281-0024 - Survey of Employment, Payrolls and Hours (SEPH), employment by type of employee and detailed North American Industry Classification System (NAICS), annual (persons)*, CANSIM (database); AAFC calculations.

E1.12 Statistics Canada. *Table 330-0008 - Raw materials price index, by North American Product Classification System (NAPCS), monthly (index, 2010=100),* CANSIM (database).

E1.13 Statistics Canada. *Table 281-0027 - Survey of Employment, Payrolls and Hours (SEPH), average weekly earnings by type of employee, overtime status and detailed North American Industry Classification System (NAICS), annual (current dollars)*, CANSIM (database).

E1.14-E1.15 Statistics Canada. *Table 301-0008 - Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual,* CANSIM (database); AAFC calculations.

E1.16-E1.17 Statistics Canada, special tabulation based on Quarterly Financial Statistics for Enterprises; AAFC calculations.

E1.18-E1.19 Statistics Canada. *Table 383-0032 - Multifactor productivity, gross output, value-added, capital, labour and intermediate inputs at a detailed industry level, by North American Industry Classification System (NAICS), annual (index, 2007=100 unless otherwise noted),* CANSIM (database); AAFC calculations.

E1.20 Statistics Canada. *Table 383-0032 - Multifactor productivity, gross output, value-added, capital, labour and intermediate inputs at a detailed industry level, by North American Industry Classification System (NAICS), annual (index, 2007=100 unless otherwise noted),* CANSIM (database); U.S Bureau of Labor Statistics; AAFC calculations.

E1.21 Statistics Canada. *Table 380-0064 - Gross domestic product, expenditure-based, quarterly (dollars unless otherwise noted), CANSIM (database); Statistics Canada. Table 358-0024 - Business enterprise research and development (BERD) characteristics, by industry group based on the North American Industry Classification System (NAICS) in Canada, annual (dollars unless otherwise noted),* CANSIM (database); AAFC calculations.

## SECTION E2: FOOD RETAIL AND FOODSERVICE

E2.1 Canadian Grocer, Jan/Feb 2001, National Market Survey, Canadian Food Store Sales, 2000, pg 22-31; Canadian Grocer, March 2017; AAFC calculations.

E2.2 Canadian Grocer, March 2017.

E2.3-E2.4 Canadian Grocer, Jan/Feb 2001, National Market Survey, Canadian Food Store Sales, 2000, pg 22-31; Canadian Grocer, March 2017; AAFC calculations.

E2.5 Statistics Canada, special tabulation based on Quarterly Financial Statistics for Enterprises; Statistics Canada. T*able 187-0002 - Quarterly statement of changes in financial position, by North American Industry Classification System (NAICS), selected financial ratios and selected seasonally adjusted components, quarterly (dollars unless otherwise noted),* CANSIM (database); AAFC calculations.

E2.6 Statistics Canada. *Table 355-0006 - Monthly survey of food services and drinking places, by North American Industry Classification System (NAICS), monthly,* CANSIM (database); Statistics Canada. *Table 383-0031 - Labour statistics consistent with the System of National Accounts (SNA), by province and territory, job category and North American Industry Classification System (NAICS), annual,* CANSIM (database).

E2.7 Statistics Canada. *Table 180-0003 - Financial and taxation statistics for enterprises, by North American Industry Classification System (NAICS), annual (dollars unless otherwise noted),* CANSIM (database).

E2.8-E2.9 Statistics Canada. *Table 355-0006 - Monthly survey of food services and drinking places, by North American Industry Classification System (NAICS), monthly,* CANSIM (database). Statistics Canada, Business Register; AAFC calculations.

E2.10 Canadian Restaurant and Foodservices Association, Quarterly InfoStats (1991-2002); Industry Canada, Office of Superintendent (2003-2014).

## SECTION F: HOUSEHOLD FOOD EXPENDITURES, FOOD PRICES AND FOOD CONSUMPTION PATTERNS

F.1 Statistics Canada. *Table 380-0067 - Household final consumption expenditure, quarterly (dollars unless otherwise noted),* CANSIM (database); Statistics Canada. *Table 380-0085 - Detailed household final consumption expenditure, quarterly (dollars),* CANSIM (database); AAFC calculations.

F.2 Statistics Canada. *Table 203-0021 - Survey of household spending (SHS), household spending, Canada, regions and provinces, annual (dollars),* CANSIM (database); AAFC calculations.

F.3 Statistics Canada. *Table 203-0028 - Survey of household spending (SHS), detailed food expenditures, Canada, regions and provinces, annual (dollars),* CANSIM (database); AAFC calculations.

F.4 Statistics Canada. *Table 380-0085 - Detailed household final consumption expenditure, quarterly (dollars),* CANSIM (database); AAFC calculations.

F.5 Statistics Canada. *Table 203-0022 - Survey of household spending (SHS), household spending, Canada, regions and provinces, by household income quintile, annual (dollars),* CANSIM (database); AAFC calculations.

F.6 OECD, OECD.Stat (database).

F.7 Statistics Canada. *Table 203-0022 - Survey of household spending (SHS), household spending, Canada, regions and provinces, by household income quintile, annual (dollars),* CANSIM (database).

F.8-F.9 Statistics Canada. *Table 326-0021 - Consumer Price Index, annual (2002=100 unless otherwise noted),* CANSIM (database).

F.10-F.11 Statistics Canada. *Table 002-0011 - Food available in Canada, annual (kilograms per person, per year unless otherwise noted),* CANSIM (database); AAFC calculations.

## SECTION G: GOVERNMENT EXPENDITURES AND SUPPORT

G.1-G.4 AAFC, Government Expenditures Database, (2016 Farm Income Databook).

G.5 Farm Income, Financial Conditions and Government Assistance - Databook, Table C.4 (December 2016 update).

G.6 AAFC, Government Expenditures Database, (2016 Farm Income Databook).

G.7 AAFC, Government Expenditures Database, (2016 Farm Income Databook); Statistics Canada. *Table 380-0066 - Price indexes, gross domestic product, quarterly (2007=100 unless otherwise noted),* CANSIM (database); AAFC calculations.

G.8-G.19 OECD, Trade and Agriculture Directorate, Producer and Consumer Support Estimates, OECD Database 1988-2016.