Alberta's Role in the Global Agri-foods Marketplace

Part A: Digging Deeper
Part B: Illustrated in Data

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Alberta's Role in the Global Agri-foods Marketplace

Part A: Digging Deeper

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Table of Contents

Executive Summary 5
Introduction 9
I. Beef: Live Animals and Processed Products 13
Production: Beef 13
Exports: Beef 16
Product Price History: Beef 18
Trends and Changes in the Alberta Beef Sector 20
Summary: Beef 21
II. Canola – Seed and Oil 23
Production: Canola 23
Exports: Canola 24
Product Price History: Canola 27
Trends and Changes in the Alberta Canola Sector 29
Summary: Canola 31
III. Wheat 32
Production: Wheat 32
Exports: Wheat 34
Product Price History: Wheat 35
Trends and Changes in the Alberta Wheat Sector 37
Summary: Wheat 43
IV. Pork: Live Animals and Processed Products 44
Production: Pork 44
Exports: Pork 45
Product Price History: Pork 47
Trends and Changes in the Alberta Pork Sector 48
Summary: Pork 49
V. Pulse Crops 51
Production: Pulse Crops 51
Exports: Pulse Crops 52
Product Price History: Pulse Crops 53
Trends and Changes in the Alberta Pulse Sector 55
Summary: Pulse Crops 58

VI. Processors 60
Agri-Food Processing GDP 64
Summary: Agri-Food Processing 64
Conclusion 66

Table 1: 2019 Farm Cash Receipts for Key Products 10

Figure 1: Historical Beef Herd Size 13
Figure 2: Historical Beef Production - Canada and Alberta 14
Figure 3: Canada Historical Top Markets for Beef Exports 17
Figure 4: Alberta Historical Top Markets for Beef Exports 17
Figure 6: Alberta Historical Farm Cash Receipts from Cattle and Calves 19
Figure 7: Alberta Historical Livestock Prices: Cattle and Calves 20
Figure 8: Canada Historical Production - Canola 23
Figure 9: Alberta Historical Production - Canola 24
Figure 10: Canada Top Markets for Canola Seed Exports 25
Figure 11: Alberta Top Markets for Canola Seed Exports 25
Figure 12: Canada Top Markets for Canola Oil Exports 26
Figure 13: Alberta Top Markets for Canola Oil Exports 27
Figure 14: Alberta Historical Canola Value and Farm Cash Receipts 28
Figure 15: Alberta Historical Canola Prices 28
Figure 16: Canada Historical Crop Yields - Canola 30
Figure 17: Alberta Historical Crop Yields - Canola 30
Figure 18: Canada Historical Production - Wheat 33
Figure 19: Alberta Historical Production - Wheat 33
Figure 20: Canada Top Markets for Wheat Exports 34
Figure 21: Alberta Top Markets for Wheat Exports 35
Figure 22: Alberta Historical Wheat Value and Farm Cash Receipts 36
Figure 23: Alberta Historical Wheat Prices 37
Figure 24: Canada Historical Acres in Major Grain Crops 39
Figure 25: Alberta Historical Acres in Major Grain Crops 39
Figure 26: Canada Historical Percentage of Seeded Area According to Tillage Practice 40
Figure 27: Alberta Historical Percentage of Seeded Area According to Tillage Practice 41
Figure 28: Canada Historical Wheat Crop Yields 42
Figure 29: Alberta Historical Wheat Crop Yields 42
Figure 30: Historical Swine Herd Size, Canada and Alberta 44
Figure 31: Historical Pork Production - Canada and Alberta 45
Figure 32: Canada Historical Top Markets for Pork Exports 46
Figure 33: Alberta Historical Top Markets for Pork Exports 47
Figure 34: Alberta Historical Farm Cash Receipts and Livestock Prices: Hogs 48
Figure 35: Canada Historical Production - Four Pulse Crops 51
Figure 36: Alberta Historical Production - Four Pulse Crops 52
Figure 37: Canada Top Markets for Pulse Exports 52
Figure 38: Alberta Top Markets for Pulse Exports 53
Figure 39: Alberta Historical Farm Cash Receipts - Pulse Crops 54

Figure 40: Alberta Historical Farm Cash Receipts per Tonne - Pulse Crops *54*
Figure 41: Canada Historical Acres in Pulse Crops *55*
Figure 42: Alberta Historical Acres in Pulse Crops *56*
Figure 43: Pulse Exports, Historical and Forecast: Select Countries and Regions *57*
Figure 44: Pulse Imports, Historical and Forecast: Select Countries and Regions *58*
Figure 45: Canada Historical Sales of Manufactured Goods Annual Growth Rate Data *62*
Figure 46: Canada Historical Merchandise Trade Balance: Intermediate Food Products, Manufactured Food and Beverage Products *63*

Executive Summary

At its heart, this paper provides an overview of data regarding Alberta's major agri-food products, including a lookback into the major trends recently observed in the Alberta agriculture industry. Part A of this paper provides a perspective of the current role that Alberta's agri-food industry plays in the global marketplace, and also a view of the potential future of that industry. Part B is a thorough, detailed compendium of data on the subject of Alberta's major agri-foods products including volumes, value, trading partners and competitors.

Canada's agriculture sector has engaged in global exports for over 150 years. Canada's natural endowments and relatively small population have allowed it to produce large agricultural surpluses which have been exported to global markets. This paper studies seven major products from Alberta's agri-food industry, accounting for 72 per cent of Alberta's total agri-food exports in 2019. These products include live cattle, wheat, canola seed, pulse crops (four primary products), and processed beef, pork and canola oil (three processed agri-food products). The paper also touches briefly on agri-food processing in Alberta, as it relates to the processed products noted above. While Alberta is an active participant in Canada's dairy, poultry and other agri-food subsectors, their contribution to GDP is relatively small at this time so the focus here is on only major contributing subsectors.

Alberta's beef industry, including live and processed beef, comprised $5 billion or 33 per cent of the province's farm cash receipts in 2020. The sector has changed significantly over the past thirty years. During this period, a major force of change was the Bovine spongiform encephalopathy (BSE) crisis of 2003. Major consolidation occurred in beef processing, while exports moved from only 12 per cent of total production to over 40 per cent. The average cold dressed weight per head

of cattle increased in that same time by over 30 per cent, demonstrating changes in operating practices over time. In 2020, 74 per cent of Alberta's beef exports were directed to the United States, with much smaller amounts going to a handful of other countries. Canada's main non-U.S. beef market is China and our major competitors, Australia, Brazil and Uruguay, provide much more to that market than does Canada at this time: in 2019, Australia provided 25 per cent, Brazil 21 per cent, and Uruguay 21 per cent while Canada contributed one per cent of China's beef imports.

The domestic growth potential for both the beef and pork sectors is primarily through population growth, with a flat-to-declining per capita demand estimated. Global market growth potential is substantial for both products however, particularly in China and India where a very large growing middle class is slowly increasing its demand for these more expensive protein products.

Canola is a relatively new crop, bred from rapeseed cultivars at the University of Manitoba in the 1970s. In the past thirty years, acres planted in canola have increased substantially, helping to meet global demand for both the grain and oil products. In 2020, canola comprised 22 per cent of Canada's total cropland and 23 per cent of the total in Alberta, with 55 per cent of the crop processed into oil and then 75 per cent of that being exported, along with most of the remaining seed crop. Alberta's canola grain and oil products are prime examples of Canadian technology successfully working with a market demand that is growing rapidly. Alberta's markets for canola oil are very focused, but Alberta also dominates them.

Alberta's wheat sector has declined in acreage in the past thirty years as farmers have gradually diversified into other crops such as canola, but has increased in total volume since the early 2000s with the continued implementation of new technologies and practices such as zero till. Wheat

comprised about 27 per cent of Canada's cropland in 2020, and 29 per cent of cropland in Alberta. Wheat yields have increased by over 50 per cent from 1990 to present, demonstrating increasing efficiencies over time. Alberta's wheat markets are diverse, with no purchaser currently taking more than 11 per cent of the province's total exports and global wheat markets forecast to increase steadily in demand.

Alberta's pulse industry has grown substantially in the past thirty years. Canada is currently the largest producer and exporter of pulses globally, with India as one major market. Future demand for pulse crops is predicted to be strong in SE Asia and African countries as a staple source of proteins.

The pork industry in Canada, and Alberta, currently exports over half its production. Alberta's pork industry contributed $415 million or around three per cent of total farm cash receipts for 2020. The industry has exhibited major consolidation of producers and processors over the last thirty years as well. In 2020, 47 per cent of Alberta's pork exports went to Japan, while 17 per cent to the United States, 12 per cent to South Korea and ten per cent to China markets. Canada's exports make up 62 per cent of pork imports to the U.S., 24 per cent of pork imports entering Japan, and 10 per cent of China's pork imports.

All of Canada's major agri-food products rely heavily on export markets. Some products like wheat and beef have competed in the global market for many years, with various long term trends such as increasing yields and sector consolidation and specialization observed. Other products like canola and pulse crops are more recent additions to the agri-food economy in Canada. All products show vulnerabilities to outside influences such as trade restrictions due to BSE, weather fluctuations and other factors.

However, Alberta has also taken advantage of the restrictions placed on other countries in the global marketplace – for example, China's African Swine Fever (ASF) problem in 2018 had a positive impact on Alberta's pork exports to that country, with Alberta exports increasing by more than a factor of ten times when comparing the period 2010 to 2015, to the post-ASF period 2016 to 2019. Alberta's level of risk exposure depends on market diversity, but also on market penetration: Alberta provides only one per cent of China's beef imports, but it provides 70 per cent of China's canola oil imports, and 96 per cent of its canola seed imports. The province's wheat market is diverse, with the largest destination receiving only 11 percent of total exports. The development of canola in the 1970s provided Canada with a product competitive with palm oil, a major global oil product. Newer products such as pulses will have the added advantages of technical and market learnings and experience from Alberta's other prime products; however, they will also be faced immediately with the additional burden of greenhouse gas (GHG) emissions challenges and will have to meet those high standards.

Introduction

Canada's farm receipts for 2019 totalled $67 billion, while its food and beverage manufacturing sales totalled $122 billion (Statistics Canada 2021a). Canada's exports of farm products, intermediate food products, and food and beverage products were $68 billion in 2019 (Statistics Canada 2021b).

Alberta plays an important role in the global agri-foods marketplace – significant for Alberta's economy. Alberta's 2019 farm receipts were $15 billion, while its food and beverage manufacturing sales reached $16 billion (Alberta Agriculture and Forestry 2020). In 2019 Alberta exported $11.6 billion in agri-food products, representing 10 per cent of the province's total exports and 18 per cent of Canada's total agri-food exports. This figure was comprised of 45 per cent primary agricultural commodities and 55 per cent value-added products (Alberta Agriculture and Forestry 2020). The agri-food industry is Alberta's largest employer, when considering employment from farm to gate, food and beverage manufacturing, wholesale and retail stores, food services and drinking places, employing over a quarter million Albertans in mid-2019 (Statistics Canada 2021c).

This paper considers seven products from Alberta's agri-food industry which in total account for 72 per cent of Alberta's total agri-food exports in 2019 (Statistics Canada 2021d). These products include live cattle, wheat, canola seed, pulse crops (four primary products), and processed beef, pork and canola oil (three processed agri-food products). Between 2011 and 2020, Canada was the world's number one exporter of canola seed, canola oil, and pulses, the second largest exporter of wheat and live cattle, the fifth largest exporter of pork, and the eighth largest exporter of beef

(Statistics Canada 2021d). Of the grain products considered, Canada exported 42 per cent of global canola seed exports, 39 per cent of global canola oil exports, 26 per cent of global exports of pulses and four per cent of global wheat exports; when considering animal products, Canada exported 18 per cent of global exports of live cattle, eight per cent of global pork exports and four per cent of global beef exports (Statistics Canada 2021d).

Looking specifically at Alberta for the period from 2011 to 2020, the province exported 14 per cent of global canola seed exports, nine per cent global canola oil exports, four per cent global wheat exports and three per cent of global pulses exports. Alberta was also a significant animal product exporter, providing eight per cent of global live cattle exports, three percent of global beef exports and one per cent of global pork exports (Statistics Canada 2021d).

This paper explores past and present major trends of these products in the agri-food industry in Alberta. It also considers the future potential for these products from the perspective of producers, processors and consumers, referencing expert opinions and surveys to build this future vision. The products are grouped together as follows, in order of gross farm cash receipts ranking: beef products, including live and processed meat as one category, canola, wheat, pulse crops, and finally pork. A section is also added regarding food processing in Alberta, as it touches upon a number of the products considered. The farm receipts for 2019 are summarized below (Statistics Canada 2020e):

Table 1: 2019 Farm Cash Receipts for Key Products

Product	2019 Farm Cash Receipts, annual x 1,000
CANADA	
Beef	$ 9,603,522

Canola	$	8,612,994
Wheat	$	6,904,045
Pork	$	4,613,301
Pulses	$	2,062,430
ALBERTA		
Beef	$	5,051,485
Canola	$	2,429,654
Wheat	$	2,071,435
Pulses	$	507,198
Pork	$	414,504

Source: Statistics Canada. 2021. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501

The above noted subsectors represent five of the top seven products in Alberta based upon farm cash receipt size, and totalled 68 per cent of total farm cash receipts in 2019 (Statistics Canada 2021e). Dairy, while ranked fourth and providing about 4.3 per cent of the province's total farm cash receipts in 2019, was felt to be fundamentally different so was not included (Statistics Canada 2021e). Since it is managed by the Supply Management system,[1] its markets are wholly domestic with no global growth potential. The other product not considered was the cannabis market: although it ranked fifth in 2019 and provided about 3.5 per cent of Alberta's farm cash receipts for that year, its governing statutes and markets are so new that it too was seen as a

[1] The "Supply Management" system in Canada refers to the federal system set up in the 1960s to address price instability and fluctuations in farmers' incomes. This national system encompasses dairy, chicken and turkey products and eggs, and provides a maximum quota and a set return on investment for farmers, through a series of marketing boards across Canada (Heminthavong 2018).

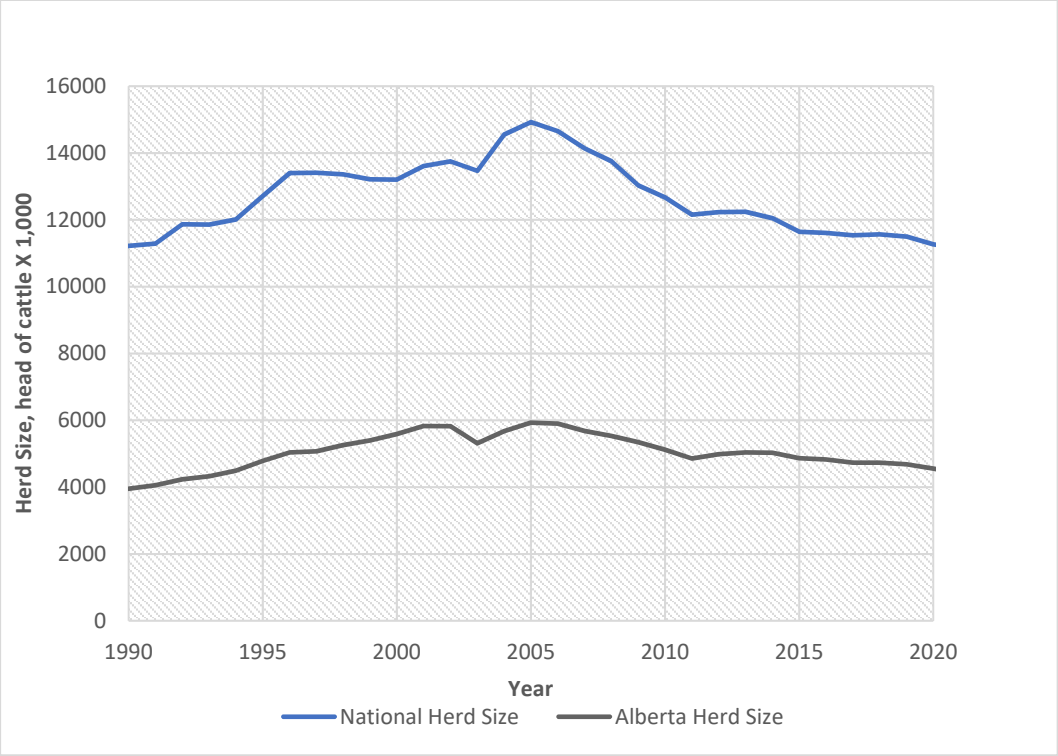
separate product type with unique characteristics, and so was not included here (Statistics Canada 2021e).

I. Beef: Live Animals and Processed Products

Production: Beef

Canada's national beef herd comprised 11.3 million head in 2020, 24 per cent below its peak in 2005. Alberta, which comprises the largest share of the national beef herd at 46 per cent of the national total in 2020, has followed a similar trend in herd size with total head of cattle decreasing from 5.9 million in 2005 to 4.5 million in 2020 (Statistics Canada 2021f). The decline from 2005 onward is noted in the figure below.

Figure 1: Historical Beef Herd Size

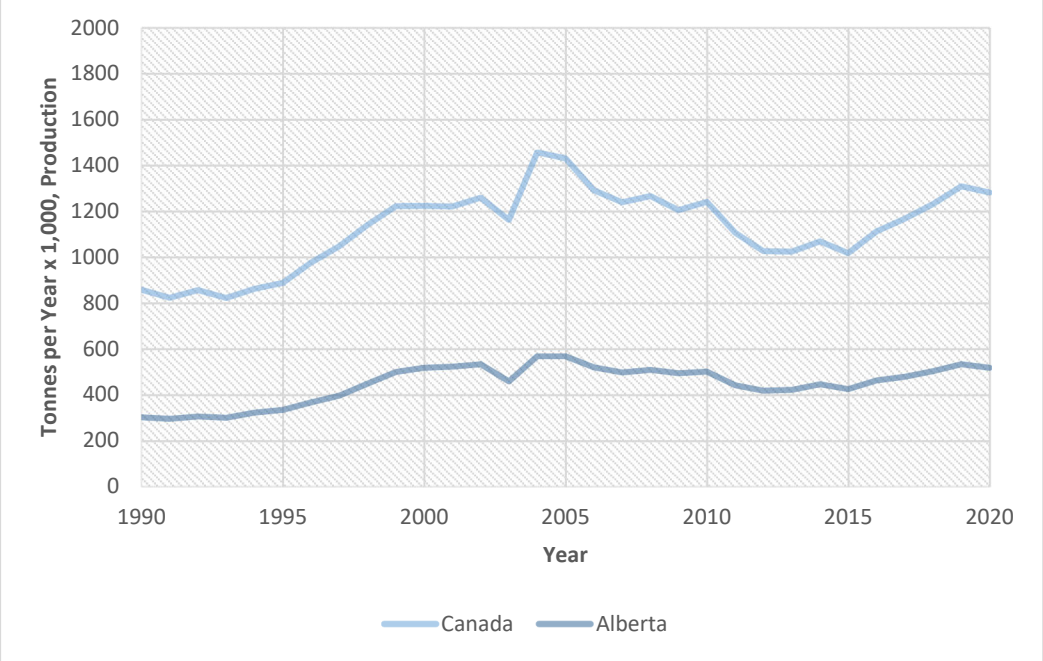


Source: Statistics Canada. Table 32-10-0130-01 Number of cattle, by class and farm type (x 1,000). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210013001

The average number of beef cows per farm in Canada increased from 38 in 1991 to 69 in 2016. The average herd size is greatest and still increasing for Alberta and Saskatchewan (Chen et al 2019). These two provinces hold 62 per cent of Canada's herd, with only 44 per cent of its beef farms (Statistics Canada 2021g).

Canada's total annual beef production peaked in 2004 at 1.46 million tonnes, then fell to 1.0 million tonnes in 2015 before seeing a major recovery to current production levels of approximately 1.3 million tonnes annually. Alberta's beef production trends are similar with a peak of 0.57 million tonnes produced in 2005, falling by 26 per cent to 0.42 million tonnes in 2012 and rebounding to 0.52 million tonnes in 2020 (Statistics Canada 2021f; Statistics Canada 2021h):

Figure 2: Historical Beef Production - Canada and Alberta



Source: Statistics Canada. Table 32-10-0130-01 Number of cattle, by class and farm type (x 1,000). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210013001; Statistics Canada. Table 32-10-0053-01 Supply and disposition of food in Canada (x 1,000). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210005301.

As the numbers in the beef herd varied in the last thirty years, another major trend occurred: an observed overall continued increase in carcass size. The average cold dressed weight in kilograms per slaughtered head of beef increased by 31 per cent from 1990 to 2019 (Statistics Canada 2021i) through a combination of factors including selective breeding, feeding practices and age at slaughter (Terry et al. 2021).

Canada's national herd has its origins in British cattle breeds, primarily Angus, Hereford, Shorthorn and Galloway. Through 1950 to 1980 and later, ranchers introduced many Continental European breeds to improve growth rates, dressing percentage and cutability (CBBC 2021). In addition to continued focus on breeding and genetics, ranchers have also historically optimized animal husbandry practices while considering climate, market prices, and other factors (Sheppard et al. 2015).

The BSE (Bovine spongiform encephalopathy) outbreak in Alberta in 2003 was followed by a 40 per cent reduction in the number of beef farms in Canada between 2006 and 2011. Many beef farms exited industry or consolidated due to market impacts and downward price pressures during that period (Chen et al 2019). Consolidation was seen prior to this as well: the number of farms in Canada fell from over 700 thousand in 1941 to less than 200 thousand in 2016 (Statistics Canada 2021j).

In considering the large-scale changes historically seen in Canadian farm and ranch practices, recent surveys also predict future changes; Canadian farmers surveyed feel that in addition to practical skills, crop science and animal care, the top skills and knowledge required in the sector today include the areas of business management, sales, marketing and communications (Martin 2017). The survey noted that both web-based marketing tools and the increase in popularity of

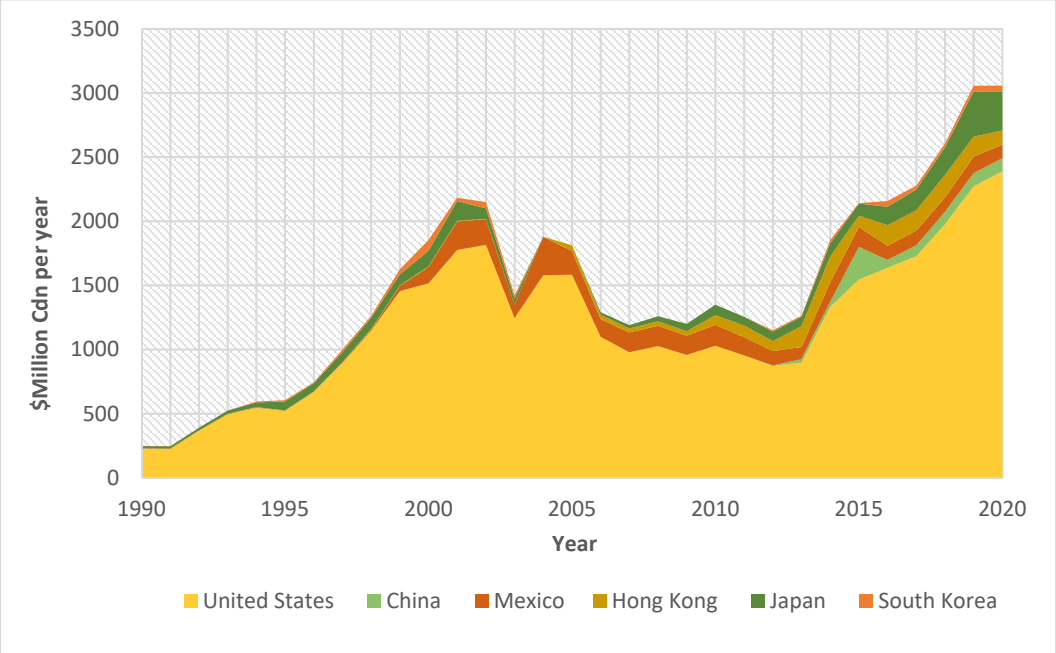
farmer's markets and other direct farm marketing have made farming easier in Canada. Current trends noted as having the biggest impact in the future included changes in consumer tastes such as demand for local and/or organic, among other points. Canadian farmers see value in shortening the supply chain and connecting the farmer directly to the consumer (Martin 2017). Canadian beef ranchers see economic benefits as a key driver to accepting new production ideas, and their preferred sources of new technical information include their own experience, farm print media, newspapers or magazines, producer organizations, producer meetings and demonstrations and field days (Sheppard et al 2015).

Exports: Beef

From 1990 to 2020, the percentage of production exported increased to a peak of 49 per cent, falling to a range of around 40 per cent by 2004 and remaining relatively flat to 2020 (Statistics Canada 2021f; Statistics Canada 2021h). An average of 19 per cent of Canada's beef cattle production was exported as live cattle in the past twenty years, with virtually all destined for the United States (Statistics Canada 2021i; Statistics Canada 2021d). The majority of Canada's beef production is thus exported as processed beef products.

Alberta is the largest beef exporter in Canada, contributing about 76 per cent of the national total (Statistics Canada 2021d). Canada's biggest market is the United States with 74 per cent of Alberta's exports going there in 2020, but more diversity has been introduced into the market in the past 15 years, mainly from additional SE Asia markets. The impact from the BSE crisis is clearly seen from 2006 through 2012 (Statistics Canada 2021d):

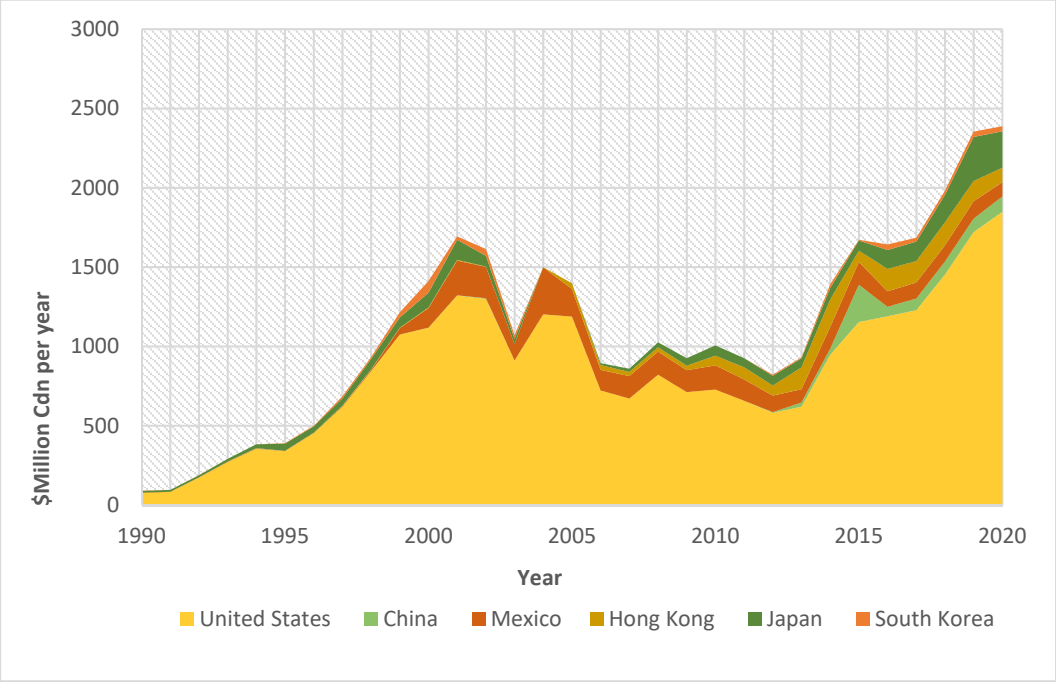
Figure 3: Canada Historical Top Markets for Beef Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan . Note: Beef includes the HS Codes from 20110 to 20629.

Alberta shows the same dependence on United States markets:

Figure 4: Alberta Historical Top Markets for Beef Exports



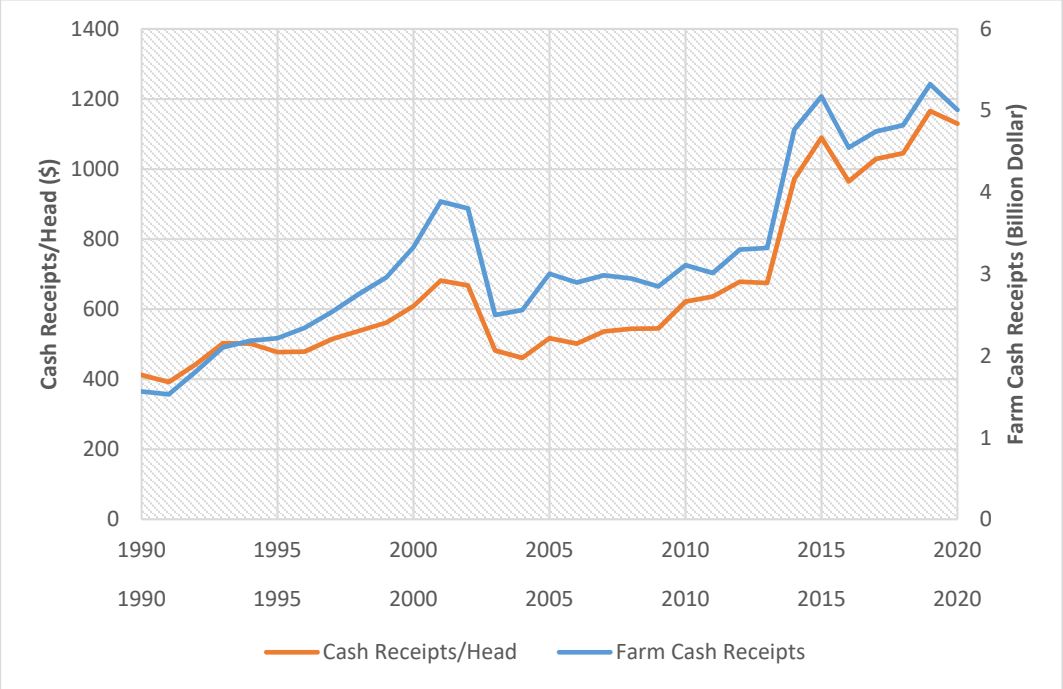
Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan . Note: Beef includes the HS Codes from 20110 to 20629.

Canada's largest export markets for beef include the United States, Mexico, Hong Kong and China. Alberta's beef exports to China and Hong Kong from 2011 to 2020 averaged about 12 per cent of the province's total beef exports, up from 2 per cent in the previous decade (Statistics Canada 2021d). Canada's beef exports to China and Hong Kong comprised 1 per cent of their total beef imports in 2019 (Statistics Canada 2021d). In contrast, Brazil, Argentina and Uruguay supplied 60 per cent of China's beef imports for the same period, and Australia and New Zealand provided 35 per cent.

Product Price History: Beef

Farm cash receipts from cattle and calves is the largest source of farm cash receipts within the province (Statistics Canada 2021e). From 1990 to 2020 receipts increased from $1.6 to $5.0 billion (all figures are 2012 chained dollars unless otherwise noted). While the general trend has been upwards over the entire period, the BSE outbreak led to a significant shock and slow recovery in cash receipts. Between 2002 and 2003 Alberta receipts fell from $3.8 to $2.5 billion a level which was not reached again until 2014 (Statistics Canada 2021e). See the graph below for the trend in Alberta farm cash receipts from cattle and calves (Statistics Canada 2021n; Statistics Canada 2021f):

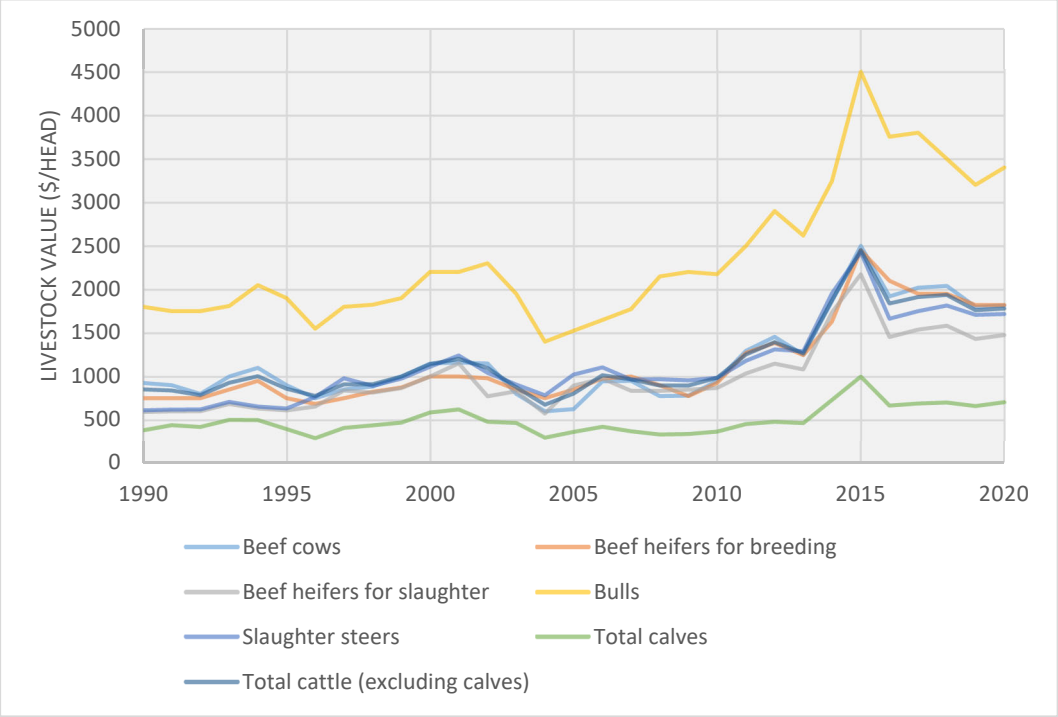
Figure 5: Alberta Historical Farm Cash Receipts from Cattle and Calves



Source: Statistics Canada. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501., Statistics Canada. "Table 32-10-0130-01 Number of Cattle, by Class and Farm Type (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210013001

The average value per head of cattle (excluding calves) has increased from $852 in 1990 to $1,780 in 2020 (Statistics Canada 2021e; Statistics Canada 2021f). The value remained relatively consistent through the 1990's and 2000's with an average value per head during that period of $924. From 2010 to 2015 the value of a head of cattle increased from $985 to $2,452 and has since decreased. The effects of the BSE outbreak are evident with the average value per head falling from $1,097 in 2002 to $676 by 2004s. The values for specific cattle subcategories can be seen in the following figure (Statistics Canada 2021k):

Figure 6: Alberta Historical Livestock Prices: Cattle and Calves



Source: Statistics Canada. "Table 32-10-0124-01 Value Per Head of Livestock at July 1." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210012401.

Trends and Changes in the Alberta Beef Sector

Currently, three large facilities account for 85 per cent of Canada's beef processing capacity; two are located in Alberta and provide 70 percent of the national capacity (Patrice and Lamboni 2020; Alberta Cattle Feeders 2021). Many forces led to this concentration of processing capacity, including the introduction of boxed beef in the mid-twentieth century which moved meat cutting operations back to the plant and away from retailers. After the BSE crisis in 2003, the beef processing industry saw domestic processing capacity diversify to include a number of small and medium processing facilities (Carlberg and Brewin 2005). Most of these facilities failed, and in response to COVID-19 impacts on the meat processing supply chain, processing capacity diversification with more small and medium-sized processing facilities is once again being considered (Rude 2020).

A 2012 consumer survey revealed 44 per cent of Canadians surveyed were eating less beef in 2012 compared to five years earlier, and 32 per cent of Canadians were eating less pork. In the same survey, 31 per cent surveyed estimated they would eat less beef five years into the future, and 23 per cent estimate they would eat less pork (ALMA 2012). The survey was correct: Canadians' beef consumption per capita continued to fall, for a total drop of 30 per cent from 1990 to 2020. With this decline, Canada's domestic consumption fell 3.7 per cent from 2008 to 2018 and is predicted to remain relatively flat, incorporating a modest per capita decrease of one per cent per year in the next decade (OECD 2020).

OECD countries like Canada are predicted to see a relatively flat beef demand over the next decade, while developing nations will be increasing both population and per capita demand over that period (OECD 2020). In the decade from 2011 to 2020, China and Hong Kong's total demand for beef increased by 25 per cent, and is forecast to increase by another 9 percent by 2028 (OECD 2020). The world consumption of beef increased 20 per cent from 2008 to 2018, and is forecast to increase an additional 10 per cent to 2028 (OECD 2020).

Summary: Beef

Alberta's beef industry was severely impacted by the BSE crisis in 2003, resulting in accelerated consolidation and a shrinking of the national provincial herd. While the provincial herd size has continued to shrink since 2005, the value of exports has grown considerably since 2012 and has surpassed previous highs. If production is to grow, Alberta's beef producers must tailor it production for a more international market. Domestically, beef demand is not projected to grow; in both Canada and the U.S., high but decreasing per capita consumption is offsetting increased demand from population growth, resulting in flat demand. China and Hong Kong markets provide significant opportunities for increased trade given their current share of imports, size of the market,

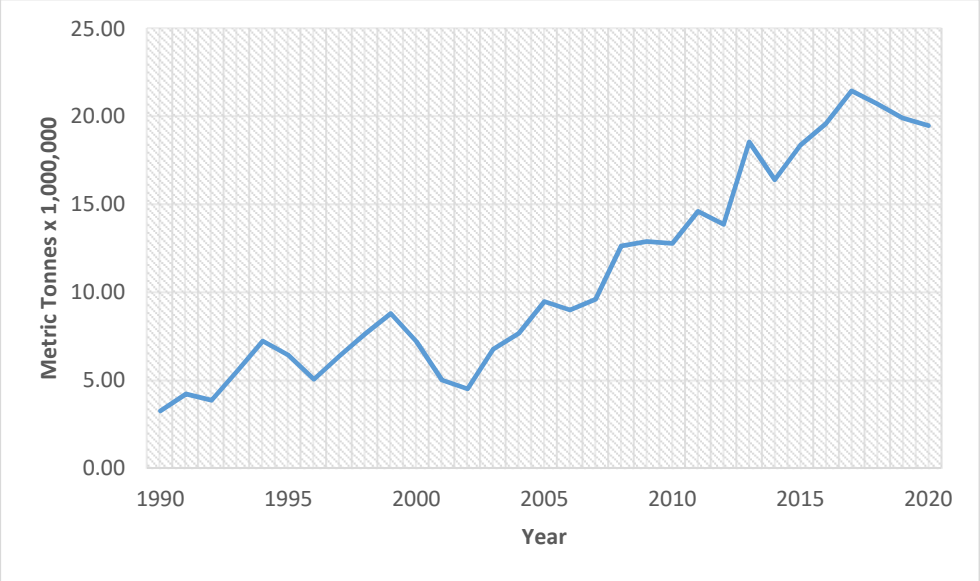
and growing demand for animal protein; however, Canada will have to become more competitive in price to gain market share.

II. Canola – Seed and Oil

Production: Canola

Canada's acres in canola have almost matched those of wheat as the country's biggest crop by acreage (Statistics Canada 2021l). Canola is a high-oil seed which is used to produce vegetable oil, with more than half the crop sent to domestic processing facilities in 2020; 76 per cent of the of the produced oil was exported in 2020, as was much of the seed for processing elsewhere (Canola Council of Canada 2021). The historical production of canola seed is illustrated below (Statistics Canada 2021l):

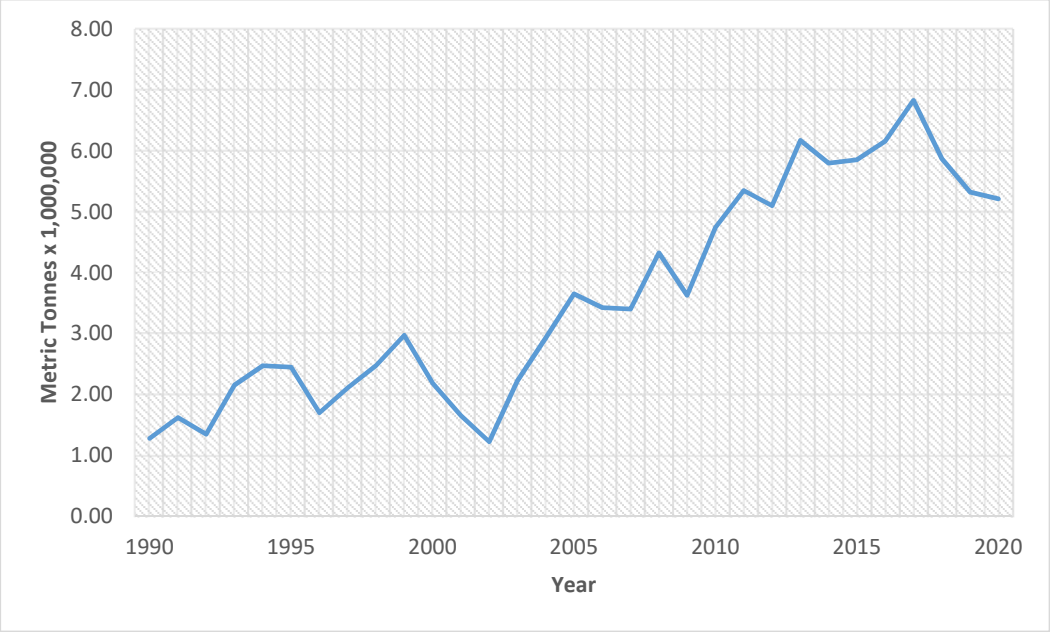
Figure 7: Canada Historical Production - Canola



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Alberta produced 27 per cent of Canada's canola production in 2020 (Statistics Canada 2021l):

Figure 8: Alberta Historical Production - Canola



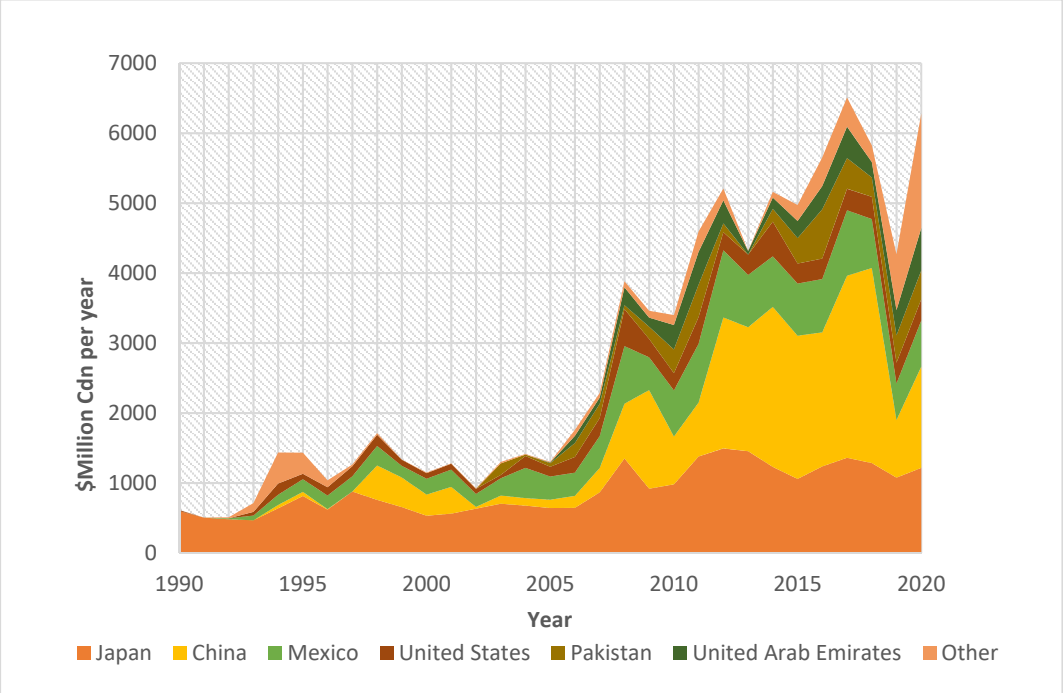
Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

In the early 1990s about 35 per cent of the canola crop in Canada was processed to make oil and meal, and this has increased to almost half the crop in 2019 (Statistics Canada 2021m).

Exports: Canola

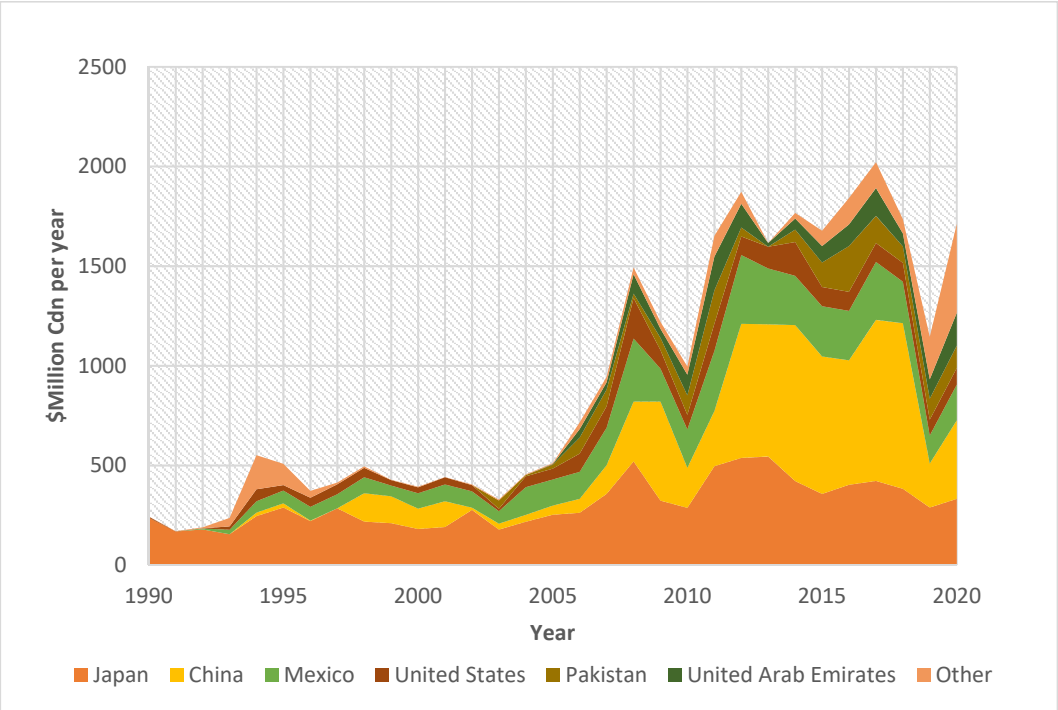
Canada's canola markets are currently concentrated in a handful of countries. Below are top export markets for canola seed for Canada and Alberta (Statistics Canada 2021d):

Figure 9: Canada Top Markets for Canola Seed Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan .

Figure 10: Alberta Top Markets for Canola Seed Exports

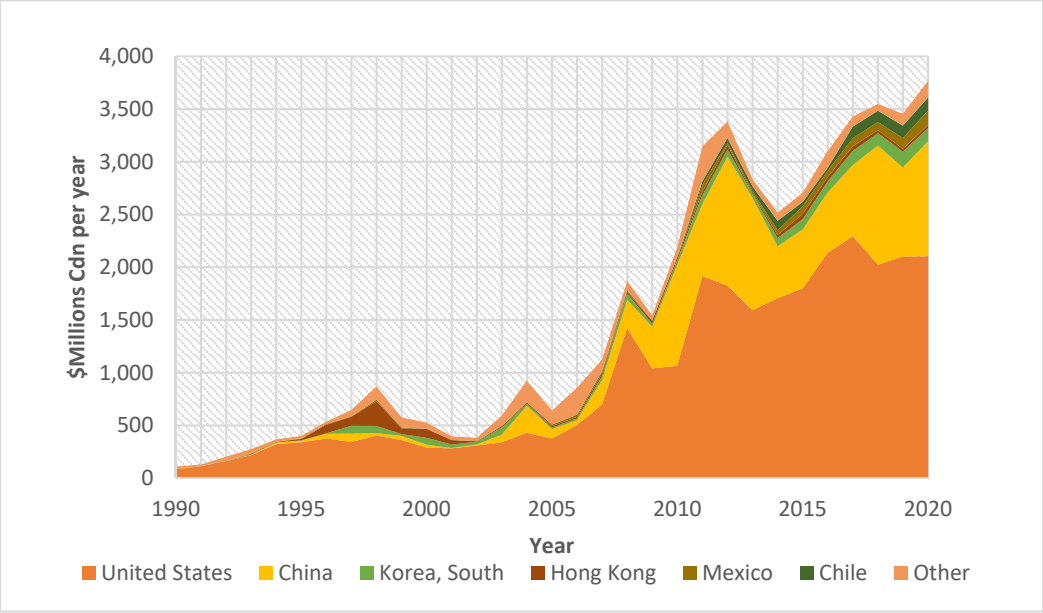


Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan .

Japan, China and Mexico dominate Alberta's canola seed market, seeing rapid increases in imports since 1990. Canada provided 96 per cent of Japan's imports, 89 per cent of China's imports, and 98 per cent of Mexico's canola seed imports for the last ten years (Statistics Canada 2021d).

Similar to its canola seed markets, canola oil markets for Canada are very focused (Statistics Canada 2021d):

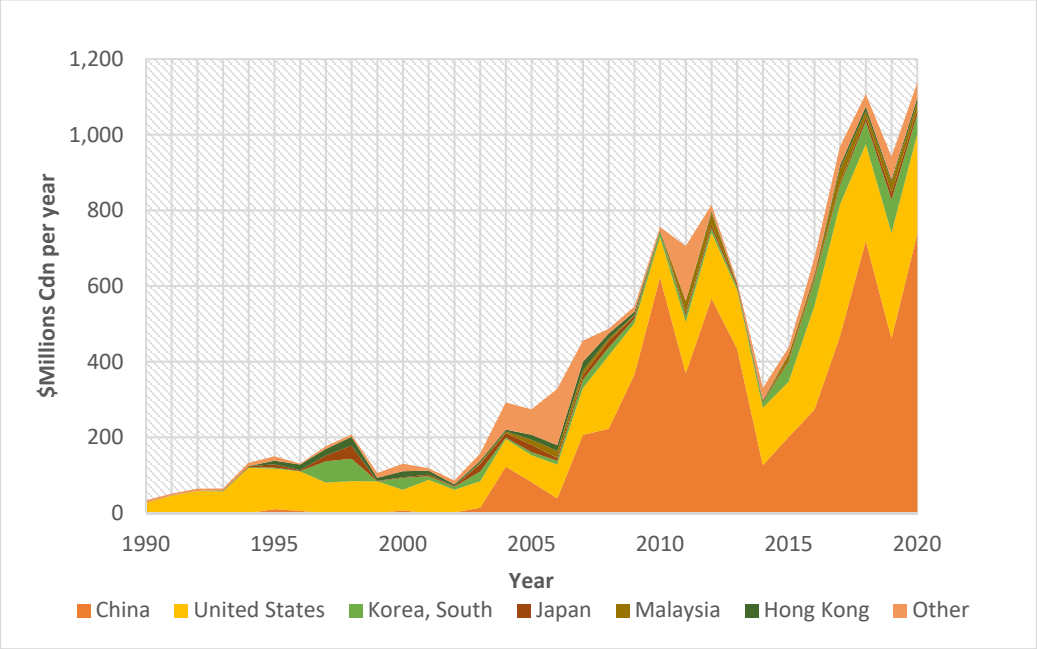
Figure 11: Canada Top Markets for Canola Oil Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan .

Alberta's canola oil markets show a similar concentration (Statistics Canada 2021d):

Figure 12: Alberta Top Markets for Canola Oil Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan .

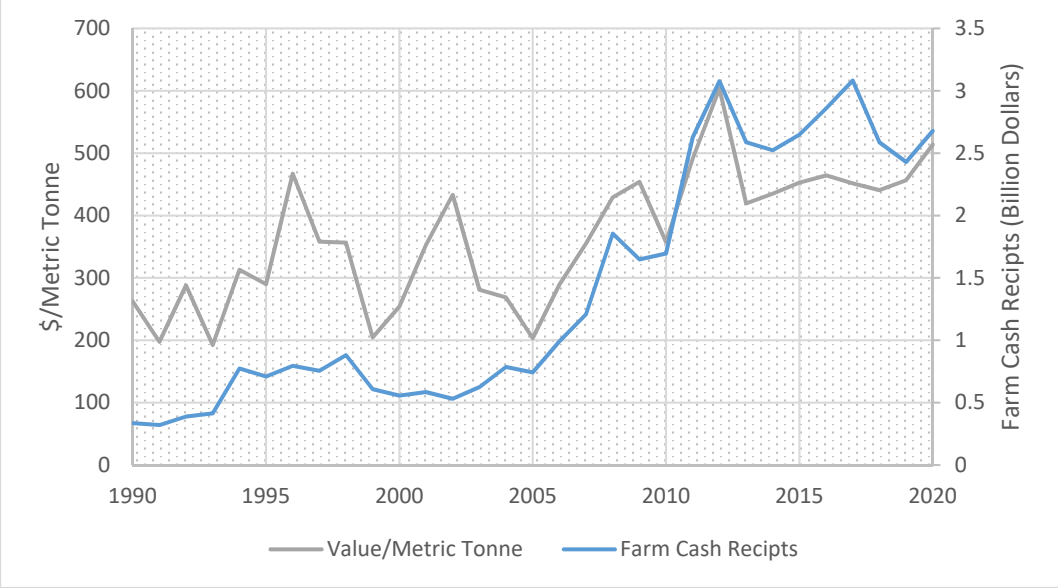
Canada is virtually the United States' sole source for canola oil with 98 per cent of its product coming from Canada in the past ten years. Similarly, Canada provides 70 per cent of China's canola oil imports (Statistics Canada 2021d).

Product Price History: Canola

Canola has surpassed wheat as the largest source of farm cash receipts in crop production from 1990 to 2020, with the value of receipts increasing from $336 million to $2.7 billion in that period (Statistics Canada 2021e). The total value of farm cash receipts has fallen since 2017 when it reached its peak at $3.1 billion. Similar to wheat, the growth in farm cash receipts primarily occurred after 2005 and has seen large swings in amounts due to weather impacts (Hemmes et al. 2014; CBC News 2004). From 2005 to 2012 receipts grew by $2.3 billion to $3.1 billion (Statistics Canada 2021e). In relative terms, growth has not been as pronounced: the value per metric tonne

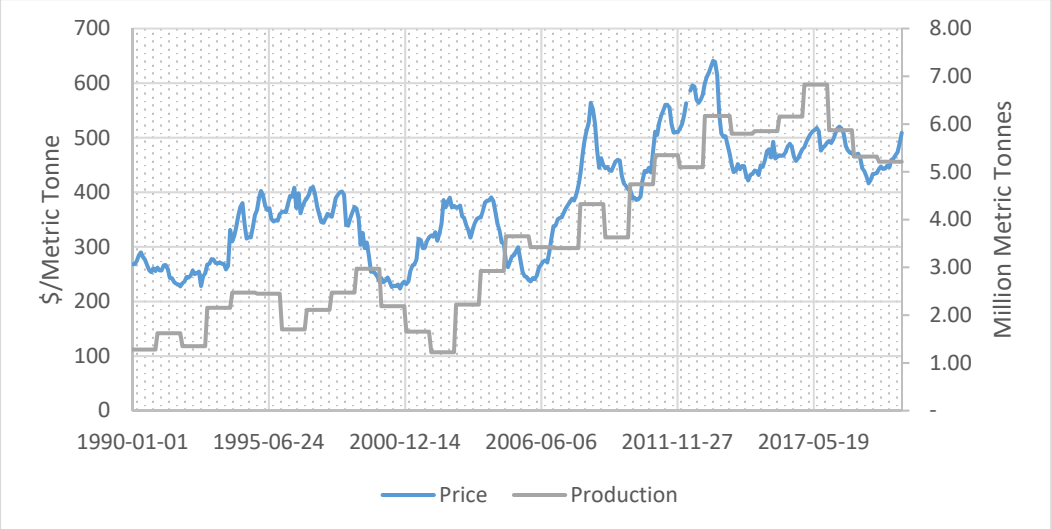
increased from $262 in 1990 to $513 in 2020 with large fluctuations in the relative value occurring in 1996, 2002, 2009, and 2012 (Statistics Canada 2021e; Statistics Canada 2021l):

Figure 13: Alberta Historical Canola Value and Farm Cash Receipts



Source: Statistics Canada. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501, Statistics Canada. "Table 32-10-0359-01 Estimated Areas, Yield, Production, Average Farm Price and Total Farm Value of Principal Field Crops, in Metric and Imperial Units." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901.

Figure 14: Alberta Historical Canola Prices



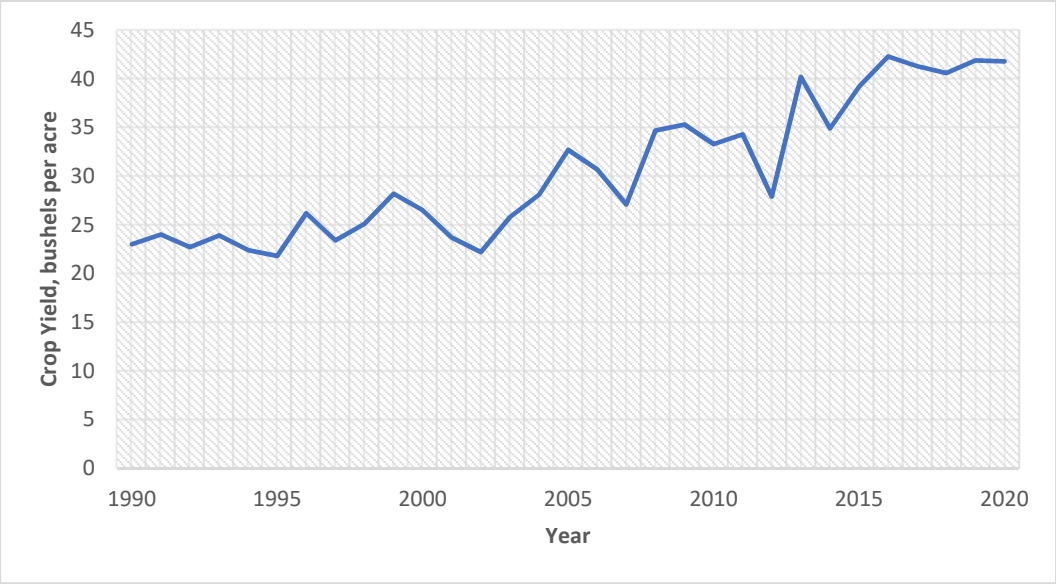
Source: Statistics Canada. "Table 32-10-0077-01 Farm Product Prices, Crops and Livestock." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210007701, Statistics Canada. "Table 32-10-0359-01 Estimated Areas, Yield, Production, Average Farm Price and Total Farm Value of Principal Field Crops, in Metric and Imperial Units." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901.

Trends and Changes in the Alberta Canola Sector

Canola was developed in the lab through conventional breeding processes in the 1970s. A team including representatives from the University of Saskatchewan, University of Manitoba, Agricultural and Agri-Food Canada and the Prairie Regional Laboratory of the National Research Council (NRC) developed a seed that was low in erucic acid and glucosinolates, both fatty acids detrimental to cardiovascular health, through a rapeseed research and breeding program (McInnis 2004). It has since become a major competitor of palm oil, another global source of food oil (Dimmell 2021). Current Canada canola oil production was 4.5 million tonnes in 2020 (Statistics Canada 2021m).The canola industry is a clear example of coordinated federal-provincial technical leadership, followed by successful marketing to large global markets (Casseus 2009, McInnis 2004).

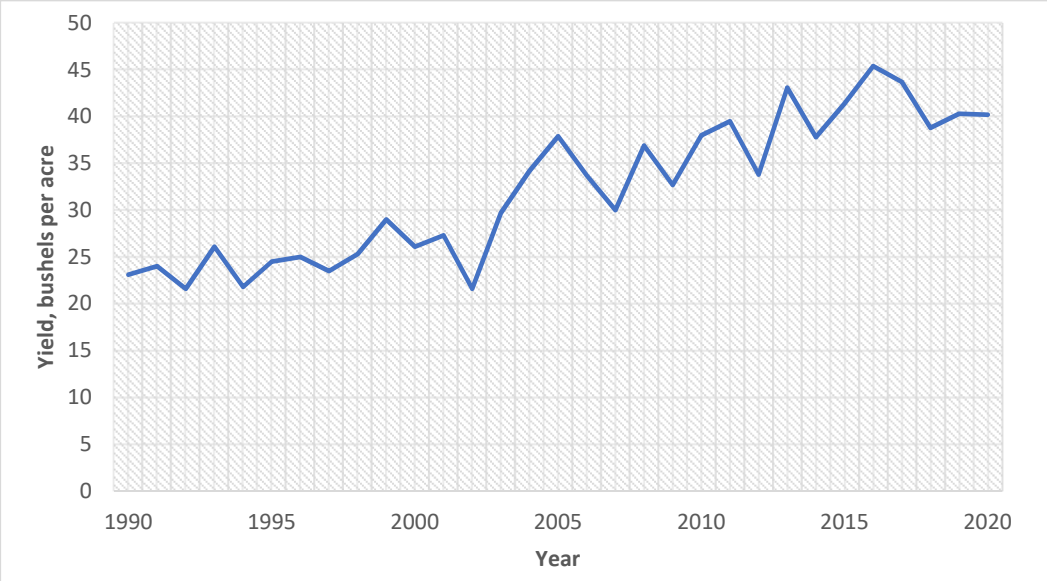
While canola- dedicated acreage increased by a factor of two to three in the past thirty years, yields almost doubled, resulting in a major impact on canola production from Canadian farms. Canada's historical canola yields are noted below (Statistics Canada 2021l):

Figure 15: Canada Historical Crop Yields - Canola



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Figure 16: Alberta Historical Crop Yields - Canola



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Summary: Canola

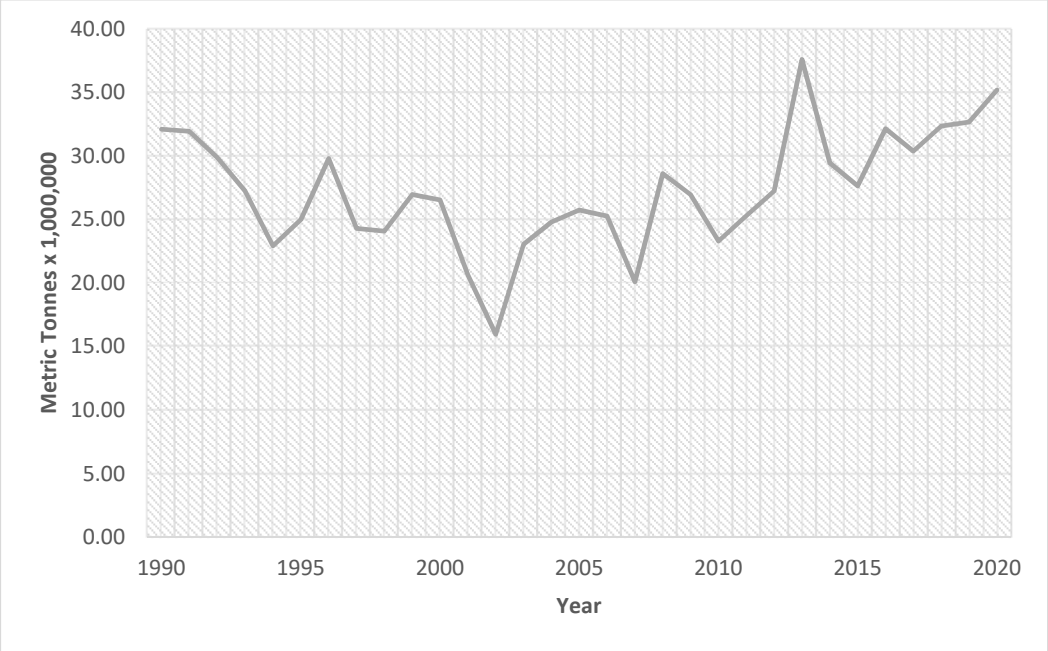
In summary, Alberta's canola production began with a strong research and development step in the 1970s, and production has seen significant entry into the global market in the past thirty years. Canada has achieved strong market growth to date and earned a significant place at the table for food oil production, and it is forecast that the next phase in growth for the canola oil sector will be related to biofuels (Dimmell 2021).

III. Wheat

Production: Wheat

Wheat production in Canada saw major changes in the past thirty years. Canada's wheat industry is characterized by large fluctuations in production mainly due to variations in weather; consider the record poor crop of 2002 and the major boom crop seen in 2013-14 (Hemmes et al. 2014). In addition, overall trends due to other factors are noted: at the national level production decreased from 32.1 Mt in 1990 to 15.9 Mt in 2002, and has since fully recovered and grown to over 35 Mt in 2020 (Statistics Canada 2021l). Within Alberta production has generally increased, growing from 7.0 Mt in 1990 to 11.4 Mt in 2020. Large production decreases were observed in 2001 and 2002 which correspond with production decreases at the national level. Alberta has also grown as a share of total production and has increased from 21.8 per cent in 1990 to 32.4 per cent in 2020 (Statistics Canada 2021l). Wheat production in Canada is illustrated below (Statistics Canada 2021g):

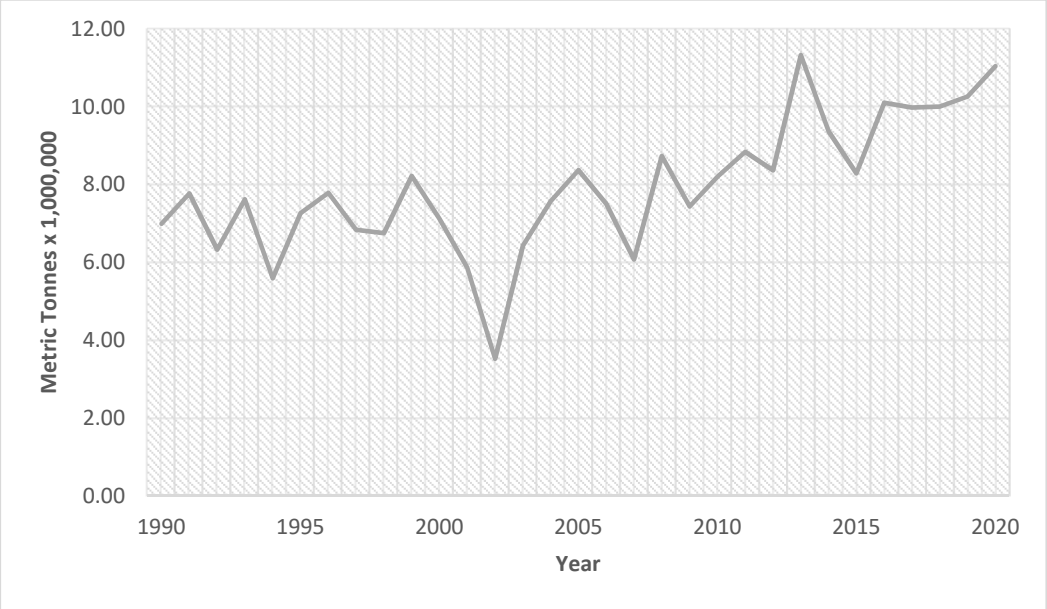
Figure 17: Canada Historical Production - Wheat



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Similar trends are seen in Alberta, but with an overall increase of 58 per cent from 1990 to 2020:

Figure 18: Alberta Historical Production - Wheat



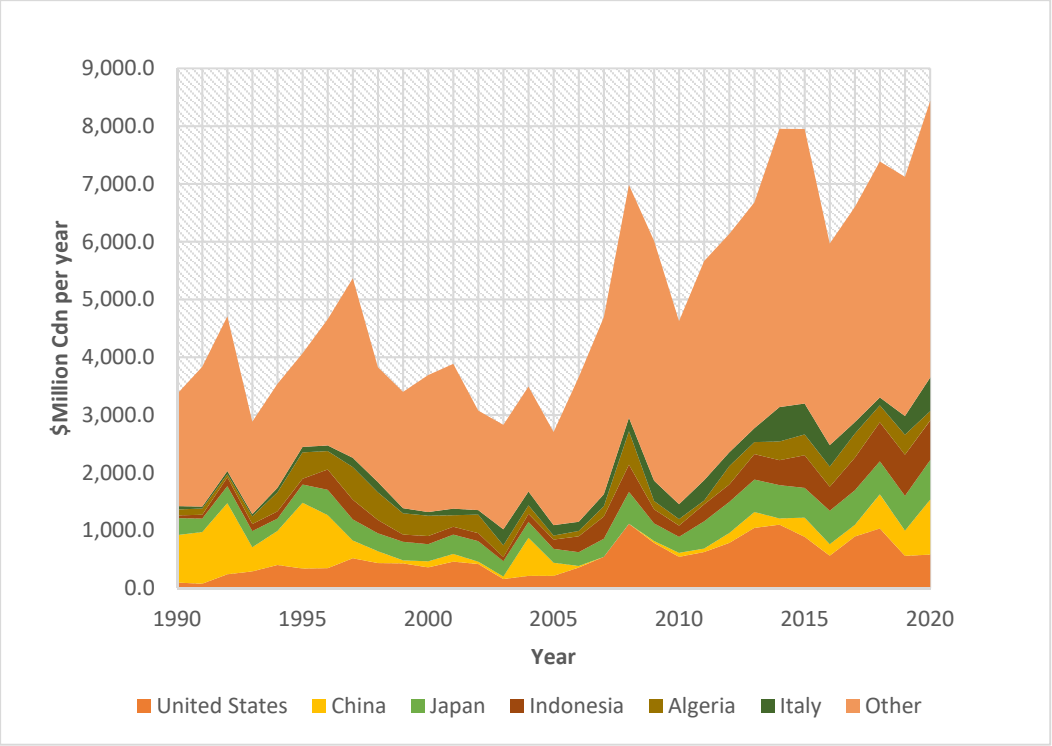
Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Alberta produced 31 per cent of Canada's wheat crop in 2020 (Statistics Canada 2021l). Alberta wheat production exhibits similar major swings year to year as Canada's trends (Statistics Canada 2002).

Exports: Wheat

Canada exports 70 per cent of its wheat production to a number of global markets (Statistics Canada 2019a; Statistics Canada 2021l). Canada's wheat exports have diverse markets, as illustrated below (Statistics Canada 2021d):

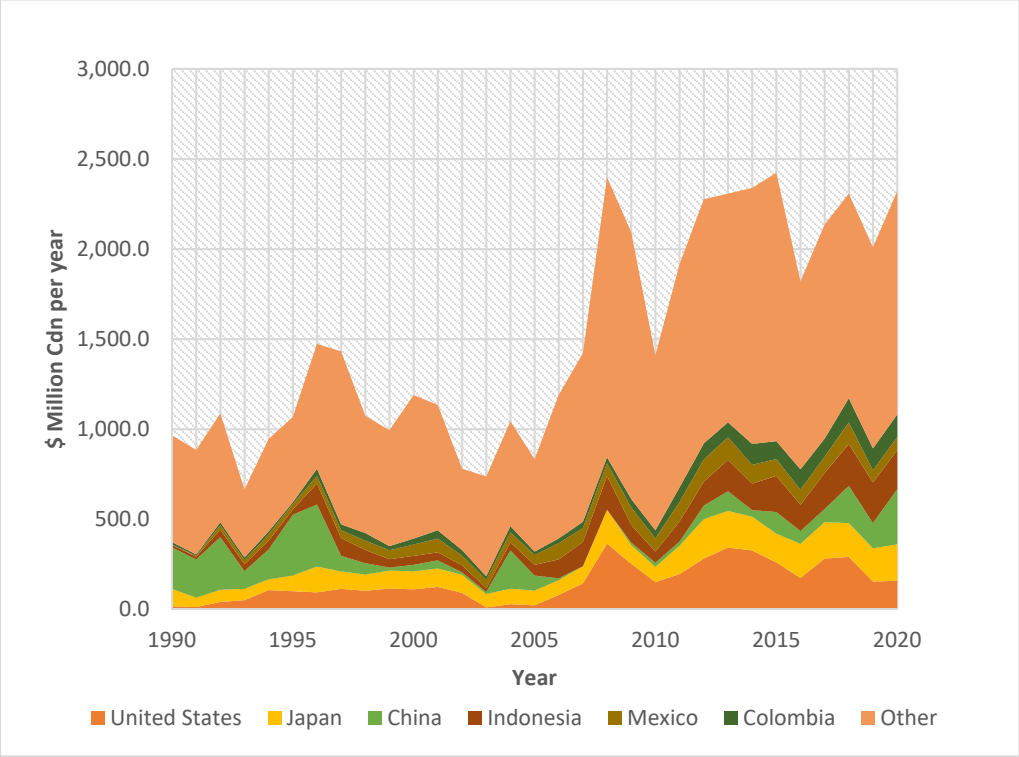
Figure 19: Canada Top Markets for Wheat Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan .

Alberta's wheat product reaches to a similar diversity of markets (Statistics Canada 2021d):

Figure 20: Alberta Top Markets for Wheat Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan .

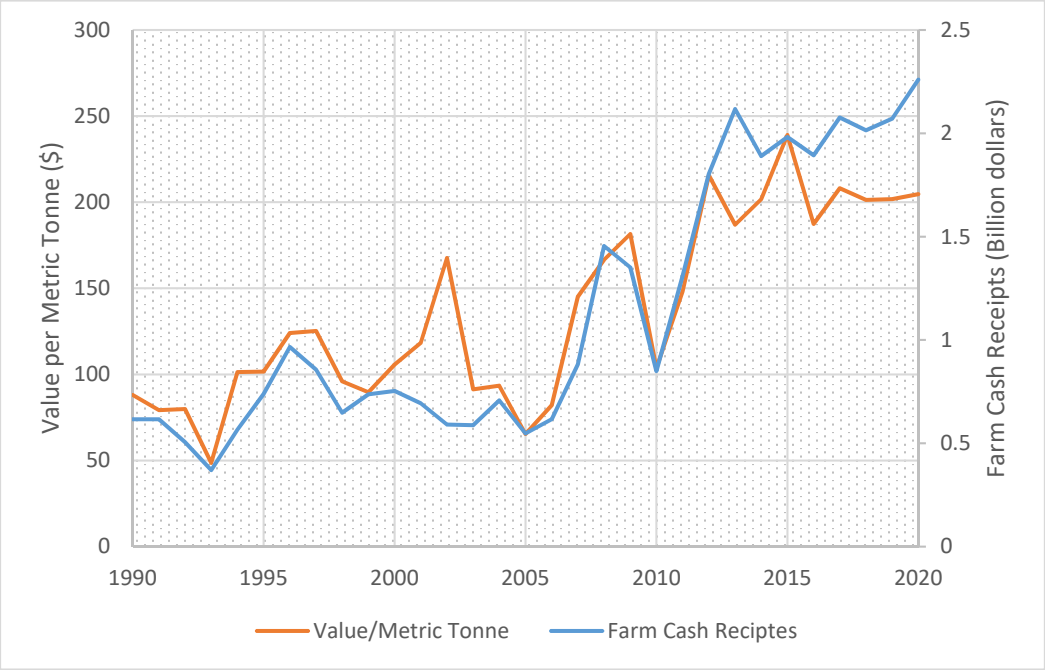
Alberta's largest wheat export market in 2020 was China, which received 11 per cent of Alberta's export volumes, close to the shares of the United States, Japan, and Indonesia.

Product Price History: Wheat

Farm cash receipts for wheat increased from approximately $700 million in 1990 to $2.3 billion in 2020 (Statistics Canada 2021e). Growth in the value of farm cash receipts primarily occurred after 2005 with the value increasing from $547 million to $2.1 billion in 2013. Since 2013 the value has still increased but at a much slower rate increasing only $200 million to 2020 levels (Statistics Canada 2021e). Compared to production, farm cash receipts have experienced similar growth with large gains in relative value after 2005 (Statistics Canada 2021l; Statistics Canada 2021e). Large differences, such as in the case of 2002 indicate decreased production as the value

per metric tonne jumped while there was a fall in total receipts. There has also been noticeable divergence since 2012 as the relative value has been trending slightly downwards while farm cash receipts have continued to increase (Statistics Canada 2021g; Statistics Canada 2021e):

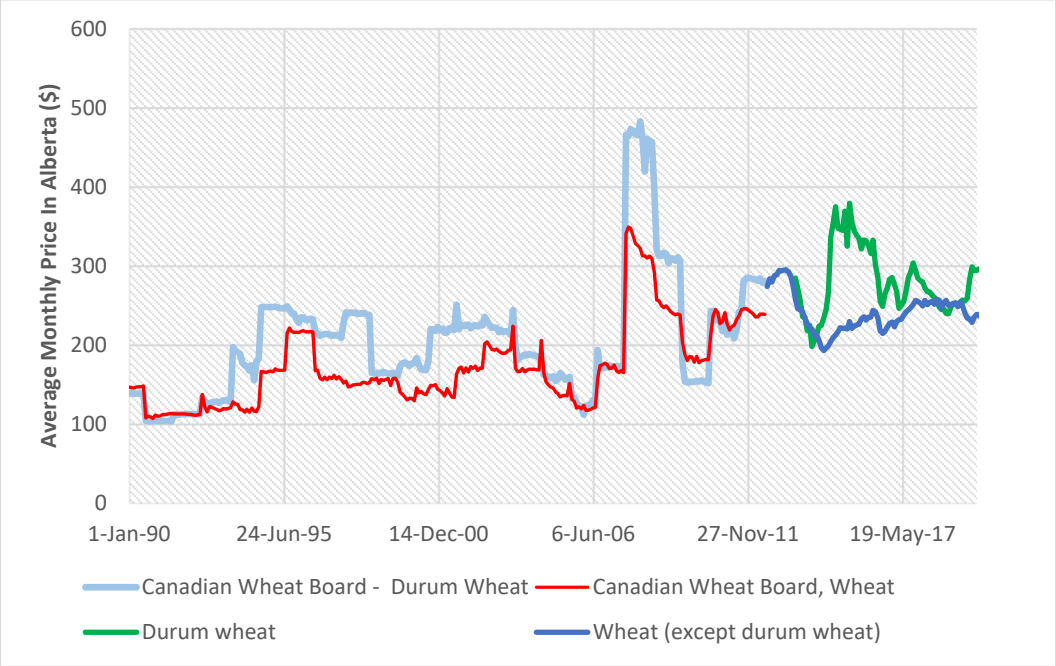
Figure 21: Alberta Historical Wheat Value and Farm Cash Receipts



Source: Statistics Canada. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501, Statistics Canada. "Table 32-10-0359-01 Estimated Areas, Yield, Production, Average Farm Price and Total Farm Value of Principal Field Crops, in Metric and Imperial Units." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901.

The figure below denotes Alberta prices for various types of wheat products (Statistics Canada 2021n):

Figure 22: Alberta Historical Wheat Prices



Source: Statistics Canada. "Table 32-10-0077-01 Farm Product Prices, Crops and Livestock." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210007701.

Trends and Changes in the Alberta Wheat Sector

In the past thirty years, Canada's wheat market has seen a number of upheavals: in the early 1990s the "Crow Rate"[2] system was ended, eliminating the market distortions it brought with it (Doan, Paddock and Dyer 2003). Grain and feed prices fell with the end of the Crow Rate, which stimulated processing and livestock industries by reducing the cost of their inputs.In addition, grain and oilseed milling and canola crush capacity was increased in western Canada following the end

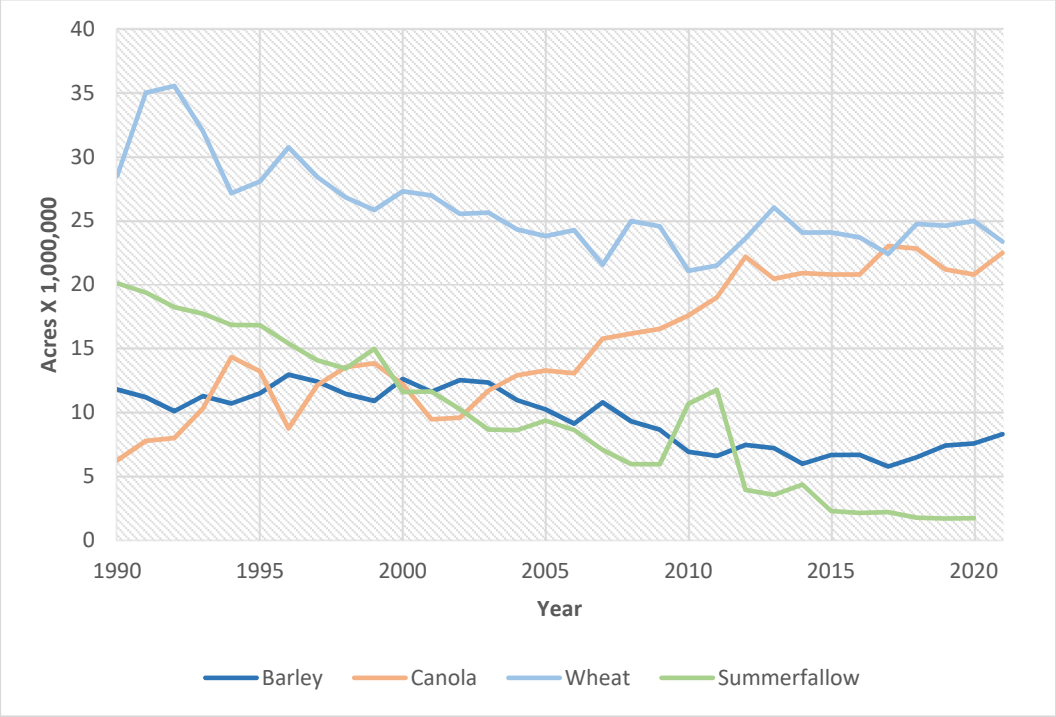
[2] In the late 1890s Canadian prairie settlers were challenged by high freight rates and tariffs on their wheat being shipped to east and west ports. The federal government negotiated an agreement with the Canadian Pacific Railway (CPR) company, setting a maximum for grain and flour moving out of the prairies to eastern ports; this was the 1897 *Crowsnest Pass Agreement*, and its set freight rate was the "Crow Rate" (Larsen 2020). The agreement was later expanded to include the Canadian National Railway (CNR) company, shipments to Pacific coast ports, and deliveries to the port of Churchill, but its set fees endured relatively untouched, until after years of studies and discussion the agreement was terminated in 1993 (Larsen 2020). For almost 100 years, the wheat sector in western Canada was subject to a transportation subsidy while all other products were not.

of the Crow Rate (Doan, Paddock and Dyer 2003). In 2012 the Canadian Wheat Board[3] was disbanded, leading to more independent farmer-led organizations being created in order to help advocate for Alberta grain farmers in the market and in policy formulation (Alberta Wheat Commission 2021).

Over the past thirty years, Canadian farmers have changed their focus on major grain crops. Total area planted in wheat fell by 18 per cent from 1990 to 2021 in Canada, while other crops have taken their place, likely due to increasing demand and attractive rates of return on investment (Government of Manitoba 2021). The changing trends in major grain crops are similar within Alberta. Acres seeded in wheat fell by nine per cent from 1990 to 2021, while barley and rye seeded acres fell 29 and 68 per cent respectively, with other crops taking their place. The amount of cropland left in summerfallow has fallen steadily since 1970. These changes in seeded acreage are illustrated below (Statistics Canada 2021l).

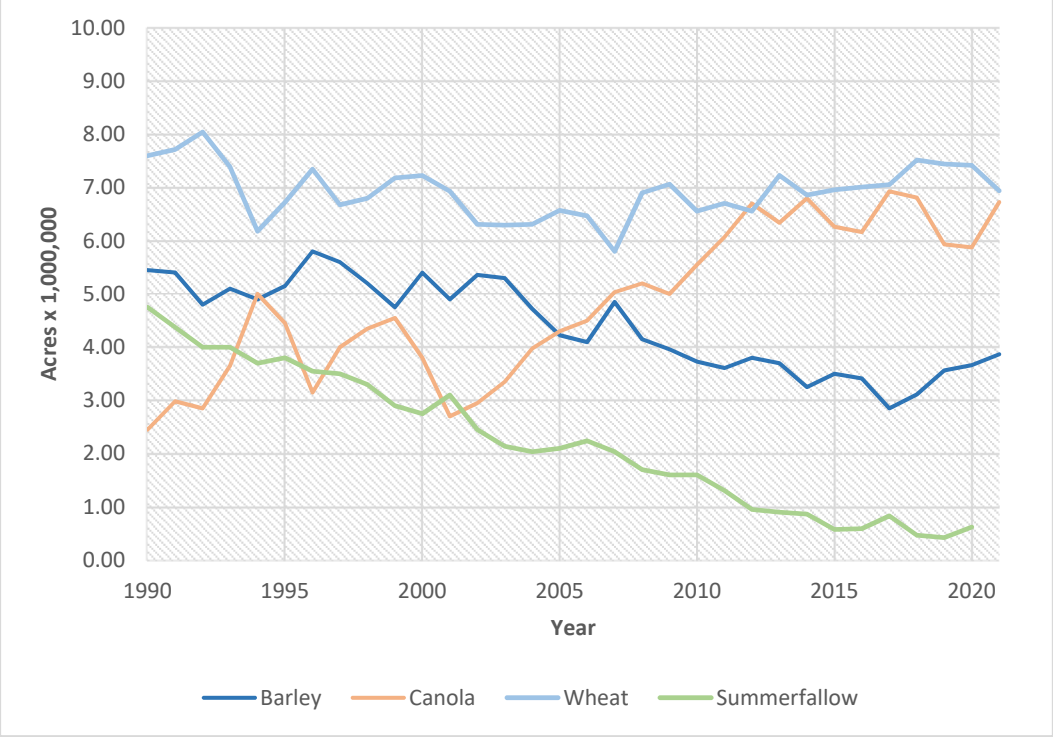
[3] The Canadian Wheat Board was set up in 1935 as a mandatory single sale point for all wheat from western Canada, and remained in place until it was removed in 2012 and replaced with *the Marketing Freedom for Grain Farmers Act* (Larsen 2020).

Figure 23: Canada Historical Acres in Major Grain Crops



Source: Statistics Canada. 2021. *Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units*. Accessed August 17, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

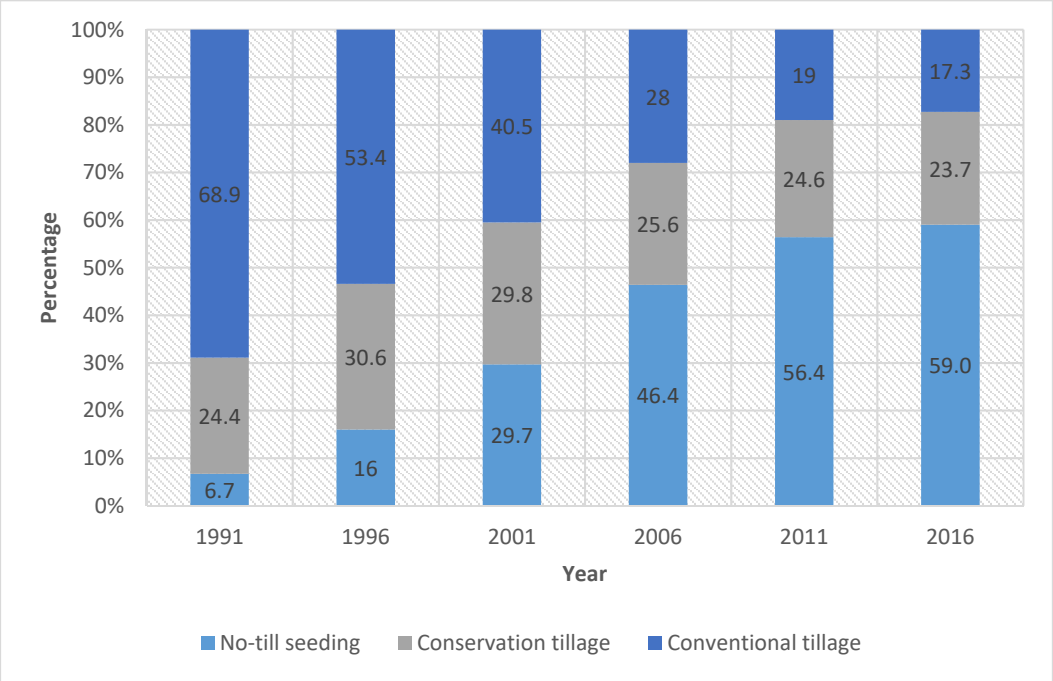
Figure 24: Alberta Historical Acres in Major Grain Crops



Source: Statistics Canada. 2021. *Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units*. Accessed August 17, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

In addition to changes in crop choice over time, Canadian farmers also changed operations practices. Zero till seeding methods have been substantially implemented over the last twenty-five years, as illustrated in the data below (Statistics Canada 2021o):

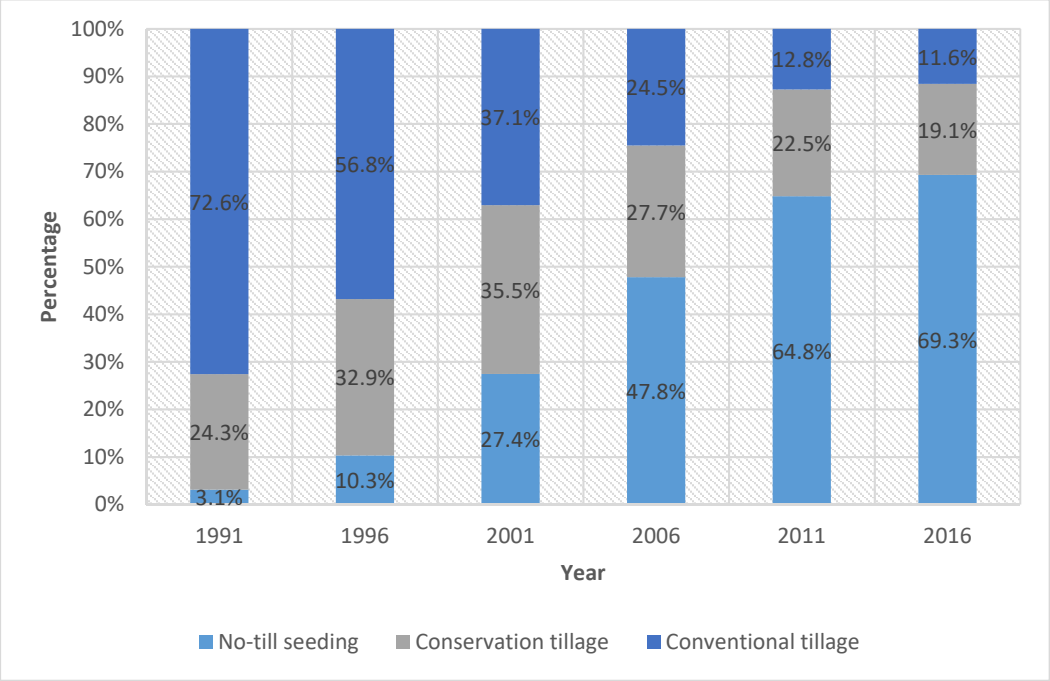
Figure 25: Canada Historical Percentage of Seeded Area According to Tillage Practice



Source: Statistics Canada. 2021. Table 32-10-0162-01 Selected land management practices and tillage practices used to prepare land for seeding, historical data. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210016201

Farmers in Alberta have incorporated zero tillage practice on average faster than the rest of Canada, with 69 per cent of farms using that method in 2016 (Statistics Canada 2021o):

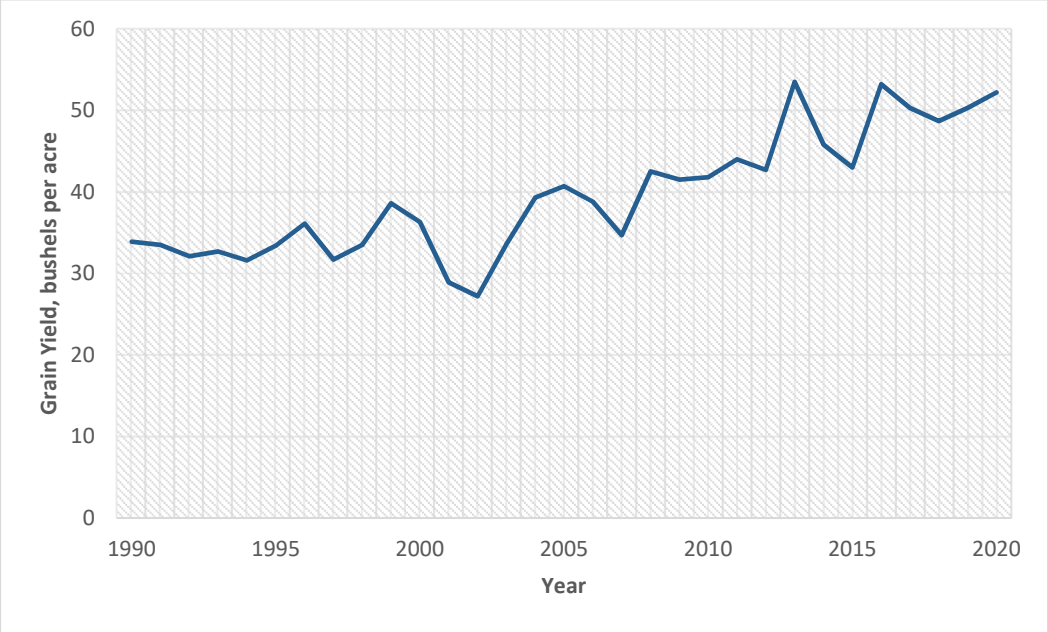
Figure 26: Alberta Historical Percentage of Seeded Area According to Tillage Practice



Source: Statistics Canada. 2021. Table 32-10-0162-01 Selected land management practices and tillage practices used to prepare land for seeding, historical data. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210016201

Crop yields for Canada's wheat have increased substantially in the last thirty years, helping to bolster total production where cultivated acres have been reduced (Statistics Canada 2021l):

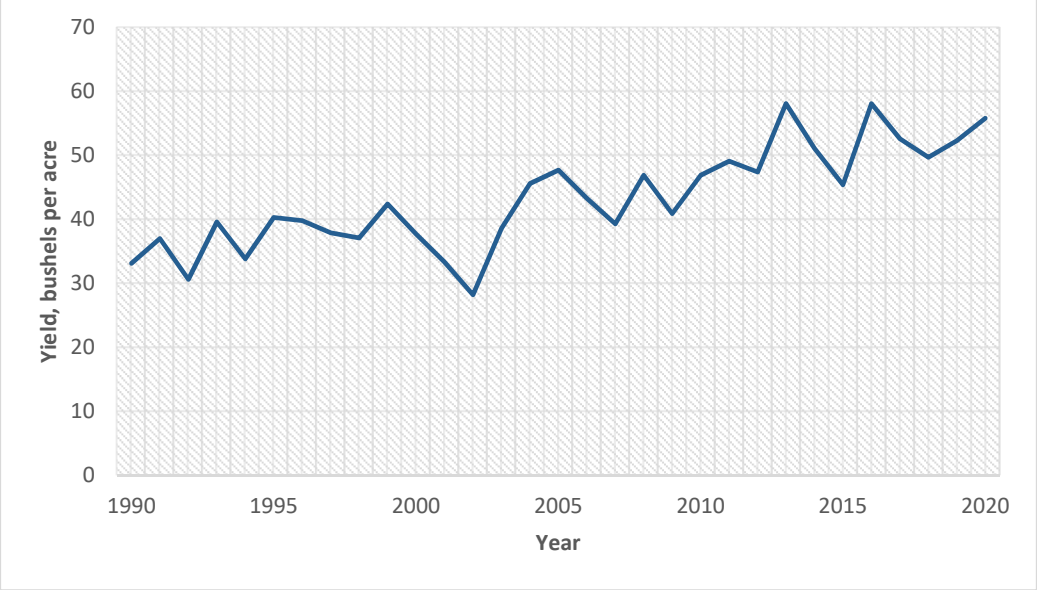
Figure 27: Canada Historical Wheat Crop Yields



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Alberta's crop yields show similar performance (Statistics Canada 2021l):

Figure 28: Alberta Historical Wheat Crop Yields



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Global demand for wheat has increased 88 per cent in the past thirty years, and is predicted to increase an additional 8 per cent for the next decade (OECD 2021).

Summary: Wheat

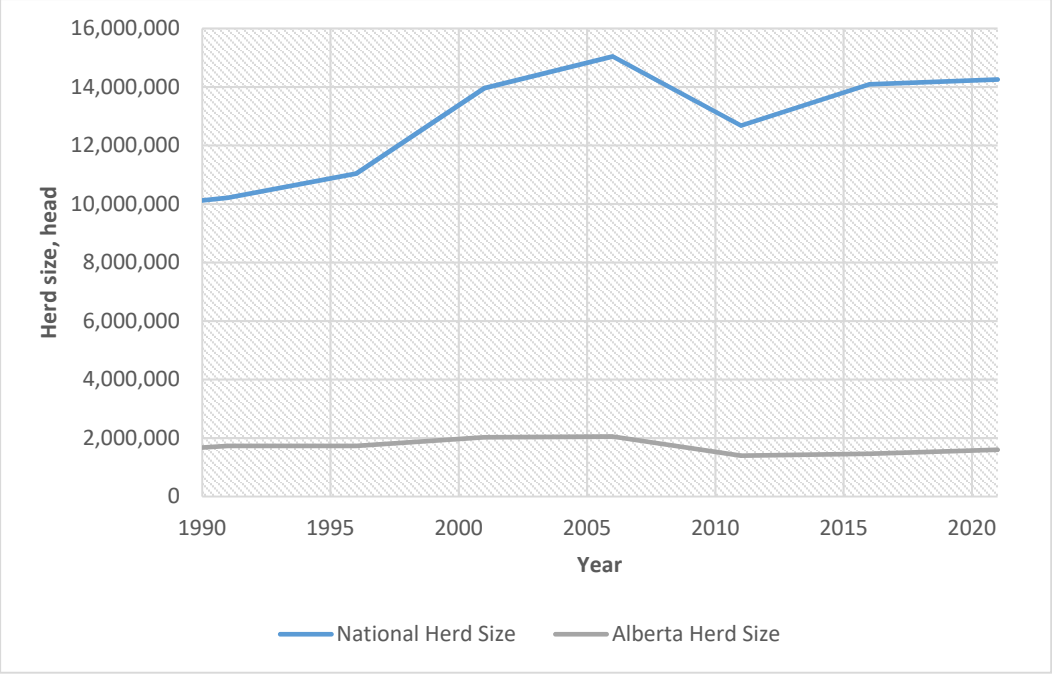
Alberta's wheat production increased rapidly in both volume and yields in the past thirty years. Some changes such as removing the Crow Rate had an impact on the market due to the effect on export price for Canadian wheat (Veeman and Gray 2009). From 1990 to 2020 wheat production within the province has increased by 58%. Increased production within the industry has been a result of increased productivity, with yields within Alberta increasing from 33.1 to 55.8 bushels per acre. With demand for wheat projected to increase over the next decade, Alberta has the ability to increase production to meet that need.

IV. Pork: Live Animals and Processed Products

Production: Pork

Canada's swine herd size increased 38 per cent from 1991 to 2021 (Statistics Canada 2021p; Statistics Canada 2021q). Quebec has 31 per cent of Canada's pork herd, Ontario 26 per cent, and Manitoba has 24 per cent (Statistics Canada 2021q). Alberta is the next largest contributor with 11 per cent of the country's swine herd (Statistics Canada 2021p). In 2016, Canada's herd comprised of 77 per cent grower, finishing and weaner pigs, almost 23 per cent sows, gilts and nursing pigs, and a fraction of a percent of the herd was boars (Statistics Canada 2021r). The national herd underwent many changes in the past thirty years as shown below (Statistics Canada 2021p):

Figure 29: Historical Swine Herd Size, Canada and Alberta

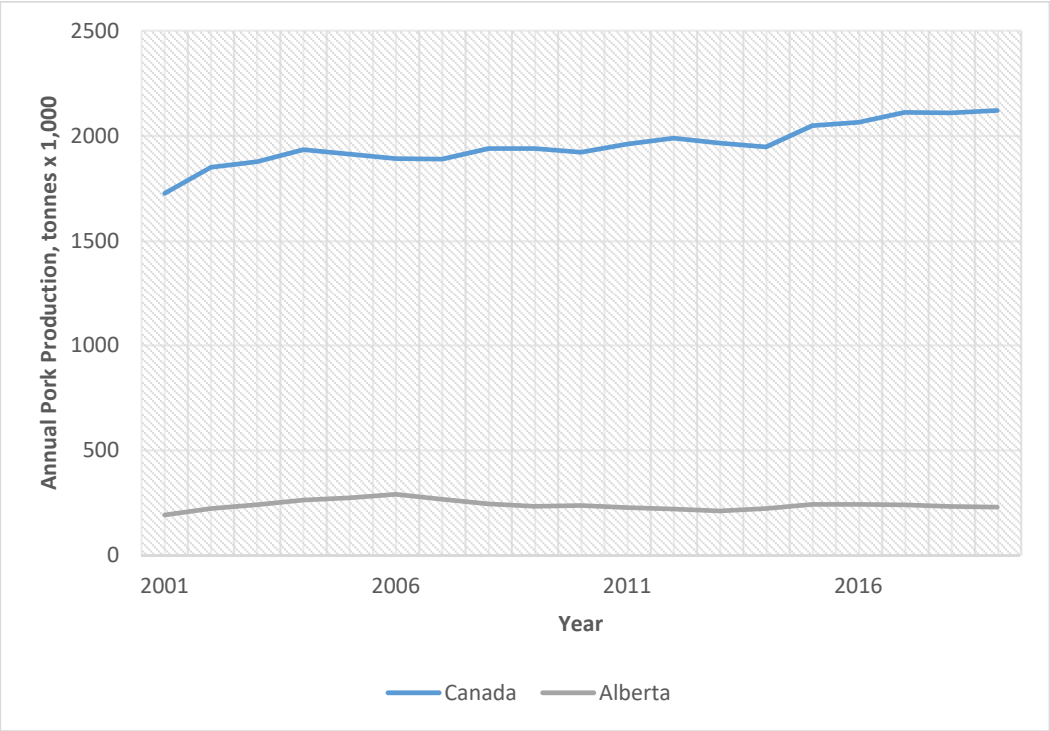


Source: Statistics Canada. Table 32-10-0155-01 Selected livestock and poultry, historical data. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210015501

In contrast, Alberta's swine herd was relatively flat in the last 30 years, seeing a nine per cent decline from 1990 to 2019 (Statistics Canada 2021p). Similar to the beef industry, hog operations have continued to decrease in number and increase in size, shifting gradually to more commercial specialized farms. (Chen et al 2019).

Canada's pork production increased 23 per cent from 2001 to 2019, reaching 2.1 million tonnes per year, while Alberta's pork production increased 19 per cent in that same period, to 0.23 million tonnes per year (Alberta Agriculture and Forestry 2020):

Figure 30: Historical Pork Production - Canada and Alberta



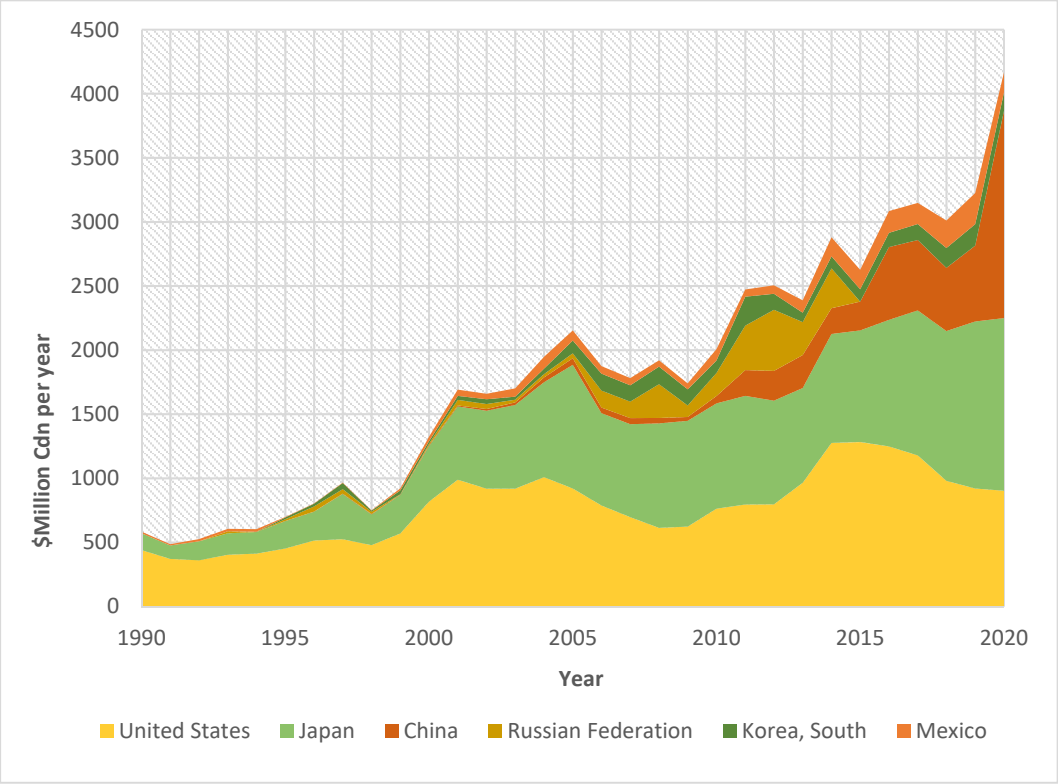
Source: Alberta Agriculture and Forestry. 2020. Agriculture Statistics Yearbook, 2019. https://open.alberta.ca/publications/1927-4106.

Exports: Pork

About 48 per cent of Canada's pork production has been exported since 2001 (Statistics Canada 2021d). Alberta is the fourth largest pork exporter in Canada, contributing about 13 per cent of Canada's pork exports, behind Quebec, Manitoba and Ontario (43, 26 and 15 percent of Canada's

total respectively) (Statistics Canada 2021d). In the past thirty years, Canada's pork exports have increased dramatically. Major markets include the United States and Japan (Statistics Canada 2021d):

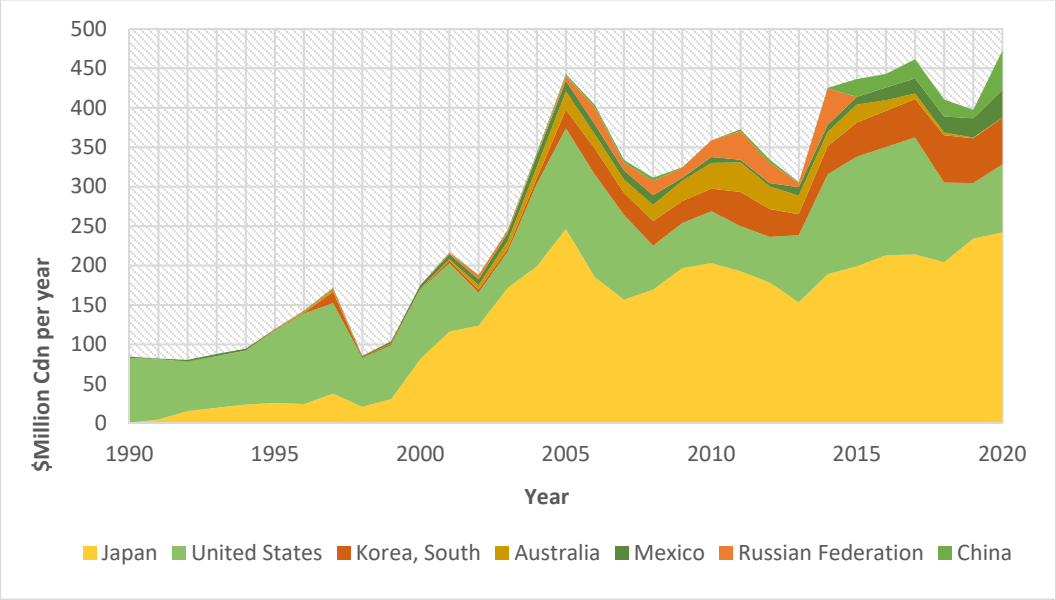
Figure 31: Canada Historical Top Markets for Pork Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan . Note: Beef includes the HS Codes from 20311 to 20649.

Alberta's pork exports show a similar reliance on a handful of markets (Statistics Canada 2021d):

Figure 32: Alberta Historical Top Markets for Pork Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan . Note: Beef includes the HS Codes from 20311 to 20649.

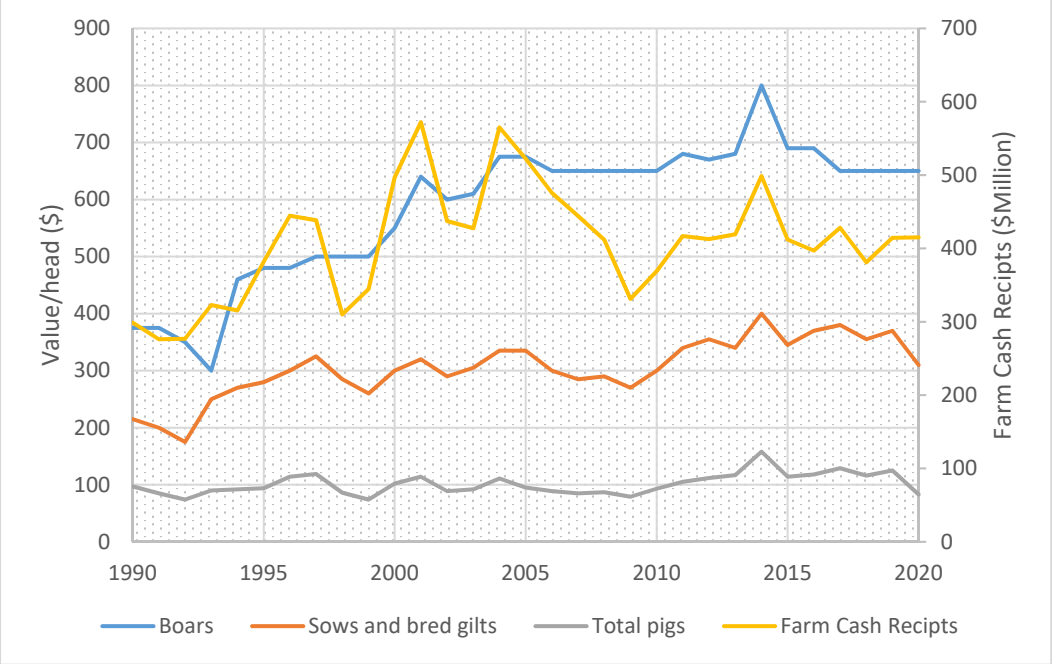
Product Price History: Pork

From 1990 to 2020 farm cash receipts from hog production increased from $289.9 to $415.2 million (all figures are 2012 dollars unless otherwise noted). While there has been overall growth, farm cash receipts fluctuate considerably with peaks in 1996 ($444 million), 2001($572 million), 2004 ($564 million), and 2014 ($498 million) and the corresponding troughs in 1998 ($310 million), 2003 ($427 million), 2009 ($331 million), 2016 ($397 million) (Statistics Canada 2021e).

The average value per head has not experienced the growth in value which was observed in the cattle industry (Statistics Canada 2021k). Total pig value increased from $97 in 1990 to $125 in 2019 before falling to $83 in 2020 the average price per head during this period was $101. The value of boars increased from $375 to $650 but the value has remained fairly constant since 2001 when it reached $640. Sows have also experienced growth in value increasing from $215 to $370

in 2019 but the majority of the growth in value occurred between 1990 and 2000 (Statistics Canada 2021n; Statistics Canada 2021k):

Figure 33: Alberta Historical Farm Cash Receipts and Livestock Prices: Hogs



Source: Statistics Canada. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501, Statistics Canada. "Table 32-10-0124-01 Value Per Head of Livestock at July 1." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210012401.

Trends and Changes in the Alberta Pork Sector

In the mid-2000s various factors impacted the pork industry in Canada, including droughts, a major increase in oil prices and a surge in grain prices all seen in 2008 to 2009 (Brisson 2014).

In 2009, Influenza A (H1N1) was named "swine flu," damaging global consumer confidence. In that same year, China and Russia stopped Canadian pork imports. Other hog diseases have impacted the Canadian herd in the last 20 years, including porcine reproductive and respiratory syndrome (PRRS) and porcine circovirus (PCV2). Also in 2009, the United States Country of Origin Labelling Policy (COOL) came into force, resulting in extra costs impacting all trade of goods with regions such as Canada, that are closely integrated with the U.S. (Brisson 2014). In

2009, the Canadian federal government introduced the Cull Breeding Swine Program (CBSP) and the Hog Farm Transition Program (HFTP), both designed to ease the transition of hog producers who wished to downsize, adapt to the current market situation, or exit from production (Brisson 2014).

With these pressures, hog operations changed between 2006 and 2011. The three major types of swine operations (suckling and nursery operations, finishing operations and farrow-to-finish) all saw consolidation and specialization in this period (Statistics Canada 2017). During this time, the number of sows decreased considerably compared to the number of piglets: major efficiencies in operations were implemented, resulting in fewer farms, with more specialized roles and more technological advancements (Brisson 2014).

In 2018, African Swine Fever (ASF) spread to the China pork industry, resulting in China hog stocks falling by 27.5 per cent from 2018 to 2019 (Statistics Canada 2020). The reduced domestic supply in China led to an increase of imports from Canada and many other countries.

National demand is predicted to be relatively flat over the next decade. The world consumption of pork increased 34 per cent from 2008 to 2018, and is predicted to increase an additional nine per cent to 2028 (OECD 2020).

Summary: Pork

In summary, Alberta's pork industry has some similarities with the beef industry. It has constantly been in consolidation mode for the past thirty years, gradually increasing its average farm herd size, and is vulnerable to global market prices and diseases. Other aspects of Alberta's pork industry differ from the beef industry markedly: the product has a shorter production time, is a more concentrated indoor process, and the national herd has a very different composition. In the

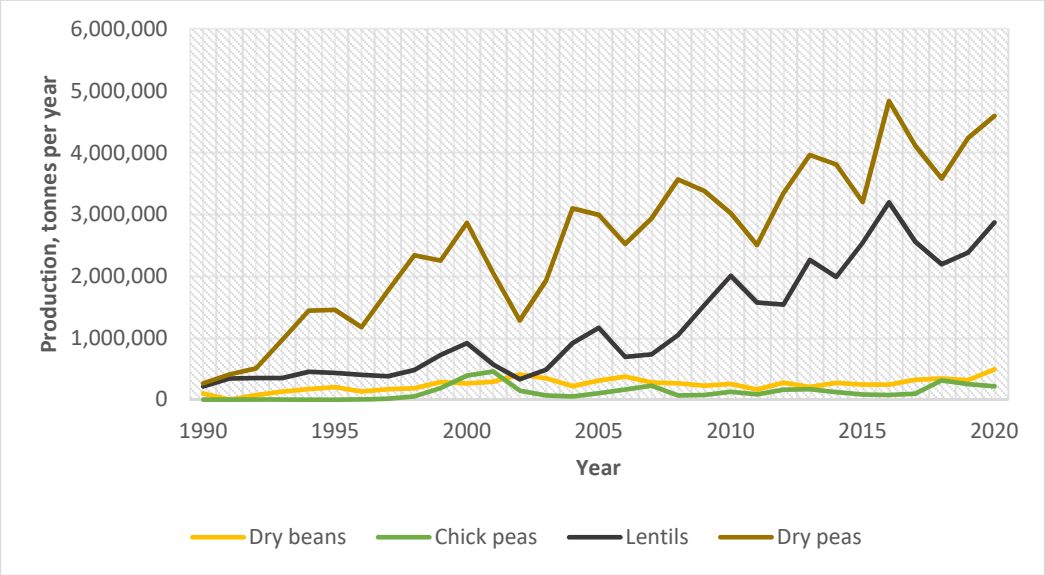
mid-2000's the pork industry across Canada suffered from a number of factors, necessitating a federal government-supported program to help pork farmers transition away from the industry, or alternatively transform to a more competitive structure. The national pork herd size has held up better in the past ten years than that of Canada's beef herd.

V. Pulse Crops

Production: Pulse Crops

Canada is currently one of the globe's largest producers of pulses, and is currently the largest exporter (OECD/FAO 2021). The historical production for four pulse crops grown in Canada - dry peas, dry beans, lentils and chickpeas – is shown below (Statistics Canada 2021l):

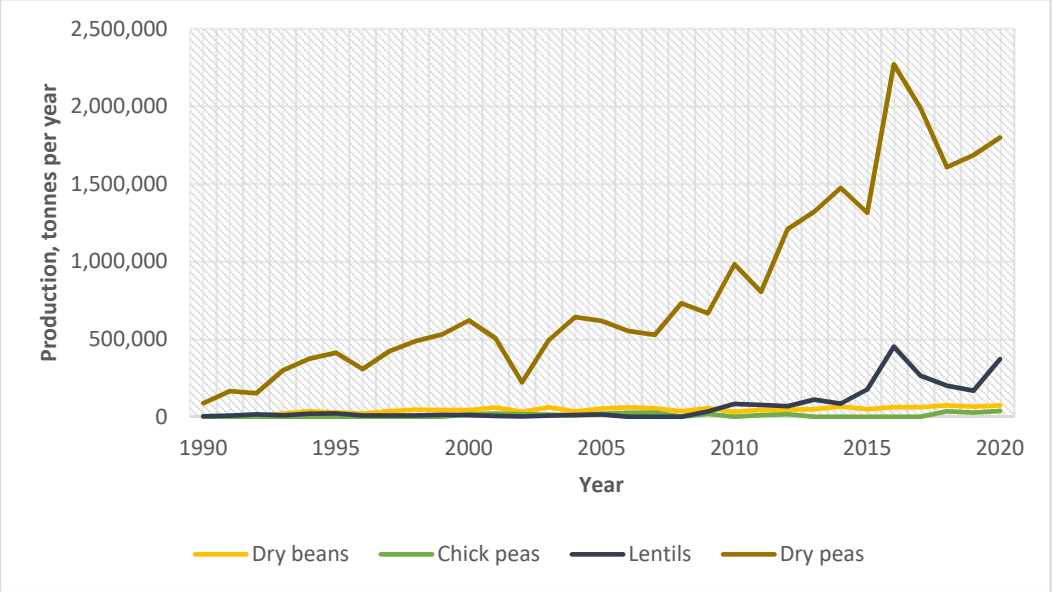
Figure 34: Canada Historical Production - Four Pulse Crops



Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Alberta's pulse production focuses primarily on dry peas and lentils to date (Statistics Canada 2021l):

Figure 35: Alberta Historical Production - Four Pulse Crops

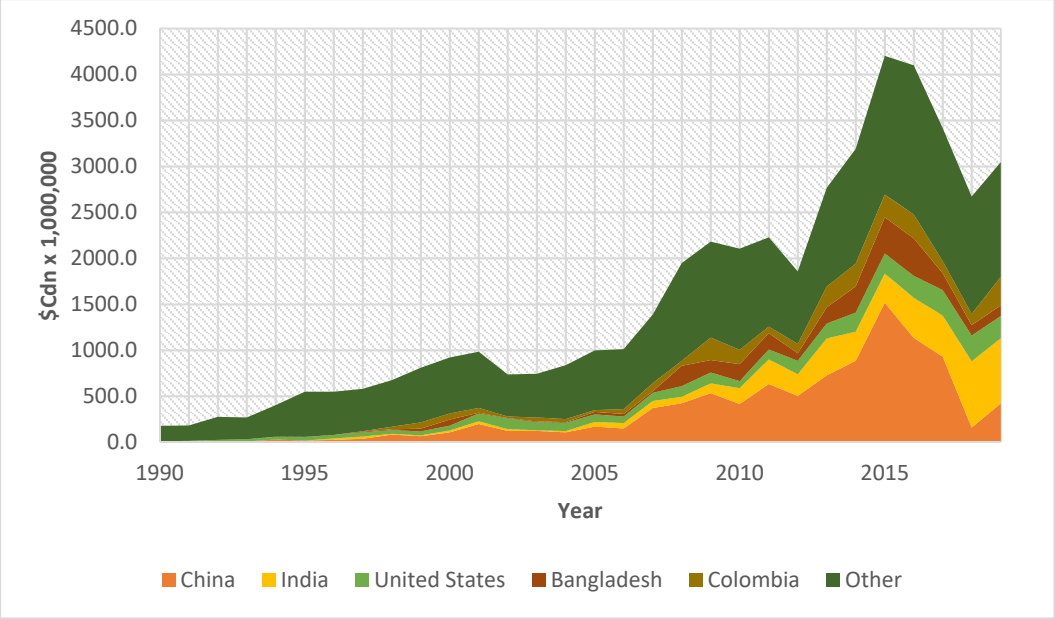


Source: Statistics Canada. Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

Exports: Pulse Crops

Canada's pulse exports increased by 40 per cent from 2009 to 2019 (Statistics Canada 2021d):

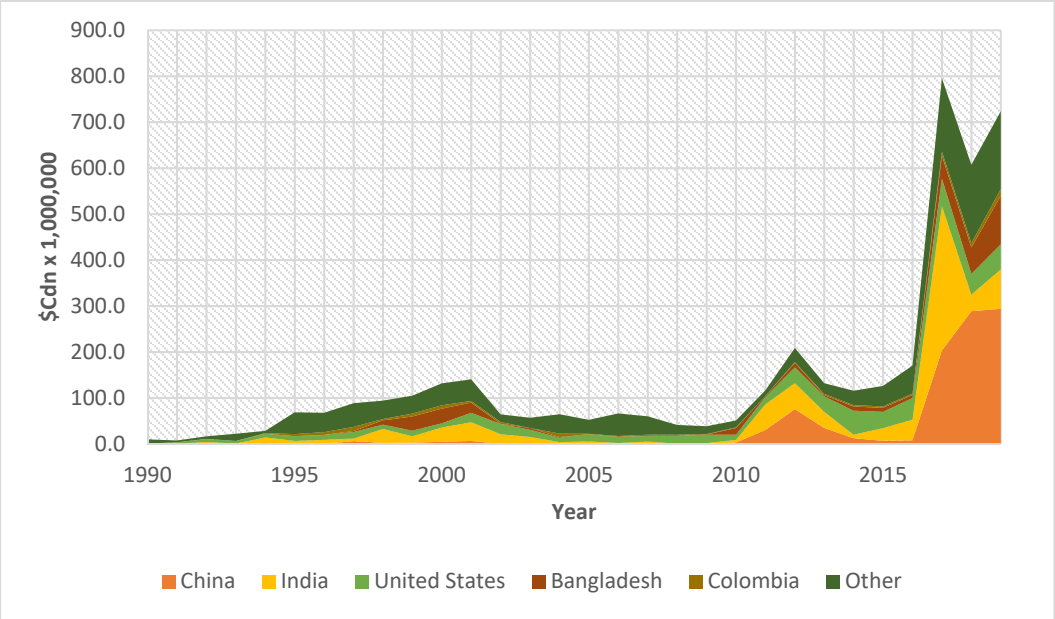
Figure 36: Canada Top Markets for Pulse Exports



Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan

Alberta's pulse export market has grown much faster since 2016:

Figure 37: Alberta Top Markets for Pulse Exports



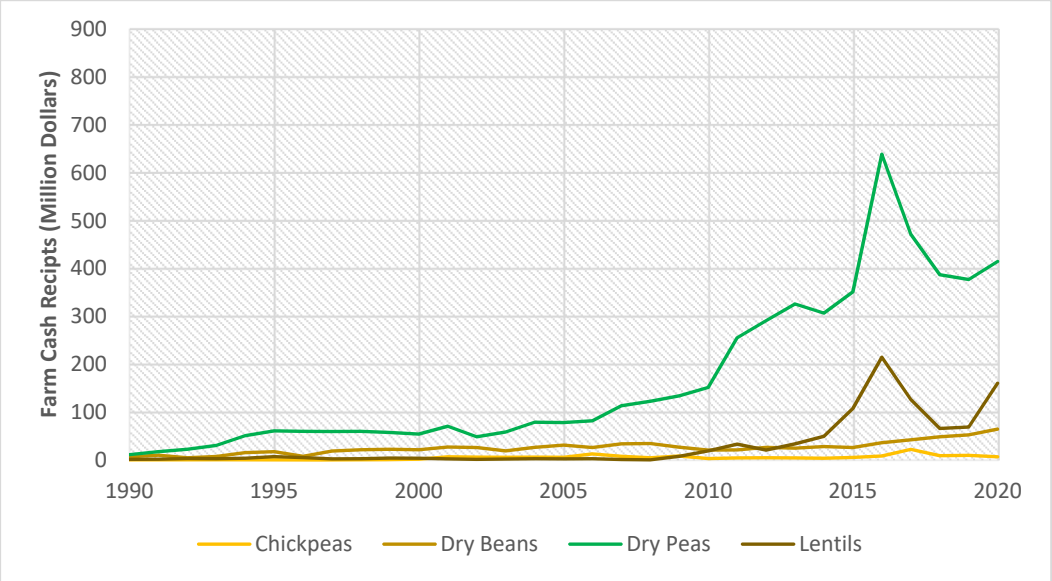
Source: Statistics Canada. Canadian International Merchandise Trade Database. https://open.canada.ca/data/en/dataset?sort=metadata_modified+desc&q=CIMT&organization=statcan

Product Price History: Pulse Crops

Farm cash receipts from pulse crops have grown from $18 million in 1990 to $645 million in 2020 (Statistics Canada 2021e). While growth in the sector occurred fairly consistently between 1990 and 2016, when farm cash receipts peaked at $898 million growth primarily occurred after 2010. Between 2010 and 2016 receipts grew by 365 per cent with the growth primarily driven by increased receipts from dry peas, and to a lesser extent lentils. The other two pulse crops, chickpeas and dry beans, make up a much smaller share of total receipts with receipts from chickpeas valued at $6.3 million and dry beans at $64 million in 2020 (Statistics Canada 2021e).

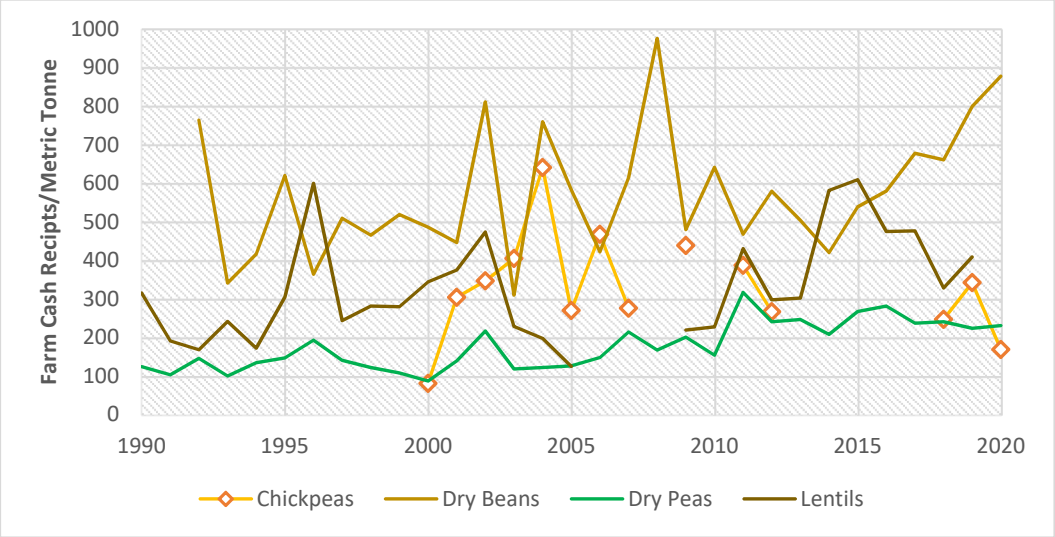
Pulse production data is limited given the small quantity produced, (Statistics Canada 2021l). With the exception of dry peas, there is significant fluctuation within the data for the relative value estimate. The relative value of dry peas has generally increased, growing from $124 to $230 of farm cash receipts per metric tonne produced (Statistics Canada 2021e; Statistics Canada 2021l).

Figure 38: Alberta Historical Farm Cash Receipts - Pulse Crops



Source: Statistics Canada. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501,

Figure 39: Alberta Historical Farm Cash Receipts per Tonne - Pulse Crops

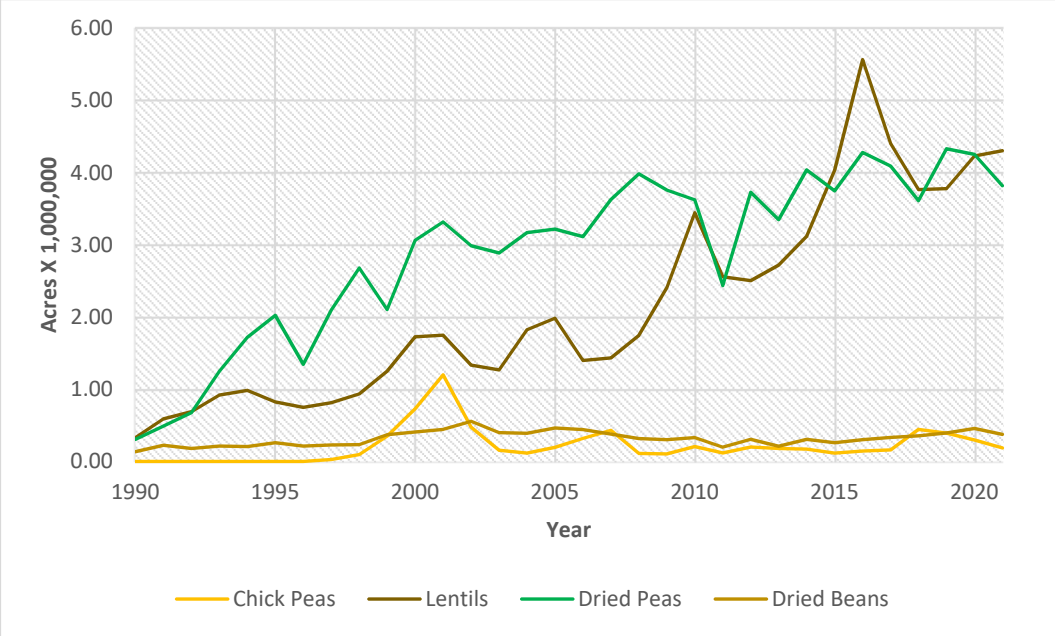


Source: Statistics Canada. "Table 32-10-0045-01 Farm Cash Receipts, Annual (X 1,000)." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210004501, Statistics Canada. "Table 32-10-0359-01 Estimated Areas, Yield, Production, Average Farm Price and Total Farm Value of Principal Field Crops, in Metric and Imperial Units." 2021-09-20. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901.

Trends and Changes in the Alberta Pulse Sector

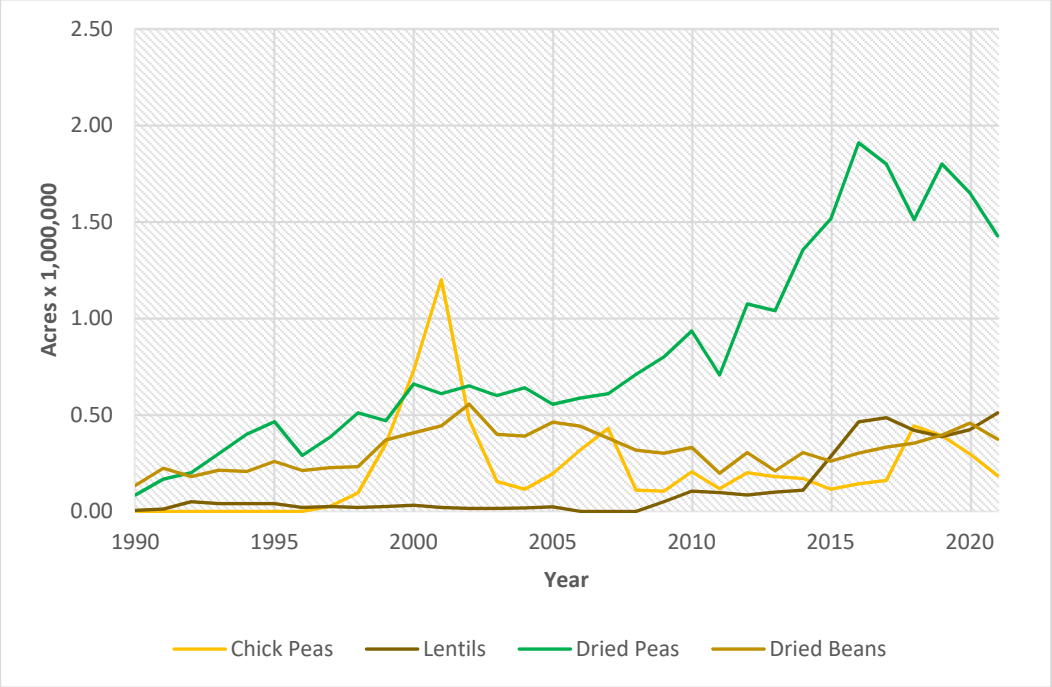
Pulse crop seeded acreage within Canada, and Alberta specifically, has increased considerably in the last thirty years, with planted acreage of lentils and dry peas both increasing by more than a factor of ten times in that period. Seeded area in Canada from 1990 to 2021 for dry beans has increased by 177 per cent (Statistics Canada 2021l). Within Alberta, acreage seeded in lentils increased dramatically in thirty years, and acres in dry peas increased by a factor of fifteen times in that same period. Seeded areas in pulse crops are shown below (Statistics Canada 2021l).

Figure 40: Canada Historical Acres in Pulse Crops



Source: Statistics Canada. 2021g. *Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units*. Accessed August 17, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

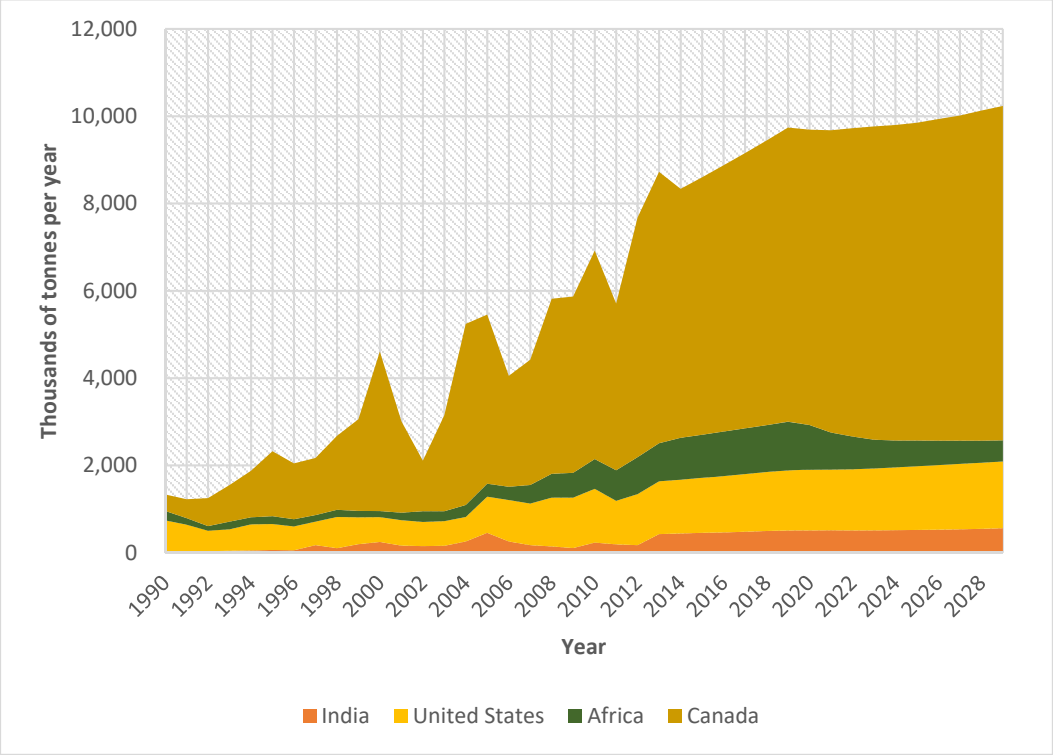
Figure 41: Alberta Historical Acres in Pulse Crops



Source: Statistics Canada. 2021g. *Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units*. Accessed August 17, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210035901

From 2010 to 2020, the average annual growth rate of the global pulses market was 3 per cent, with this increase being led by Asia and Africa (OECD/FAO 2021). Asian markets are forecast to be the biggest market for pulses in the next ten years as well: one of Canada's major trading partners is India (OECD/FAO 2021). The graph below illustrates select large exporters of pulses, historical and forecast, including Canada. This demonstrates the speed at which Canada has entered the market to date (OECD/FAO 2021):

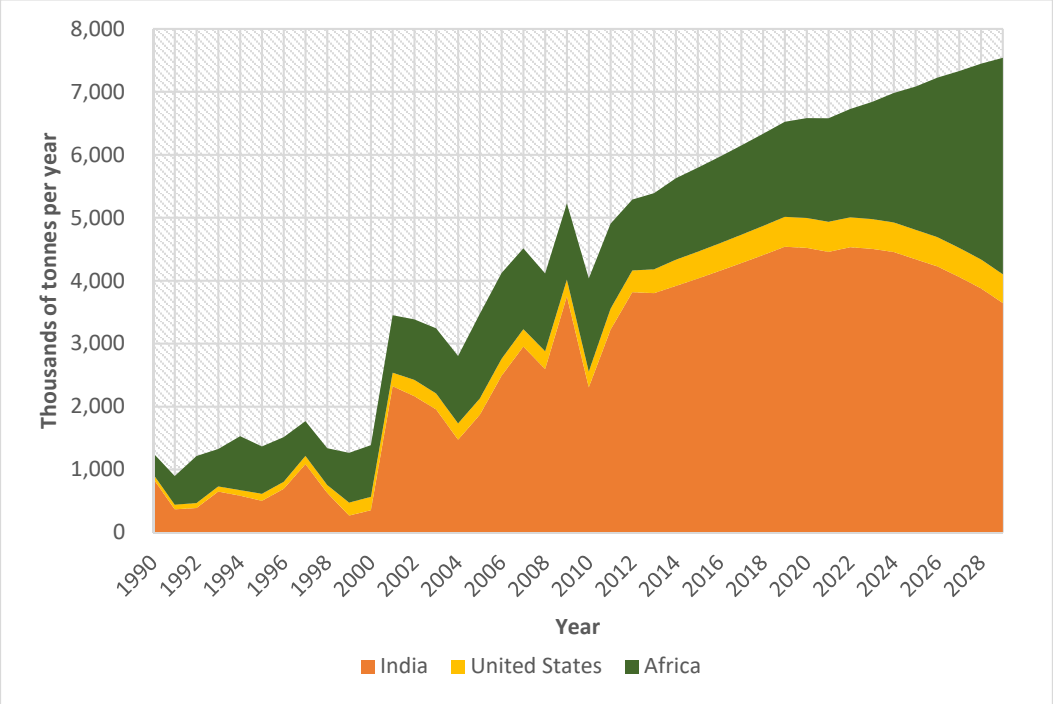
Figure 42: Pulse Exports, Historical and Forecast: Select Countries and Regions



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database). https://stats.oecd.org/viewhtml.aspx?datasetcode=HIGH_AGLINK_2020&lang=en#

Currently, India and Africa combined receive 40 per cent of global exports (OECD/FAO 2021). They are expected to be major importers in the next ten years as well although India is predicted to slow its import growth and increase its domestic production capabilities (OECD/FAO 2021). Some of the world's largest pulse importers are noted below (OECD/FAO 2021):

Figure 43: Pulse Imports, Historical and Forecast: Select Countries and Regions



Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database). https://stats.oecd.org/viewhtml.aspx?datasetcode=HIGH_AGLINK_2020&lang=en#

Global pulse exports increased 6 per cent per year since 2000, and are predicted to increase by another 8 per cent from now to 2029 (OECD/FAO 2021).

In addition to the changing pulse markets noted above in India and African countries, there is also a growing market in more developed countries for alternative protein, including plant protein products. Demand for the plant-based meat market is estimate to grow to US $85 billion by 2035 globally (EY 2021).

Summary: Pulse Crops

In summary, the pulse industries in Alberta and Canada are in their infancy. The Alberta pulse industry in particular has grown at a huge rate over the last twenty years. The growth potential for

plant proteins in the global market as a product for developed nations is in its earliest stages at this time but is considered to be significant for Canada (EY 2021).

VI. Processors

Food processing is Canada's second largest manufacturing industry. Food and beverage manufacturing generated $123 billion in revenues nationally in 2019, including $17 billion from Alberta industry (Statistics Canada 2021a). In 2020, Canada had 10,075 food manufacturing establishments on record, with 898 of those located in Alberta (Government of Canada 2021).

From 2006 to 2014, 63 new food manufacturing plants opened and 67 other companies announced major investments in Canada, while 143 plants closed (Sparling and LeGrow 2015). The majority of these closure decisions were plants that were part of multi-plant companies, many targeting improved efficiencies and showing a focus on newer production facilities, new technologies, automation and new processing systems and methods. Almost 90 per cent of these closure decisions were made by multinational foreign and domestic firms focused on reorganizing or consolidating production and investments in order to improve scale and efficiency (Sparling and LeGrow 2015). The majority of closures studied in this period involved secondary processing; that is, taking the outputs from primary processing of farm gate products and turning them into further processed food products. The sector with the most Canadian food manufacturing plant closures for the period from 2006 to 2014 included meat and edible meats, and preparation of meat, fish and crustaceans (Sparling and LeGrow 2015). Protein industries in Canada felt pressure during this period, at least in part due to the BSE crisis seen in the early 2000s (Sparling and LeGrow 2015).

Sparling and LeGrow also studied capital investment into food manufacturing from 2006 to 2014 (2015). While not a fully comprehensive study, the authors noted 70 per cent of the 56 new capital

projects considered in that period required over one million Canadian dollars, and almost 30 per cent were above the $10 million mark. Of the projects studied, Canadian non-multinational (domestic) plants tended to maintain domestic assets and keep investing in Canadian projects, while foreign multinational companies approached optimization through more plant closures and consolidations.

In the decade from 2010 to 2020, approximately 20 new federal food manufacturing facilities opened in Canada, compared to around 4,000 new facilities in the United States; during this period the industry was challenged by a general labour shortage and technology was used to aid in compensating for this shortfall (Charlebois, Hill and Vezeau 2021). Seventy two per cent of food processing industry firms introduced at least one type of innovation during the fiscal years from 2016 to 2018, with commensurate investment in new technologies (Statistics Canada 2019).

In 2020 when impacted by Covid-19, the Canadian food manufacturing industry reported annual sales increasing year over year, compared to overall manufacturing sales, which decreased in that year (Charlebois, Hill and Vezeau 2021). This is also apparent when the annual growth rate of total sales of manufactured goods is compared to the growth rate of manufactured food products. The latter is less sensitive to major economic shocks, as indicated by a general smaller range in change in annual growth rate over time (Statistics Canada 2021s):

Figure 44: Canada Historical Sales of Manufactured Goods Annual Growth Rate Data

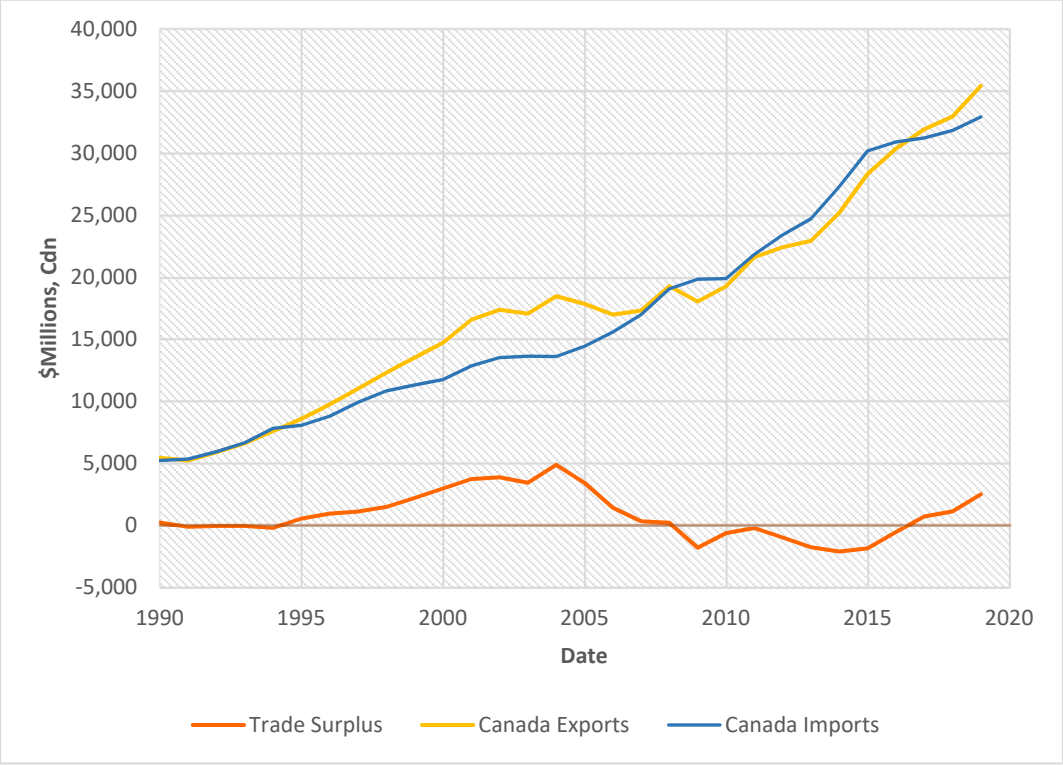
Source: Statistics Canada Table 16-10-0047-01 Manufacturers' sales, inventories, orders and inventory to sales ratios, by industry (dollars unless otherwise noted) (x 1,000). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610004701

From 2012 through 2014, the Canadian Agri-Food Policy Institute studied the increasing trade deficit in the Canadian processed food sector, and explored the issues and possible solutions to improve the situation, including improving the corporate tax levels, accelerated Capital Cost Allowance, increasing research and innovation capacity, improved access to and lower cost of ingredients, and leveraging diversity (CAPI 2014). In 2014, Canada's trade balance for primary processing was a substantial trade surplus, led by canola oil and pork. In contrast, remaining processed food products demonstrated a significant and growing trade deficit. The CAPI report noted that "…virtually all the growth in net trade has occurred in only four commodities: canola oil, pork, edible offal, and malt" (CAPI 2014). The growth seen in these areas was substantial from

1990 to 2013, but was more than outweighed by deficits seen in all other areas, resulting in an overall trade deficit.

The figure below illustrates that the trend in trade deficit for this sector has turned around, and a trade surplus is now seen for processed foods in Canada (Statistics Canada 2021b):

Figure 45: Canada Historical Merchandise Trade Balance: Intermediate Food Products, Manufactured Food and Beverage Products



Source: Statistics Canada. Table 12-10-0120-01 Historical (real-time) releases of merchandise imports and exports, customs and balance of payments basis for all countries, by seasonal adjustment and North American Product Classification System (NAPCS) (x 1,000,000). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1210012001

While the trade deficit increased for meat products, frozen fresh and canned fruit and vegetable juices and alcoholic beverages from 2014 to 2019, the recovering trade surplus in recent years was primarily due to canola oil exports increasing(Statistics Canada 2021b).

Agri-Food Processing GDP

From 1997 to 2020 Alberta's economy grew by 66 per cent increasing from $184.3 to $307.1 billion (in 2012 chained dollars) (Statistics Canada 2021t). During the same period, agricultural production and processing sectors combined increased 116 per cent from $4.1 billion to $8.9 billion.

Food manufacturing's contribution to GDP in Alberta increased from $1.8 billion to $3.0 billion annually, and while growth in the sector more closely followed provincial GDP trends, several subsectors more than doubled their contribution. Fruit and vegetable preserving, and specialty food manufacturing increased 368 per cent to $209 million; grain and oilseed milling increased 252 per cent to $466 million; animal food/feed manufacturing increased 202 per cent to $192 million; and other food manufacturing increased 175 per cent to $473 million in 2020 (Statistics Canada 2021t). Meat product manufacturing was the largest subsector in Alberta, increasing 30 per cent from $804.6 million in 1997 to $1.0 billion in 2020. Dairy production manufacturing was one of the few subsectors to decrease overall, decreasing 8 per cent to $237.6 million (Statistics Canada 2021t).

Summary: Agri-Food Processing

In summary, the processed food industry in Canada faces less swings in demand when compared to other manufactured goods industries. However, it has still seen substantial business turnover and consolidations over the past thirty years. Its growth rate has been substantially above the average GDP growth rate in Alberta, specifically in the meat product manufacturing subsector but also in smaller subsectors. The trade balance for manufactured foods has improved for Canada, mainly due to a small number of products, including canola and pork. Development of policies

that encourage more capital expenditures on new processed food facilities within Alberta would increase the food sector GDP and add needed jobs.

Conclusion

The industries of Alberta's major agri-food products have all gone through considerable consolidation and technical innovation in the past thirty years in order to gain or maintain global competitiveness. From 1990 to 2020 total farm cash receipts increased from $4.3 billion, to $15.5 billion within Alberta. Total farm cash receipts from crop production increased from $1.6 billion in 1990 to $7.4 billion in 2020. Receipts from animal production grew from $2.3 billion to $6.7 billion, of which $5.0 billion originated with cattle.

Alberta's largest agri-food product, beef, demonstrated vulnerability to global bovine disease and the associated impacts on international markets, but the global market for this product continues to steadily grow. Significant disruptions in the supply chain occurred in both the beef and pork industries in the past thirty years due to animal diseases entering the herd, or in some cases affecting the herds of other countries in the marketplace. These disruptions lasted for years and resulted in accelerated consolidation, restructuring, specialization, and government supports, but also resulted at times in opportunities for Alberta's industry. Major trends in the last thirty years include a connection of the Alberta beef and pork markets to SE Asia countries.

The canola industry is an example of successful research leading to a marketable product with large global demand. Canola seed and oil production have both increased substantially in the last thirty years, contributing to Canada's improved trade surplus in agri-food products.

Alberta's wheat industry displayed considerable increases in yields in the past thirty years, resulting in strong production figures even with reduced acreage as some lands shifted to canola

and other crops. Major impacts on the grain industry in Alberta in the past thirty years included structural changes such as removing the "Crow Rate" and ending the Canada Wheat Board, but the industry has also shown vulnerability to weather conditions, with large swings in production seen year over year due to major episodes of drought or abundance of rainfall.

The food manufacturing and processing sector has demonstrated more resilience than its primary product counterparts, with a more stable growth rate in annual sales observed compared to other manufacturing sectors in Canada; however, this sector has also seen consolidation, restructuring and recapitalization targeted at increased global competitiveness.

In addition, the blossoming pulse industry in Canada has anchored itself into the global market with its major trading partner India, and there is large global growth potential in other countries as well.

This paper serves to begin to reveal some of the strengths and vulnerabilities of Alberta's agri-foods industry, its historical trends and future target markets, as the Simpson Centre begins its detailed study of agriculture-based GHG emissions reductions and how they can be achieved.

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Alberta's Role in the Global Agri-foods Marketplace

Part B: Illustrated in Data

September 2021

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Table of Contents

Abstract 6

Introduction 7

Description of Alberta's Agri-food Products 9

Production and Exports of Agri-food Products in Alberta and Canada 19

a. **Beef** 20

b. **Wheat** 21

c. **Canola Seed** 22

d. **Canola oil** 23

e. **Pulses** 24

f. **Live animals** 25

g. **Pork** 27

Top Markets for Alberta and Canada 28

a. **Beef** 29

b. **Wheat** 30

c. **Canola Seed** 31

d. **Canola oil** 32

e. **Pulses** 33

f. **Live cattle** 34

g. **Pork** 35

Top Exporting Countries in the World 36

a. **Beef** 37

b. **Wheat** 37

c. **Canola Seed** 38

d. **Canola oil** 38

e. **Pulses** 39

f. **Live cattle** 39

g. **Pork** 40

Top Competitors for Alberta's Agri-food Markets 41

a. **Beef** 42

b. **Wheat** 43

c. **Canola Seed** 45

d. **Canola oil** 47

e. **Pulses** 48

f. Live cattle 50
g. Pork 51
Forecast of Agri-food Products in Canada and the World 53
a. Beef 56
b. Wheat 57
c. Oilseeds 58
d. Pulses 59
e. Pork 60
References 61

Table of Tables

Table 1: Selected agri-food products with their Harmonized System (HS) Code 9
Table 2: Live cattle and live hogs by the Harmonized System (HS) Code and Alberta's exports in 2019 11
Table 3: Beef and pork by the Harmonized System (HS) Code and Alberta's exports in 2019.. 11
Table 4: Pulses by the Harmonized System (HS) Code and Alberta's exports in 2019 12
Table 5: Wheat by the Harmonized System (HS) Code and Alberta's exports in 2019 12
Table 6: Canola seed by the Harmonized System (HS) Code and Alberta's exports in 2019..... 13
Table 7: Canola oil by the Harmonized System (HS) Code and Alberta's exports in 2019..... 13

Table of Figures

Figure 1: Share of Alberta's agri-food exports to the provincial total exports in 2019..... 14
Figure 2: Alberta's major agri-food exports by the Harmonized System (HS) category in 2019 15
Figure 3: Top five products of Alberta agri-food exports in 2019 15
Figure 4: Distribution of Alberta food manufacturing exports in 2019..... 16
Figure 5: Top five markets for Alberta agri-food exports in 2019 16
Figure 6: Alberta's total agri-food exports to the world, nominal terms, 1990 – 2020 17
Figure 7: Alberta's major agri-food exports, nominal terms, 1990-2020 17
Figure 8: Proportions of primary agriculture and value-added products to Alberta's total agri-food exports, 2010 – 2019 18
Figure 9: Alberta beef production and exports, 2003-2019..... 20
Figure 10: Canada beef production and exports, 2003-2019..... 20
Figure 11: Alberta wheat production and exports, 1990-2020 21
Figure 12: Canada wheat production and exports, 1990-2020 21
Figure 13: Alberta canola seed production and exports, 1990-2020 22
Figure 14: Canada canola seed production and exports, 1990-2020 22
Figure 15: Alberta canola oil exports, 1990-2020 23
Figure 16: Canada canola oil exports, 1990-2020 23
Figure 17: Alberta pulses production and exports, 1990-2020..... 24
Figure 18: Canada pulses production and exports, 1990-2020..... 24

Figure 19: Alberta total supply and exports of live cattle, 2000-2019 25
Figure 20: Canada total supply and exports of live cattle, 2000-2019 25
Figure 21: Alberta total supply and exports of live hogs, 2001-2020 26
Figure 22: Canada total supply and exports of live hogs, 2001-2020 26
Figure 23: Alberta pork production and exports, 2001-2019 27
Figure 24: Canada pork production and exports, 2001-2019 27
Figure 25: Top five markets for beef exports in Alberta, average 1990-2020 29
Figure 26: Top five markets for beef exports in Canada, average 1990-2020 29
Figure 27: Top five markets for wheat exports in Alberta, average 1990-2020..... 30
Figure 28: Top five markets for wheat exports in Canada, average 1990-2020..... 30
Figure 29: Top five markets for canola seed exports in Alberta, average 1990-2020..... 31
Figure 30: Top five markets for canola seed exports in Canada, average 1990-2020..... 31
Figure 31: Top five markets for canola oil exports in Alberta, average 1990-2020..... 32
Figure 32: Top five markets for canola oil exports in Canada, average 1990-2020..... 32
Figure 33: Top five markets for pulse exports in Alberta, average 1990-2020..... 33
Figure 34: Top five markets for pulse exports in Canada, average 1990-2020..... 33
Figure 35: Top market for live cattle exports in Alberta, average 2012-2020 34
Figure 36: Top market for live cattle exports in Canada, average 2012-2020 34
Figure 37: Top five markets for pork exports in Alberta, average 1990-2020..... 35
Figure 38: Top five markets for pork exports in Canada, average 1990-2020..... 35
Figure 39: Top exporters of beef to the world, sorted by average 2011-2020, nominal terms ... 37
Figure 40: Top exporters of wheat to the world, sorted by average 2011-2020, nominal terms. 37
Figure 41: Top exporters of canola seed to the world, sorted by average 2011-2020, nominal terms..... 38
Figure 42: Top exporters of canola oil to the world, sorted by average 2011-2020, nominal terms 38
Figure 43: Top exporters of pulses to the world, sorted by average 2011-2020, nominal terms 39
Figure 44: Top exporters of live cattle to the world, sorted by average 2012-2020, nominal terms 39
Figure 45: Top exporters of pork to the world, sorted by average 2011-2020, nominal terms ... 40
Figure 46: Market shares of Canada and its competitors to the United States beef imports, average 2011-2020..... 42
Figure 47: Market shares of Canada and its competitors to the United States beef imports, 1991-2020..... 42
Figure 48: Market shares of Canada and its competitors to China's wheat imports, average 2011-2020 43
Figure 49: Market shares of Canada and its competitors to China's wheat imports, 1992-2020 43
Figure 50: Market shares of Canada and its competitors to the United States wheat imports, average 2011-2020..... 44
Figure 51: Market shares of Canada and its competitors to Japan's wheat imports, average 2011-2020..... 44
Figure 52: Market shares of Canada and its competitors to Mexico's wheat imports, average 2011-2020 45
Figure 53: Market shares of Canada and its competitors to China's canola seed imports, average 2011-2020 45

Figure 54: Market shares of Canada and its competitor to Japan's canola seed imports, average 2011-2020 46
Figure 55: Market shares of Canada and its competitors for the Mexico canola seed imports, average 2011-2020..... 46
Figure 56: Market shares of Canada and its competitors to the United States canola seed imports, average 2011-2020..... 47
Figure 57: Market shares of Canada and its competitors to China's canola oil imports, average 2011-2020 47
Figure 58: Market shares of Canada and its competitors to the United States canola oil imports, average 2011-2020..... 48
Figure 59: Market shares of Canada and its competitors to India's pulses imports, average 2011-2020..... 48
Figure 60: Market shares of Canada and its competitors to India's pulses imports, 1990-2020 . 49
Figure 61: Market shares of Canada and its competitors to China's pulse imports, average 2011-2020..... 49
Figure 62: Market shares of Canada and its competitors to the United States pulse imports, average 2011-2020..... 50
Figure 63: Market shares of Canada and Mexico to the United Sates imports of live cattle (excluding purebred), 2012-2020..... 50
Figure 64: Market shares of Canada and its competitors to Japan's imports of pork, average 2011-2020 51
Figure 65: Market shares of Canada and its competitors to the United Sates imports of pork, average 2011-2020..... 51
Figure 66: Market shares of Canada and its competitors to China's imports of pork, average 2011-2020 52
Figure 67: Market shares of Canada and the USA to Mexico's imports of pork, average 2011-2020..... 52
Figure 68: Forecast of beef and veal production and exports in Canada, 2020-2029 56
Figure 69: Forecast of beef and veal production and exports in the world, 2020-2029 56
Figure 70: Forecast of wheat production and exports in Canada, 2020-2029 57
Figure 71: Forecast of wheat production and exports in the world, 2020-2029..... 57
Figure 72: Forecast of oilseeds production and exports in Canada, 2020-2029..... 58
Figure 73: Forecast of oilseeds production and exports in the world, 2020-2029..... 58
Figure 74: Forecast of pulses production and exports in Canada, 2020-2029..... 59
Figure 75: Forecast of pulses production and exports in the world, 2020-2029 59
Figure 76: Forecast of pigmeat production and exports in Canada, 2020-2029..... 60
Figure 77: Forecast of pigmeat production and exports in the world, 2020-2029..... 60

Abstract

Alberta is the third largest exporter of agri-food products in Canada after Ontario and Saskatchewan. Alberta's agri-food exports include both primary agricultural commodities (crops and live animals) and processed food and agricultural products (value-added exports). Using data gathered from different sources, this paper illustrates the role of Alberta in the global agri-foods marketplace considering four primary agricultural commodities (wheat, canola seed, live cattle, and pulses) and three value-added products (beef, pork, and canola oil), collectively accounting for 72 per cent of Alberta's total agri-food exports in 2019. First, historical production and exports of Alberta's and Canada's major agri-food products over the last three decades (1990-2020) are provided using data gathered from Statistics Canada and the top markets for these key products are identified on a product-basis. Second, the global major exporters of the selected agri-food products over the last three decades are provided using trade data gathered from the United Nations Comtrade Database and the performances of Alberta and Canada in exporting agri-food products are compared with other exporting countries. Third, Alberta's major competitors for its top markets are identified using the same database. Finally, forecast of production and exports of major agri-food products in Canada and globally over the coming decade (2020-29) are provided using data gathered from OECD-FAO Agricultural Outlook 2020-2029, prepared by the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO).

Keywords

Agri-food exports, Alberta, beef, canola, wheat, market share.

Introduction

Alberta is the third largest exporter of agri-food products in Canada after Ontario and Saskatchewan. Alberta's agri-food exports include both primary agricultural commodities (crops and live animals) and processed food and agricultural products (value-added exports). In 2019, Alberta exported $11.6 billion in the agri-food products, representing 10 per cent of the province's total exports and accounting for 18 per cent of the national total agri-food exports. Of the total agri-food exports, 45 per cent ($5.3 billion) was primary agricultural commodities and 55 per cent ($6.4 billion) was value-added products (Alberta Agriculture and Forestry 2020; Government of Alberta 2020).

The major agri-food exports in Alberta are beef, wheat, canola seed, crude canola oil, and live cattle. In 2019, beef was the top export, representing 21 per cent of Alberta's agri-food exports, which includes all beef products, such as fresh, chilled, and frozen meat and offal, but excludes live cattle. Wheat was the second largest export, representing 17 per cent. Canola seed and crude canola oil contributed 10 per cent and 7 per cent to the total agri-food exports, respectively. Live cattle (excluding purebred) contributed 6 per cent. There are also other products, such as pulses (dry peas, beans, chickpeas, lentils) and pork that contributed 6 per cent and 4 per cent to the total agri-food exports, respectively (Alberta Agriculture and Forestry 2020; Government of Alberta 2020).

The major markets for Alberta's agri-food exports are the United States, China, Japan, Mexico, and South Korea. In 2019, these markets represented 74 per cent of the total agri-food exports. United States was by far the top market, accounting for 40 per cent of Alberta's total agri-food exports. China was the second largest market, accounting for 14 per cent. Japan was the third

largest market, representing 12 per cent. Mexico and South Korea accounted for 4 per cent and 3 per cent, respectively (Alberta Agriculture and Forestry 2020; Government of Alberta 2020).

The aim of this paper is three-fold. First, it provides historical and forecast of Alberta's and Canada's agri-food exports considering seven major products: beef, wheat, canola seed, canola oil, live cattle, pork, and pulses. Second, it provides estimates of the current and forecast of the global market demand for selected agri-food products. Finally, it develops a list of Alberta's major competitors in the agri-food sector for its major export products.

This paper is divided into seven parts. After this introduction, the second part provides a brief description of the agri-food products and the data sources used in this paper. The third part presents historical production and exports of the major agri-food products in Alberta and Canada. The fourth part presents the top markets for Alberta's and Canada's agri-food exports. The fifth part presents the top exporters of agri-food products in the world by comparing the roles of Alberta and Canada with other exporting countries. The sixth part presents Alberta's major competitors for its major export products. The last part presents the current and forecast of the global market demand by focusing on the production and exports of major agri-food products in Canada and globally.

Description of Alberta's Agri-food Products

This paper is focused on seven major Alberta's agri-food products that include four primary agricultural commodities (wheat, canola seed, live cattle, and pulses) and three value-added products (beef, pork, and canola oil). These products accounted for 72 per cent of Alberta's total agri-food exports in 2019. The trade data for these products was obtained from the Canadian International Merchandise Trade Database (Statistics Canada 2021a) and the United Nations Comtrade Database. In the two data sources, the products are categorized according to the Harmonized System (HS) Code. The production data for the corresponding products was gathered from Statistics Canada. The forecast data for agri-food products was obtained from the OECD-FAO Agricultural Outlook 2020-2029, prepared by the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization (FAO) (OECD 2021).

Table 1 below provides a list of the seven selected agri-food products with their corresponding HS Code and category name.

Table 1: Selected agri-food products with their Harmonized System (HS) Code

Chapter (HS-Code)	Product Category	Individual Product
Chapter 1	Live animals	Live cattle, live hogs, others
Chapter 2	Meat and edible meat offal	Beef, pork, others
Chapter 7	Vegetables and certain roots and tubers	Pulses, others
Chapter 10	Cereals	Wheat, others
Chapter 12	Oil seeds and related products	Canola seeds, others
Chapter 15	Animal or vegetable fats and oils	Canola oil, others

The individual products are further broken down by their subproducts (See Tables 2 through 7). A detailed information about the HS-Code product classification in the Canadian context can be found in the Canadian Export Classification (Statistics Canada 2019).

The individual products were determined by aggregating their corresponding subproducts based on the report of Alberta Agriculture and Forestry (2020). The aggregated quantities and values of exports for all selected products were confirmed with this report (Alberta Agriculture and Forestry 2020, 54-55).

According to the report of Alberta Agriculture and Forestry, live cattle include purebred cattle and other cattle. Similarly, live hogs include purebred swine and other swine. In 2019, live cattle and live hogs accounted for 87 per cent and 5 per cent of Alberta's total exports of live animals, respectively (Table 2). Beef includes 10 different products of fresh, chilled, and frozen meat and offal. Similarly, pork includes 13 different products of fresh, chilled, and frozen meat and offal. In 2019, beef and pork accounted for 83 per cent and 15 per cent of Alberta's total exports of meat products, respectively (Table 3). Pulses include 13 products of dried peas, chickpeas, lentils, and dried beans. In 2019, pulses accounted for 93 of Alberta's total exports of the vegetable products category (Table 4). Wheat includes durum wheat and wheat and meslin. In 2019, wheat accounted for 87 of Alberta's total exports of cereals (Table 5). Canola seed includes mainly low erucic acid rape or colza seeds. Canola seed accounted for 79 of Alberta's total exports of oil seeds (Table 6). Alberta's canola/mustard oil exports include four products: crude canola oil, refined canola oil, crude mustard oil, and refined mustard oil. Canola/mustard oil accounted for 88 of Alberta's total exports of animal or vegetable oils (Table 7).

Over the last three decades, the value of Alberta's agri-food exports has significantly increased, notably from $2.3 billion in 1990 to $12.4 billion in 2020, growing by 6.5 per cent annually on average. Value-added exports have continued to grow over the last few years due to increase in exports of beef and canola oil. On the other hand, exports of primary agricultural commodities have declined due to lower exports of wheat, canola seed, and live cattle (Government of Alberta

2020). Alberta's beef exports have been negatively affected by the discovery of bovine spongiform encephalopathy (BSE) or mad cow disease in 2003 (Klein and Le Roy 2010).

Table 2: Live cattle and live hogs by the Harmonized System (HS) Code and Alberta's exports in 2019

HS Code	Product Name	2019 (CAN$)	2019 (% of Ch 1)
10221	Cattle, live, pure-bred	439,367	0
10229	Cattle, live, other than pure-bred	742,266,339	87
10310	Swine, live pure-bred breeding	9,279	0
10391	Swine, live other than pure-bred weighing less than 50 kg	20,752,874	2
10392	Swine, live other than pure-bred weighing 50 kg or more	27,471,809	3
Chapter 1 (Live Animals)-Gross		**848,743,049**	**100**

Note: Live cattle include HS 10221 and 10229. Live hogs include HS 10310, 10391, and 10392.
Source: Statistics Canada (2021a)

Table 3: Beef and pork by the Harmonized System (HS) Code and Alberta's exports in 2019

HS Code	Product Name	2019 (CAN$)	2019 (% of Ch 2)
20110	Bovine carcasses and half carcasses, fresh or chilled	8,068,817	0
20120	Bovine cuts bone in, fresh or chilled	176,399,623	6
20130	Bovine cuts boneless, fresh or chilled	1,617,107,542	55
20210	Bovine carcasses and half carcasses, frozen	57,355	0
20220	Bovine cuts bone in, frozen	91,079,648	3
20230	Bovine cuts boneless, frozen	340,352,779	12
20610	Bovine edible offal, fresh or chilled	64,717,699	2
20621	Bovine tongues, edible offal, frozen	26,132,132	1
20622	Bovine livers, edible offal, frozen	7,280,187	0
20629	Bovine edible offal, frozen, nes	94,455,135	3
20311	Swine carcasses and half carcasses, fresh or chilled	-	-
20312	Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled	72,708,776	2
20319	Swine cuts, fresh or chilled, nes	229,818,280	8
20321	Swine carcasses and half carcasses, frozen	-	-
20322	Hams, shoulders and cuts thereof, of swine, bone in, frozen	27,813,266	1
20329	Swine cuts, frozen, nes	72,286,716	2
20630	Swine edible offal, fresh or chilled	5,440,650	0
20641	Swine livers, edible offal, frozen	262,424	0
20649	Swine edible offal, frozen, nes	23,322,199	1
Chapter 2 (Meat Products)-Gross		**2,928,091,833**	**100**

Note: Beef includes the HS Codes from 20110 to 20629. Pork includes the HS Codes from 20311 to 20649. The empty cells (-) represent values that were not available in 2019.
Source: Statistics Canada (2021a)

Table 4: Pulses by the Harmonized System (HS) Code and Alberta's exports in 2019

HS Code	Product Name	2019 (CAN$)	2019 (% of Ch 7)
71310	Peas dried, shelled, whether or not skinned or split	508,485,203	66
71320	Chickpeas, dried, shelled, whether or not skinned or split	14,800,622	2
71331	Beans, Vigna mungo, Hepper or Vigna radiata Wilczek, dried, shelled, w/n skin/split	-	-
71332	Beans, small red (Adzuki), dried, shelled, whether or not skinned or split	2,032,376	0
71333	Kidney beans and white pea beans, dried, shelled, whether or not skinned/split	22,798,939	3
71334	Bambara beans, dried, shelled, w/n skinned or split	-	-
71335	Cow peas, dried, shelled, whether or not skinned or split	3,575	0
71339	Beans, dried, shelled, whether or not skinned or split, nes	80,558,900	10
71340	Lentils, dried, shelled, whether or not skinned or split	90,013,959	12
71350	Broad beans and horse beans, dried, shelled, whether or not skinned or split	5,125,566	1
71360	Pigeon peas, dried, shelled, whether or not skinned or split	-	-
71390	Leguminous vegetables, dried, shelled, whether or not skinned or split, nes	11,587	0
71390	Leguminous vegetables, dried, shelled, w/n skinned/split, nes	11,587	0
Chapter 7 (Vegetables and Certain Roots and Tubers)-Gross		**772,130,450**	**100**

Note: The empty cells (-) represent values that were not available in 2019.
Source: Statistics Canada (2021a)

Table 5: Wheat by the Harmonized System (HS) Code and Alberta's exports in 2019

HS Code	Product Name	2019 (CAN$)	2019 (% of Ch 10)
100111	Durum wheat, seed for sowing	197,876	0
100119	Durum wheat, other than seed for sowing	219,018,963	10
100191	Wheat and meslin, other than durum, seed for sowing	1,752,059	0
100199	Wheat and meslin, other than durum, other than seed for sowing	1,788,215,044	78
Chapter 10 (Cereals)-Gross		**2,284,177,205**	**100**

Source: Statistics Canada (2021a)

Table 6: Canola seed by the Harmonized System (HS) Code and Alberta's exports in 2019

HS Code	Product	2019 (CAN$)	2019 (% of Ch 12)
120510	Low erucic acid rape or colza seeds, whether or not broken	1,145,016,360	79
120590	Rape or colza seeds, whether or not broken, other than low erucic acid	404,941	0
Chapter 12 (Oil Seeds and Related Products)-Gross		**1,443,258,359**	**100**

Source: Statistics Canada (2021a)

Table 7: Canola oil by the Harmonized System (HS) Code and Alberta's exports in 2019

HS Code	Product	2019 (CAN$)	2019 (% of Ch 12)
151411	Low erucic acid rape or colza oil and its fractions, crude	828,981,126	77
151419	Low erucic acid rape or colza oil and its fractions, refined	113,033,303	11
151491	Rape, colza or mustard oil, other than low erucic acid, crude	27	0
151499	Rape, colza, other than low erucic & mustard oil & fractions, refined	195,049	0
Chapter 15 (Animal or Vegetable Fats and Oils)-Gross		**1,076,334,513**	**100**

Source: Statistics Canada (2021a)

Figures 1 through 8 below provide an overview of Alberta's agri-food exports by presenting the aggregate value of exports, the distribution of major products, the top markets, and the proportions of primary agriculture and value-added exports over time.

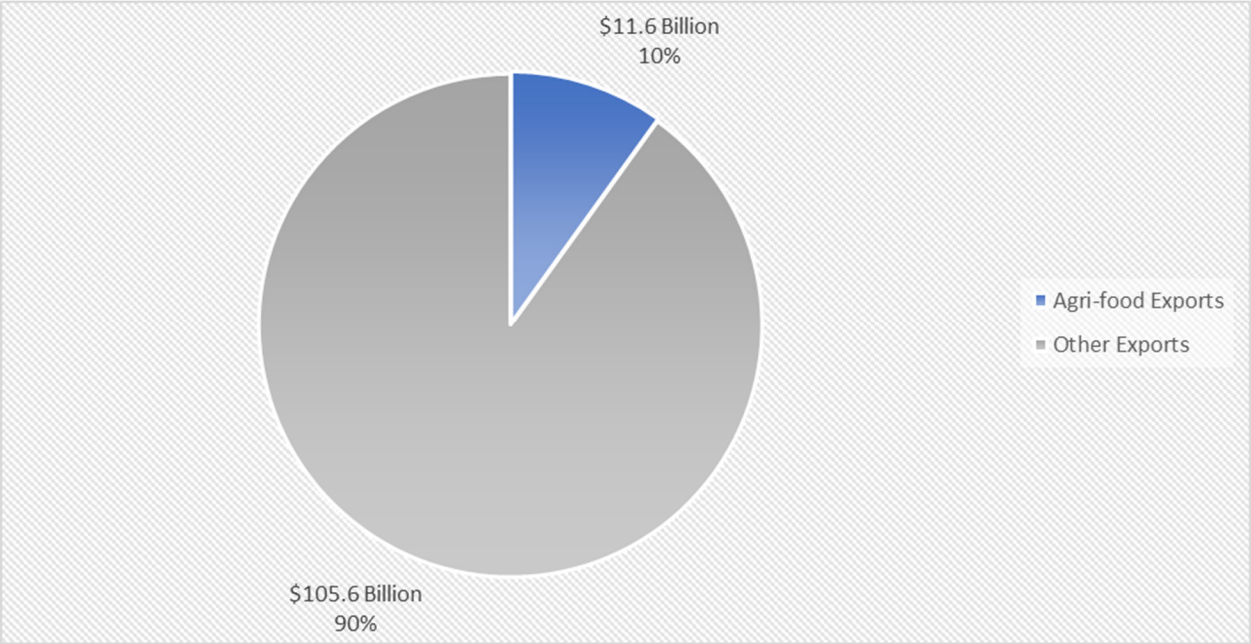

Figure 1: Share of Alberta's agri-food exports to the provincial total exports in 2019
Sources: Alberta Agriculture and Forestry (2020); Statistics Canada (2021a)

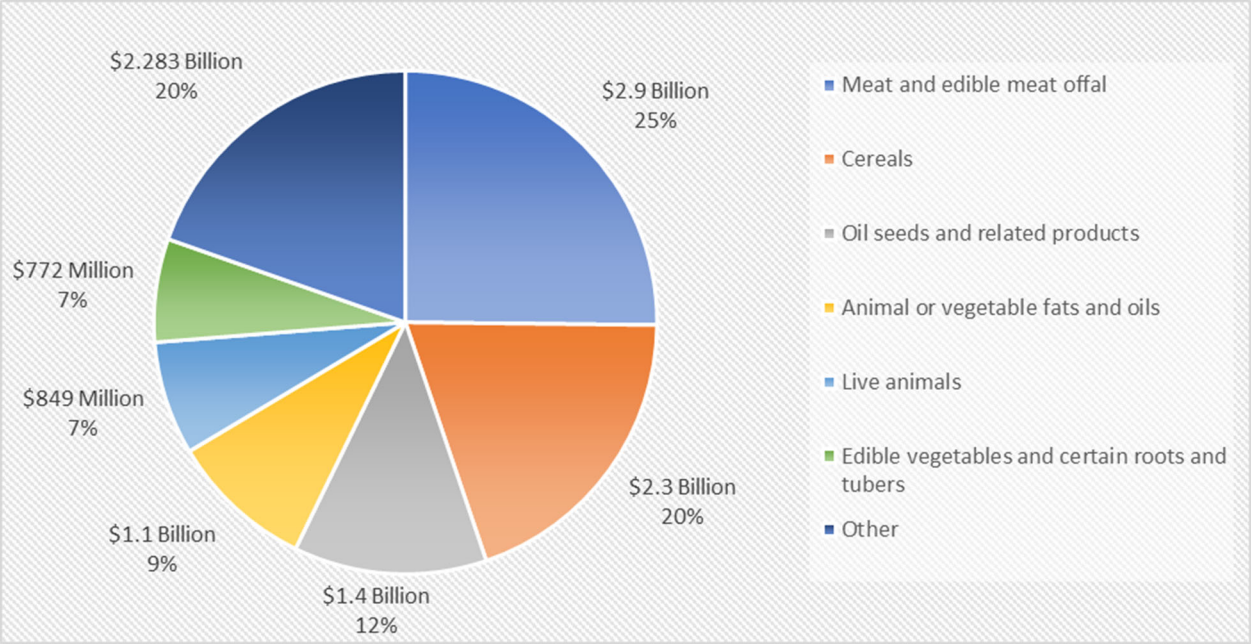

Figure 2: Alberta's major agri-food exports by the Harmonized System (HS) category in 2019
Sources: Alberta Agriculture and Forestry (2020); Statistics Canada (2021a)

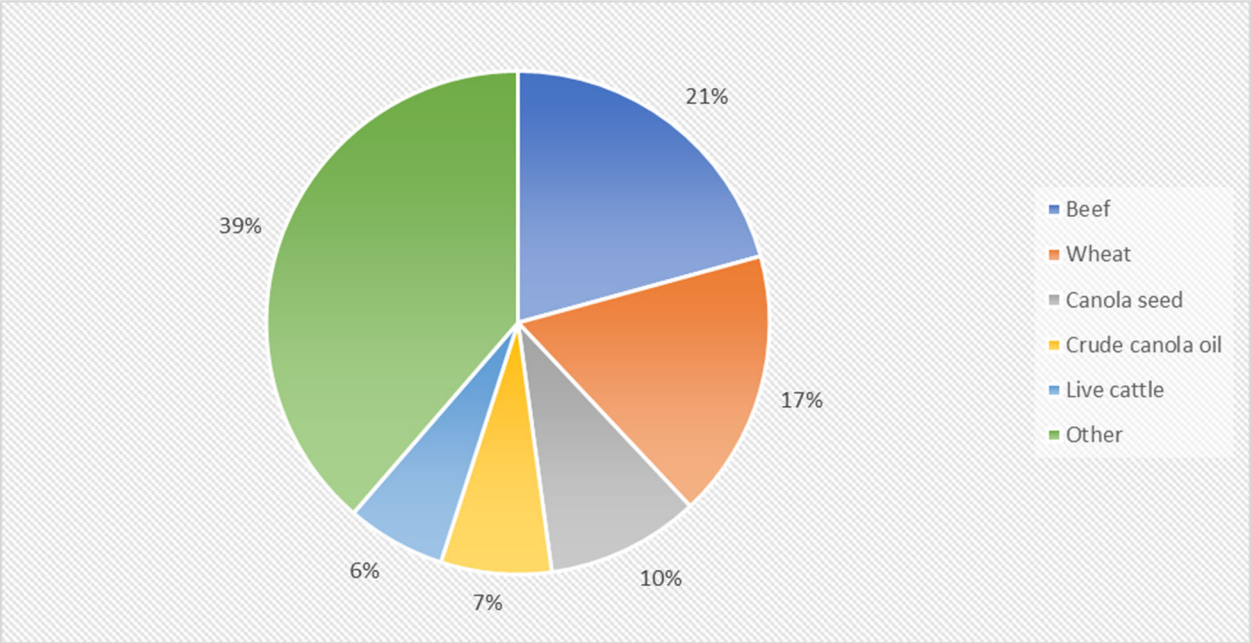

Figure 3: Top five products of Alberta agri-food exports in 2019
Source: Government of Alberta (2020)

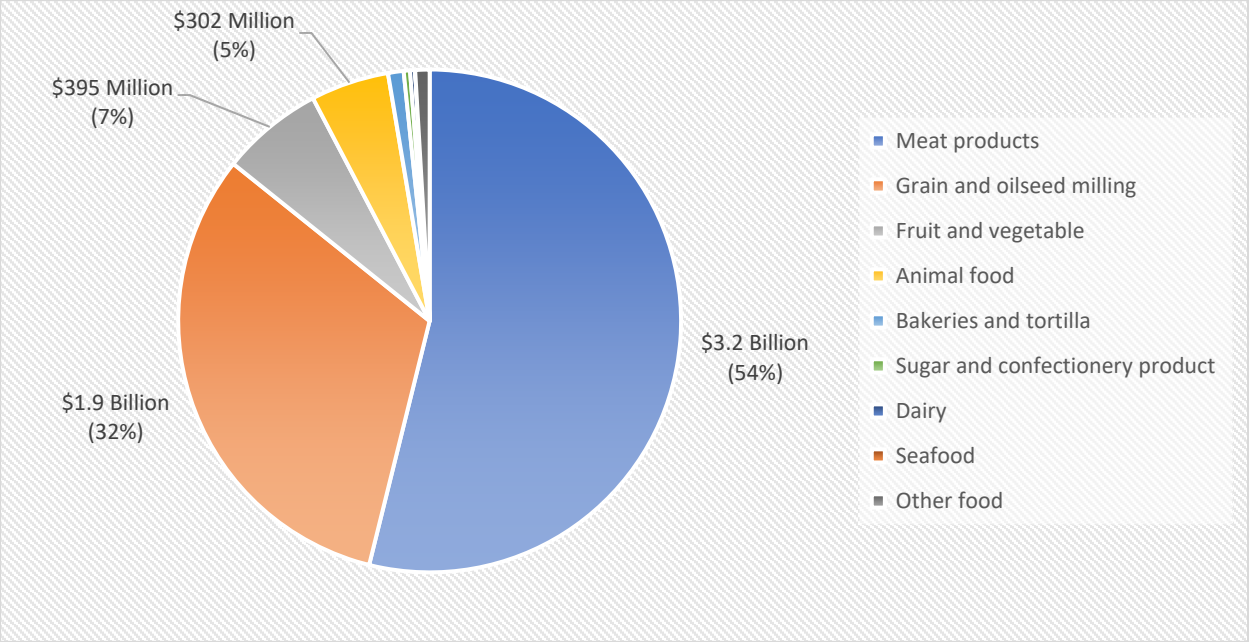

Figure 4: Distribution of Alberta food manufacturing exports in 2019
Source: Government of Canada (2021)

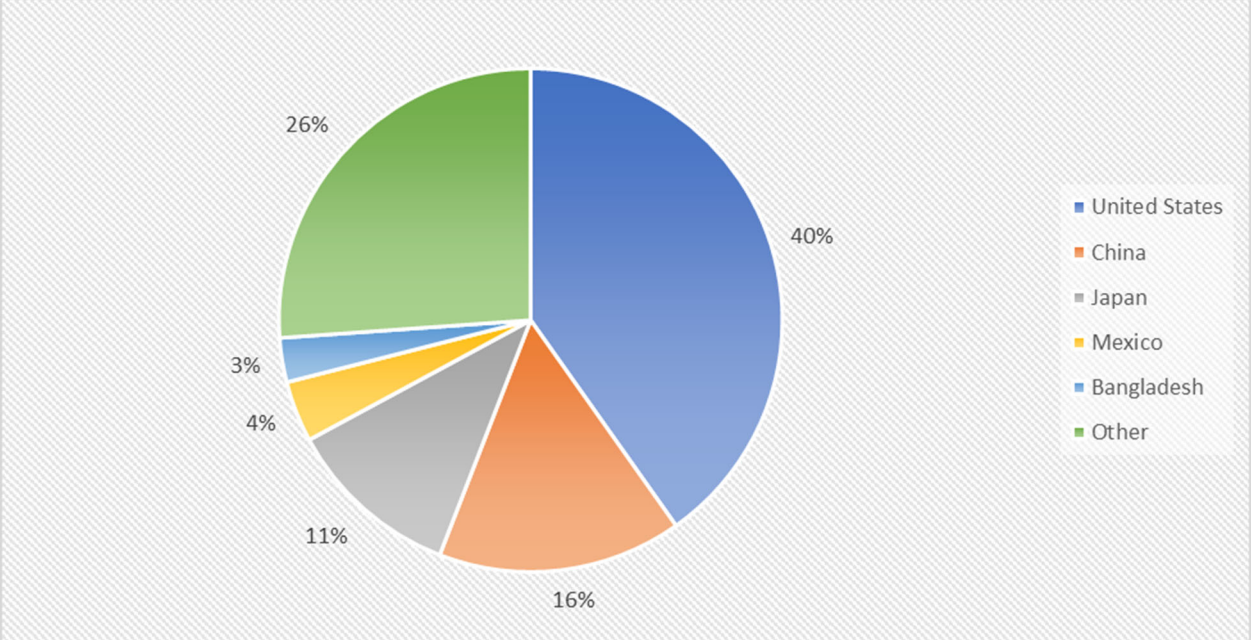

Figure 5: Top five markets for Alberta agri-food exports in 2019
Source: Government of Alberta (2020)

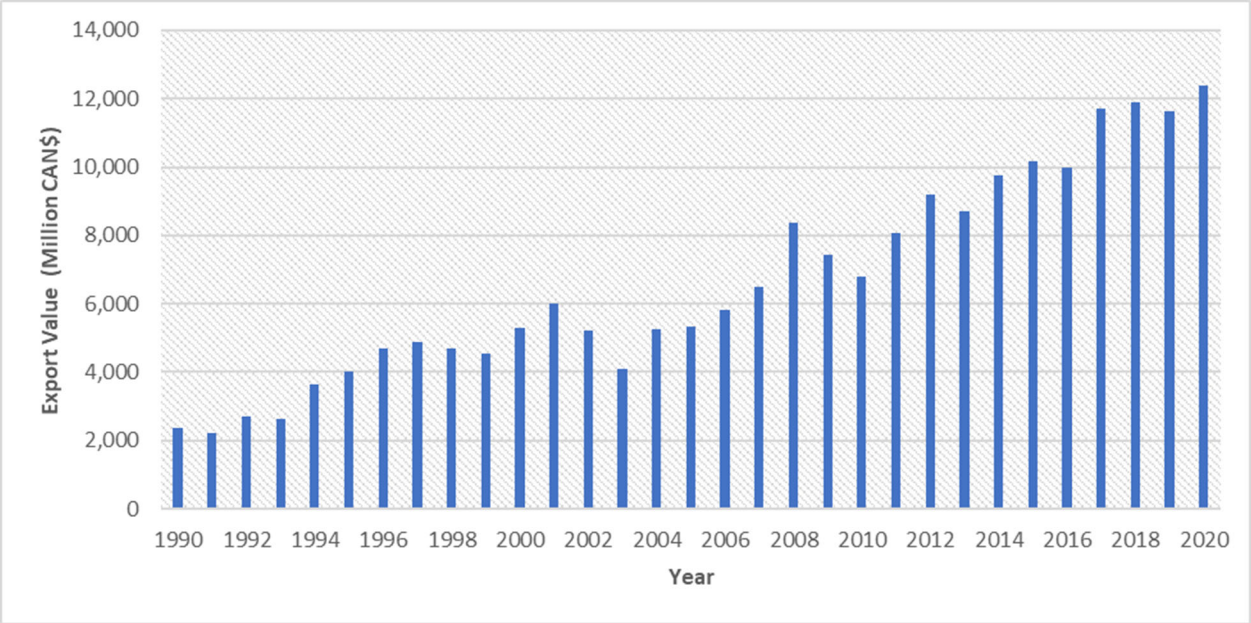

Figure 6: Alberta's total agri-food exports to the world, nominal terms, 1990 – 2020
Sources: Alberta Agriculture and Forestry (2020); Government of Alberta (2021)

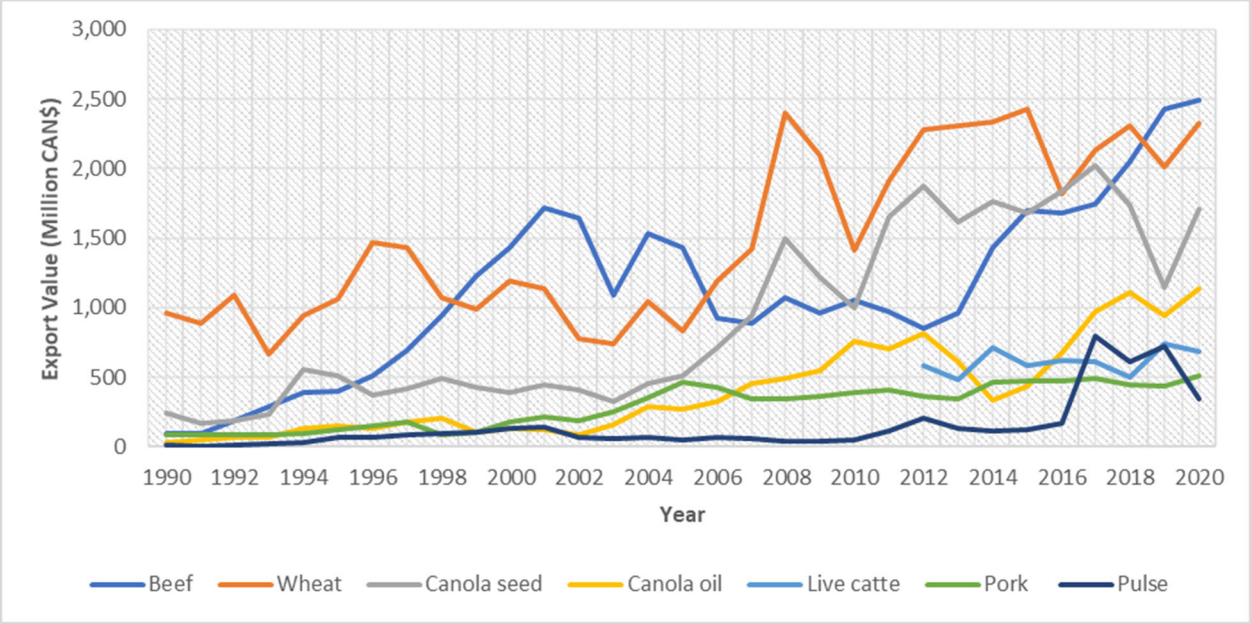

Figure 7: Alberta's major agri-food exports, nominal terms, 1990-2020
Source: Statistics Canada (2021a)

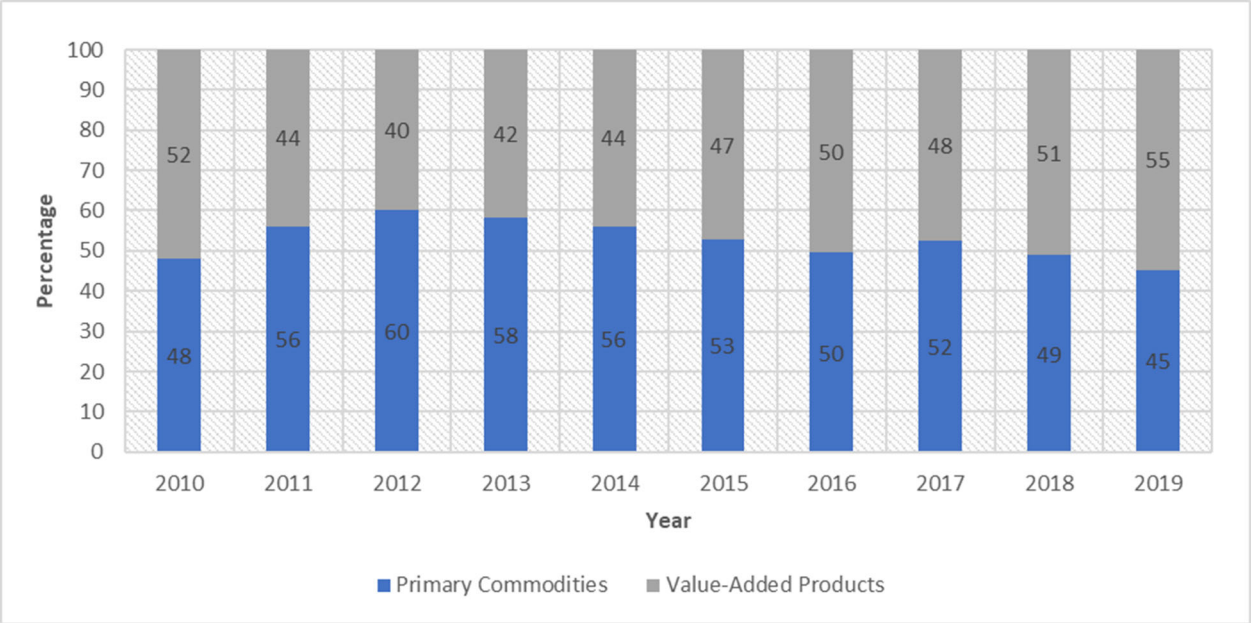

Figure 8: Proportions of primary agriculture and value-added products to Alberta's total agri-food exports, 2010 – 2019
Source: Alberta Agriculture and Forestry (2020)

Production and Exports of Agri-food Products in Alberta and Canada

The historical production and exports of Alberta's and Canada's major agri-food products over the last three decades are presented in Figures 9-24 using data obtained from the Canadian International Merchandise Trade Database and other sources from Statistics Canada.

Between 2003 and 2019, Alberta exported 276 thousand tonnes of beef annually on average, representing 38 per cent of its production and accounting for 75 per cent of the national beef exports. Pork exports were 116 thousand tonnes, representing 48 per cent of Alberta's pork production and accounting for 13 per cent of the national pork exports.

Between 1990 and 2019, Alberta exported 5.6 million tonnes of wheat annually, representing 73 per cent of its production and accounting for 30 per cent the national wheat exports. Alberta exported 1.9 million tonnes of canola seed, representing 54 per cent of its production and accounting for 34 per cent of the national canola seed exports. It also exported 407 thousand tonnes of canola oil, accounting for 29 per cent of the national canola oil exports. Alberta exported 353 thousand tonnes of pulses, representing 35 per cent of its production and accounting for 10 per cent of the national pulses exports.

Between 2000 and 2020, Alberta exported 367 thousand of live cattle and 600 thousand of live hogs per year, representing 3 per cent of the province's total supply of cattle and 10 per cent of total supply of hogs, respectively.

a. Beef

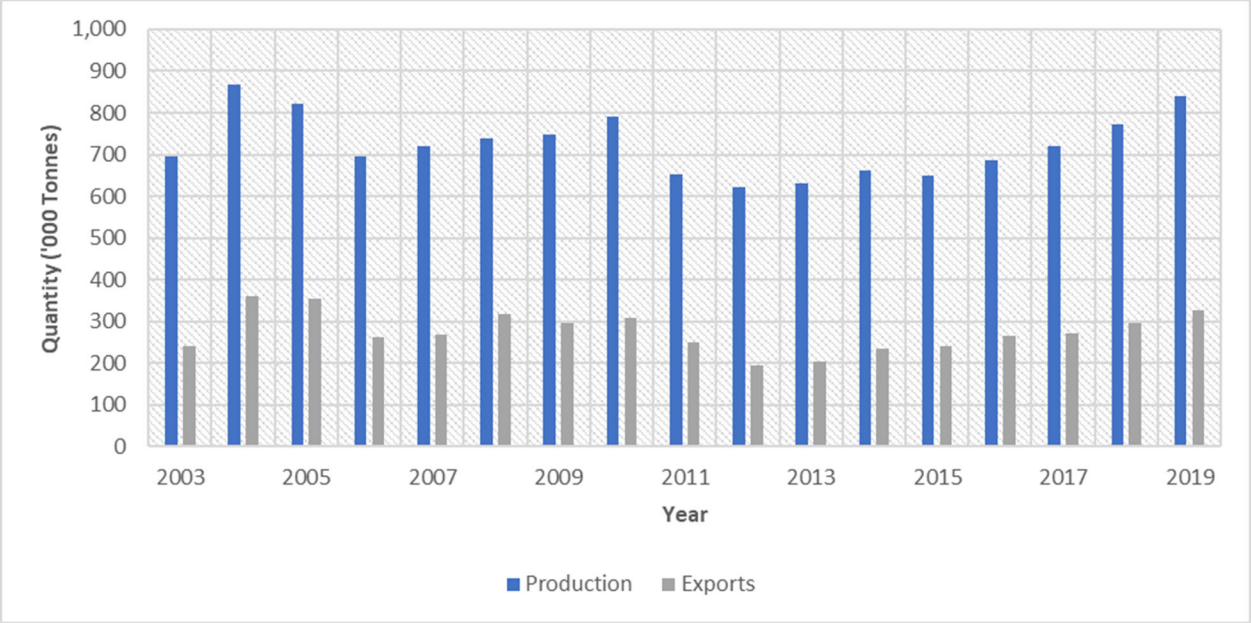

Figure 9: Alberta beef production and exports, 2003-2019
Note: Alberta's beef production was derived from the Western Canada's beef production by using Alberta's share of slaughter of cattle to Western Canada's slaughter of cattle.

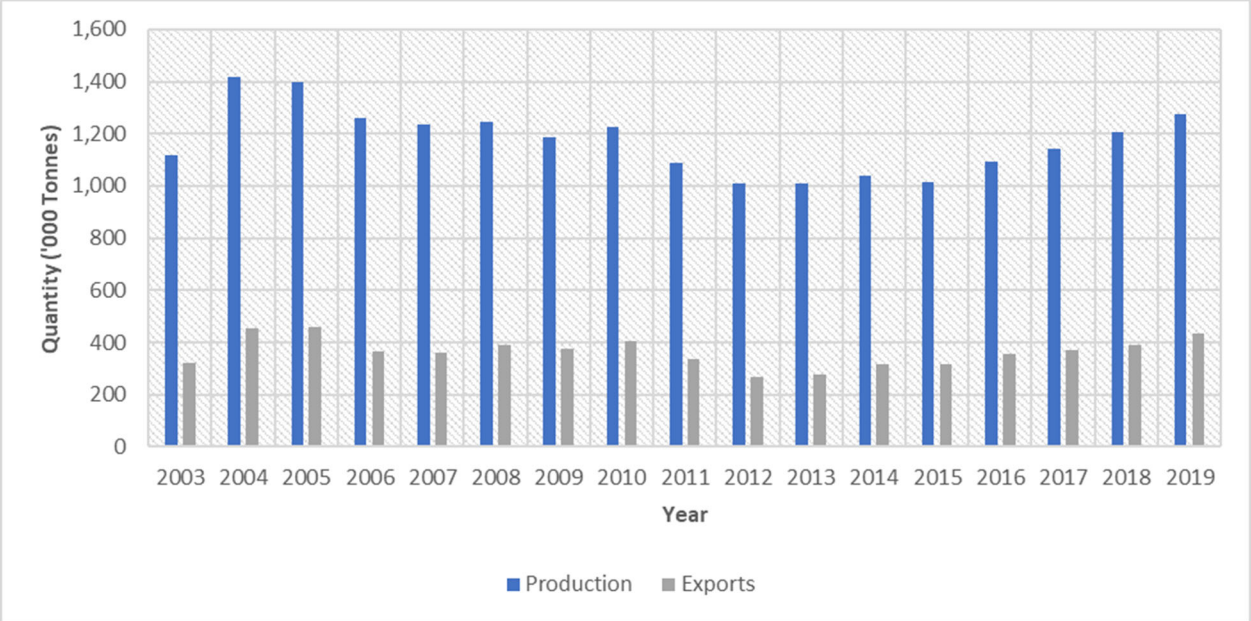

Figure 10: Canada beef production and exports, 2003-2019
Sources: Alberta Agriculture and Forestry (2020); Statistics Canada (2021a; 2021b)

b. Wheat

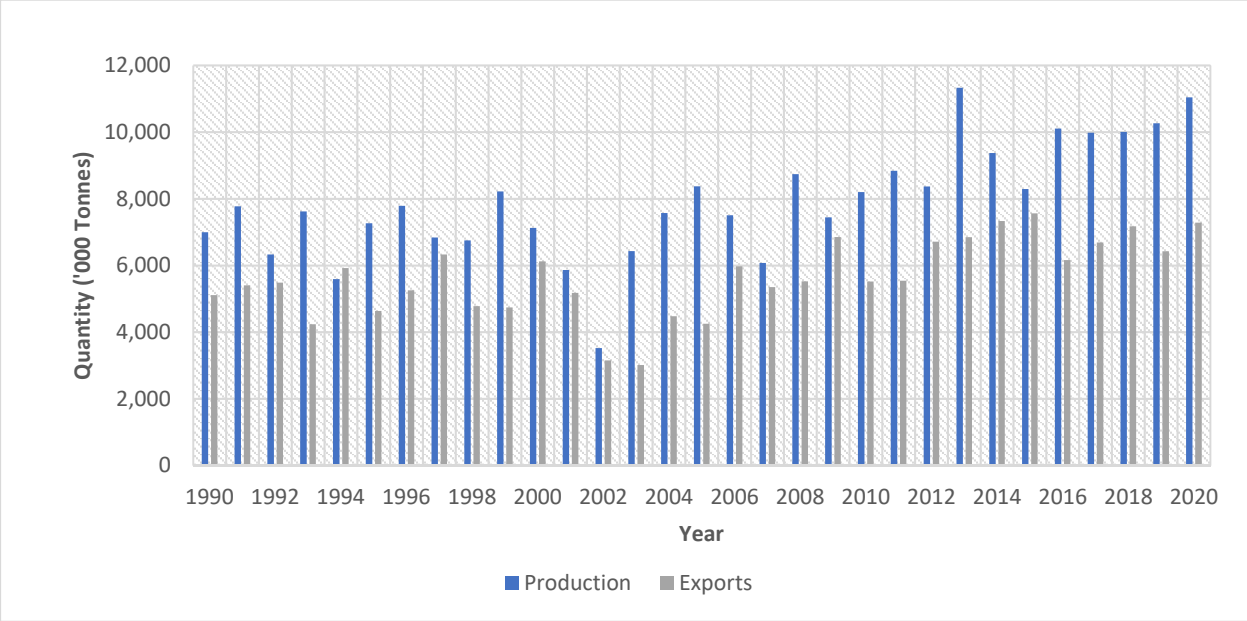

Figure 11: Alberta wheat production and exports, 1990-2020

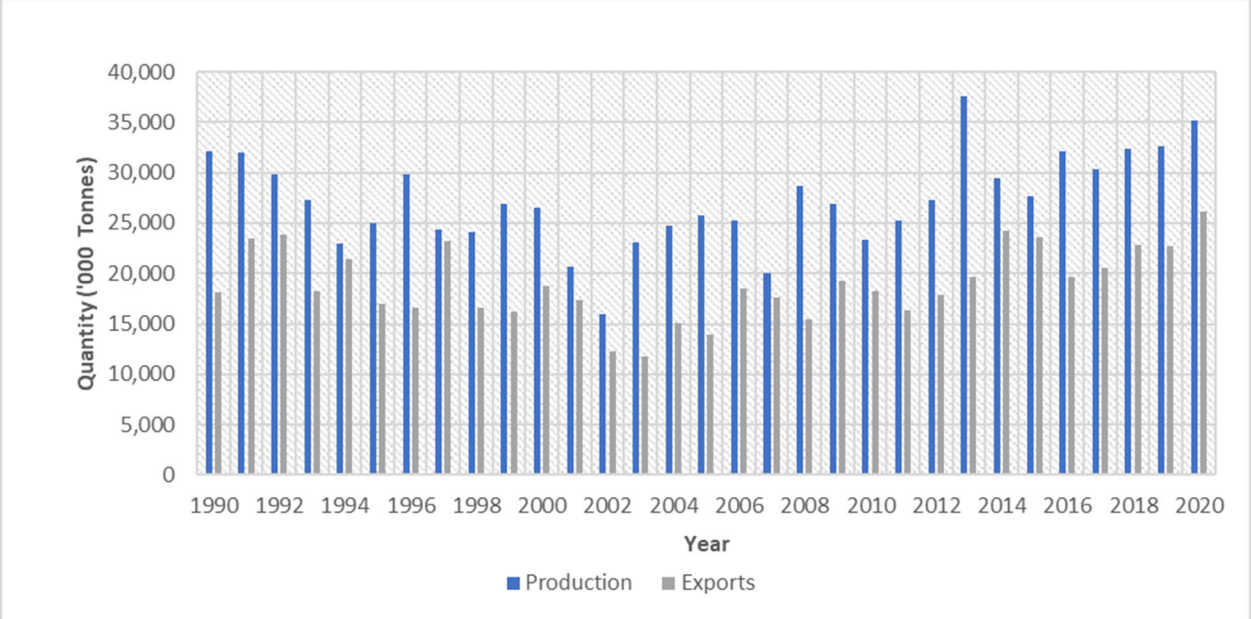

Figure 12: Canada wheat production and exports, 1990-2020
Sources: Statistics Canada (2021a; 2021c)

c. Canola Seed

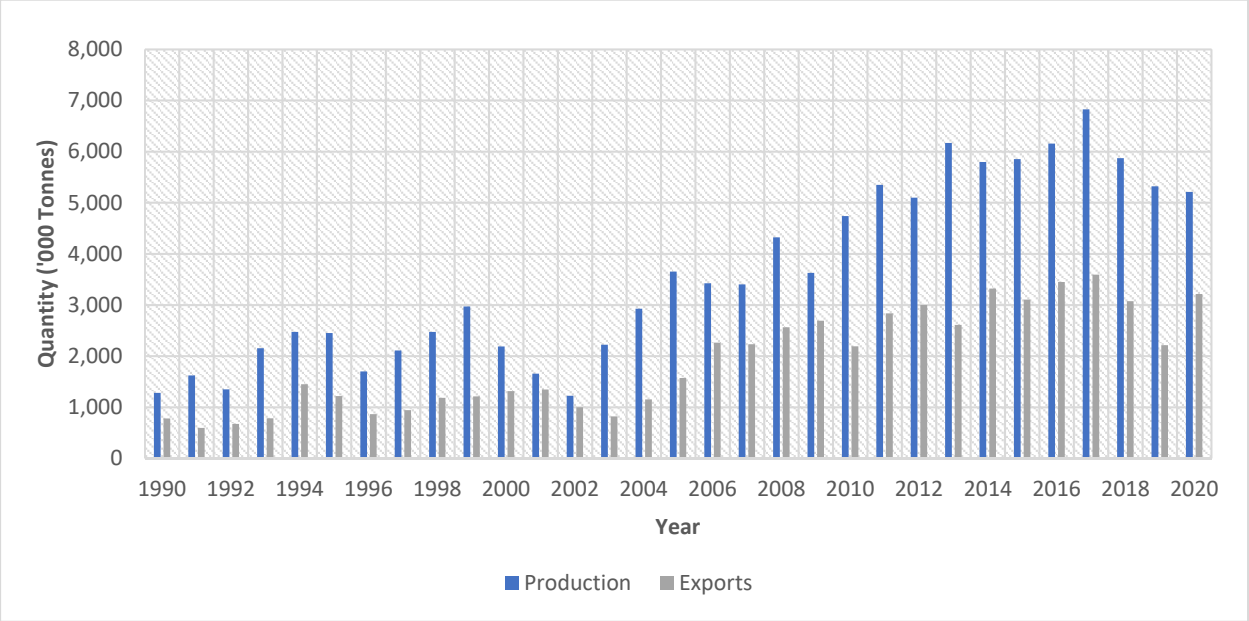

Figure 13: Alberta canola seed production and exports, 1990-2020

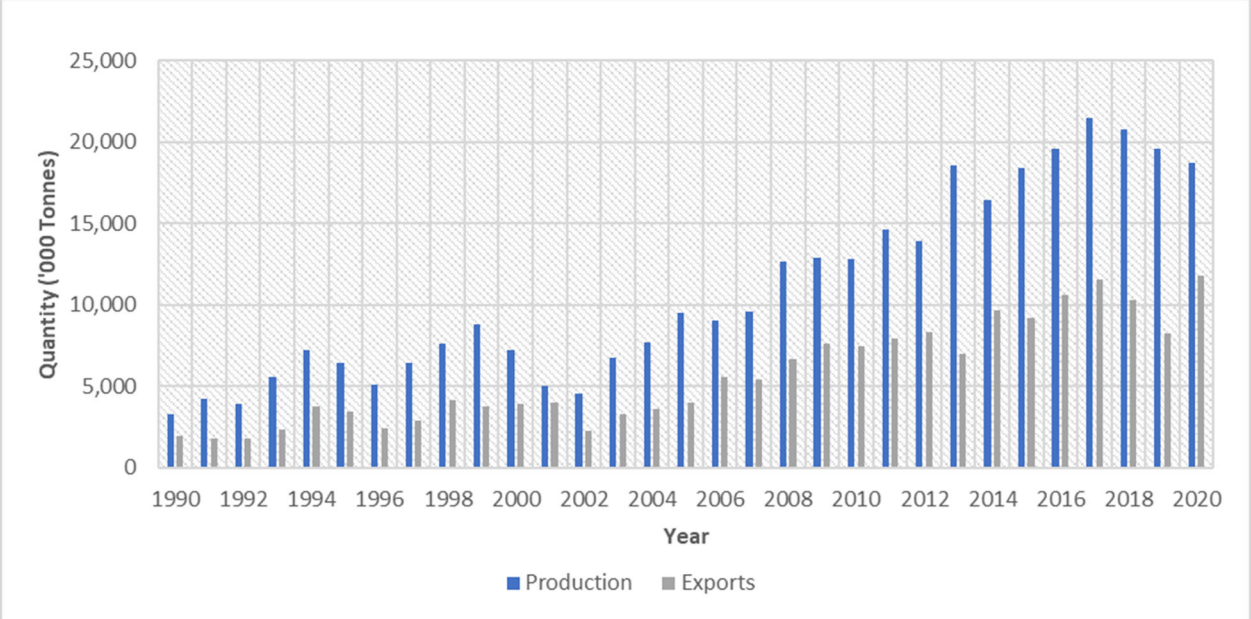

Figure 14: Canada canola seed production and exports, 1990-2020
Sources: Statistics Canada (2021a; 2021c)

d. Canola oil

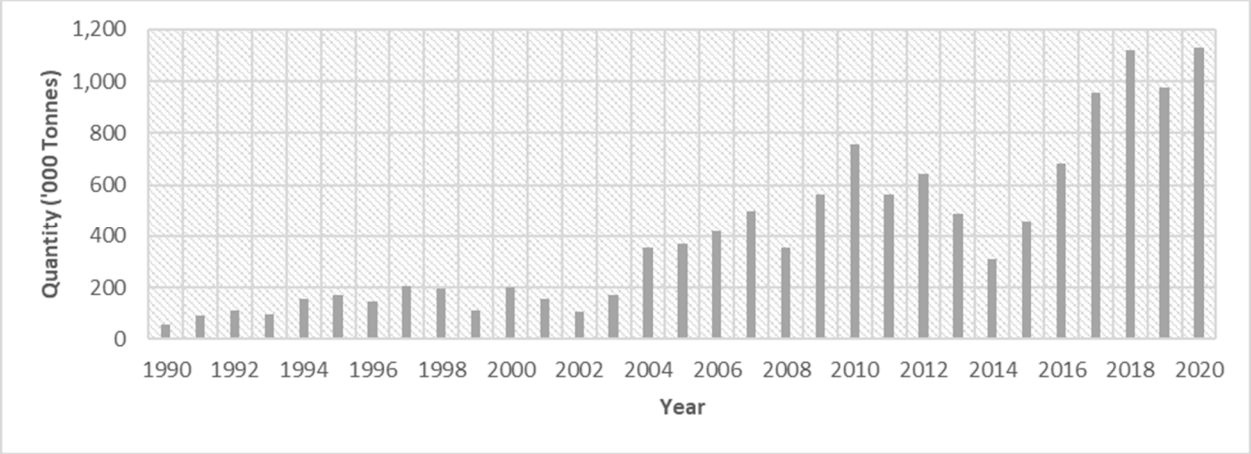

Figure 15: Alberta canola oil exports, 1990-2020

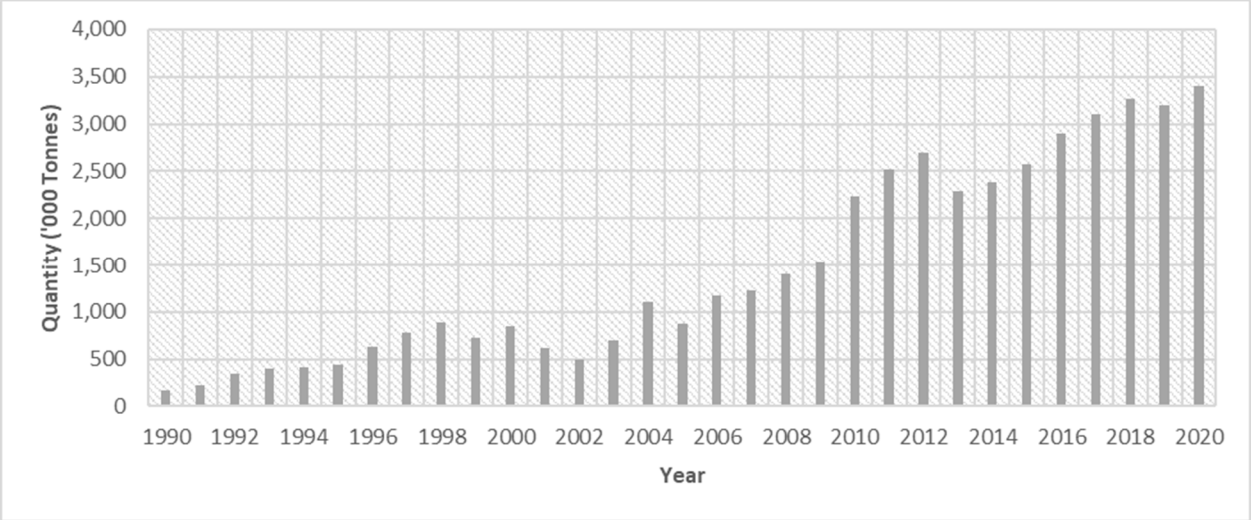

Figure 16: Canada canola oil exports, 1990-2020
Sources: Statistics Canada (2021a)

e. Pulses

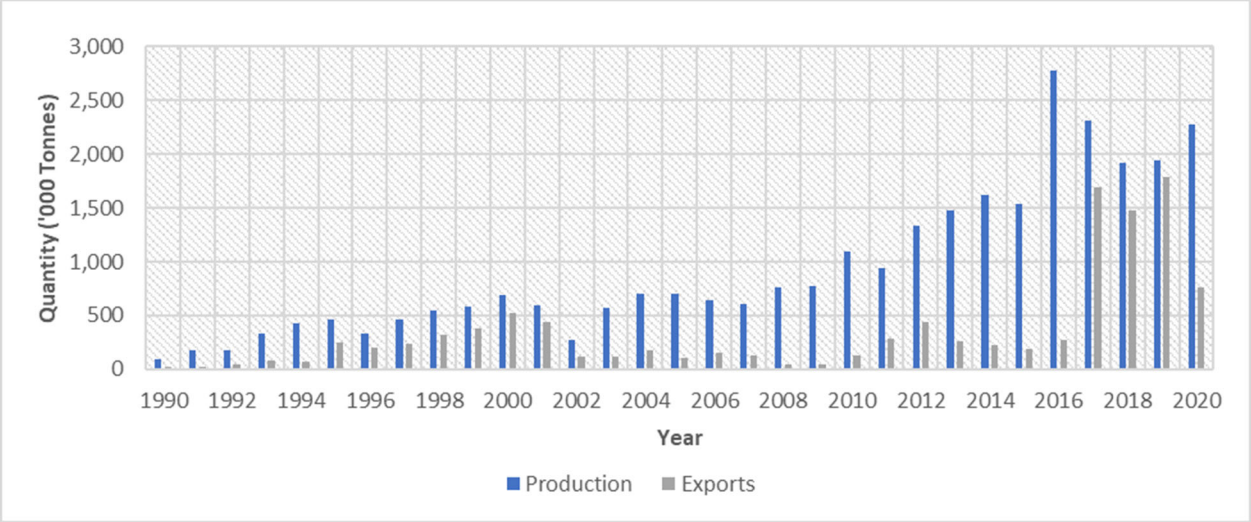

Figure 17: Alberta pulses production and exports, 1990-2020

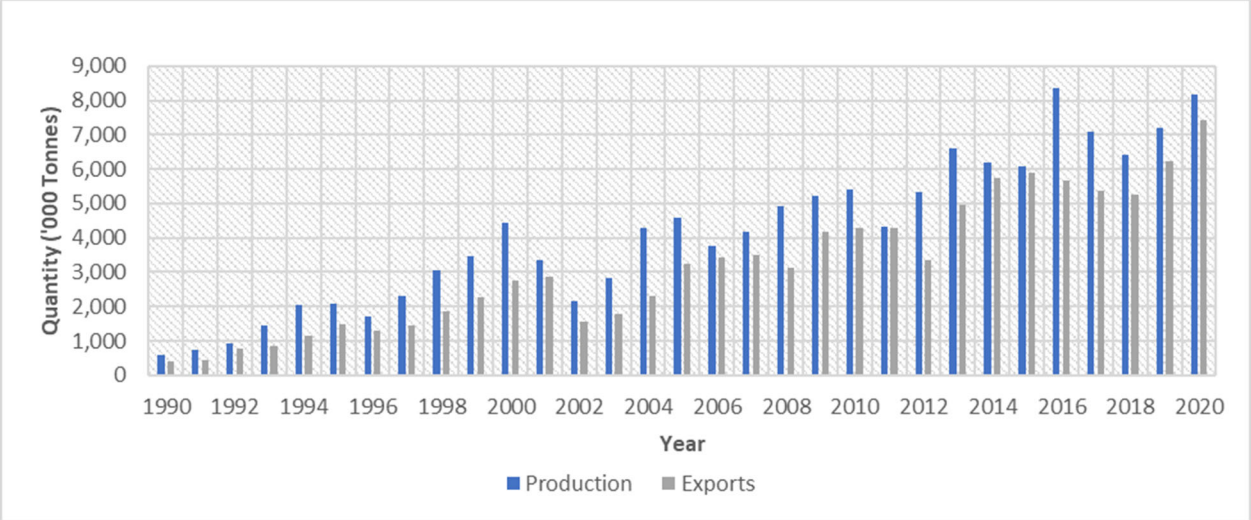

Figure 18: Canada pulses production and exports, 1990-2020
Sources: Statistics Canada (2021a; 2021c)

f. Live animals

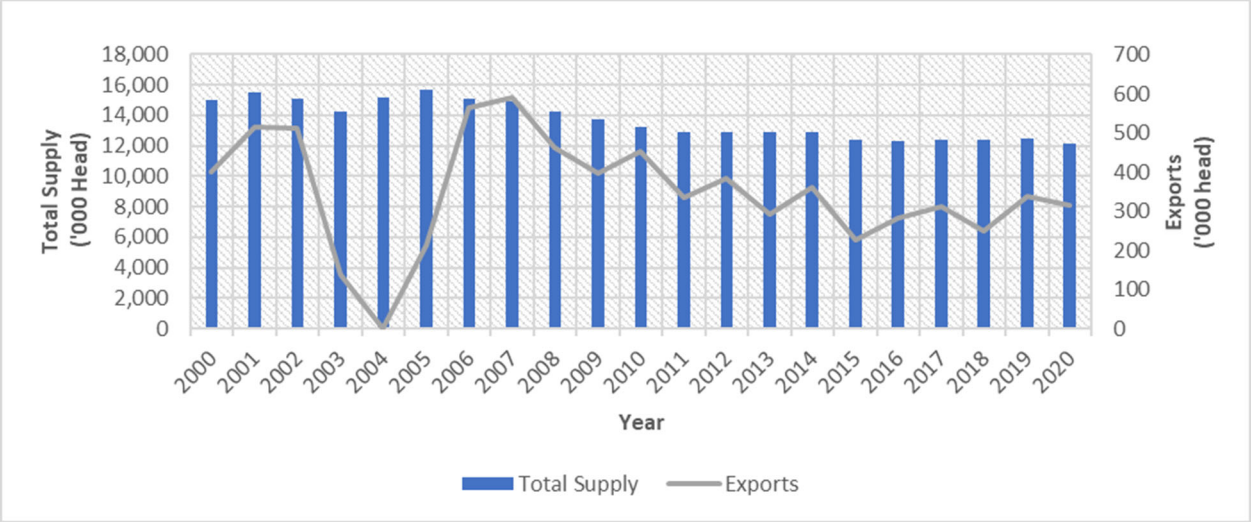

Figure 19: Alberta total supply and exports of live cattle, 2000-2019

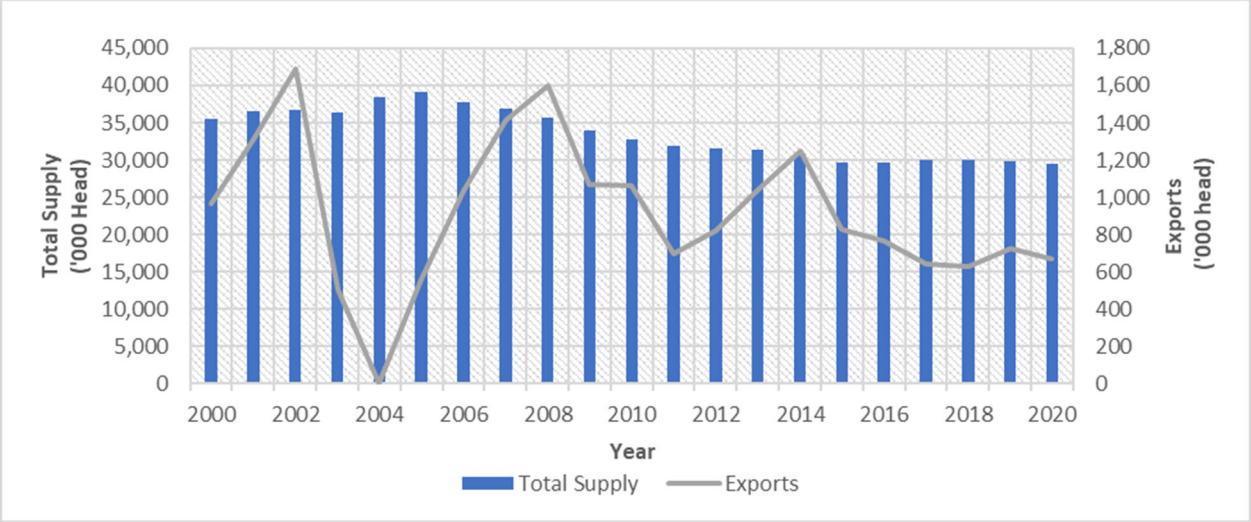

Figure 20: Canada total supply and exports of live cattle, 2000-2019
Sources: Statistics Canada (2021a; 2021b)

Figure 21: Alberta total supply and exports of live hogs, 2001-2020

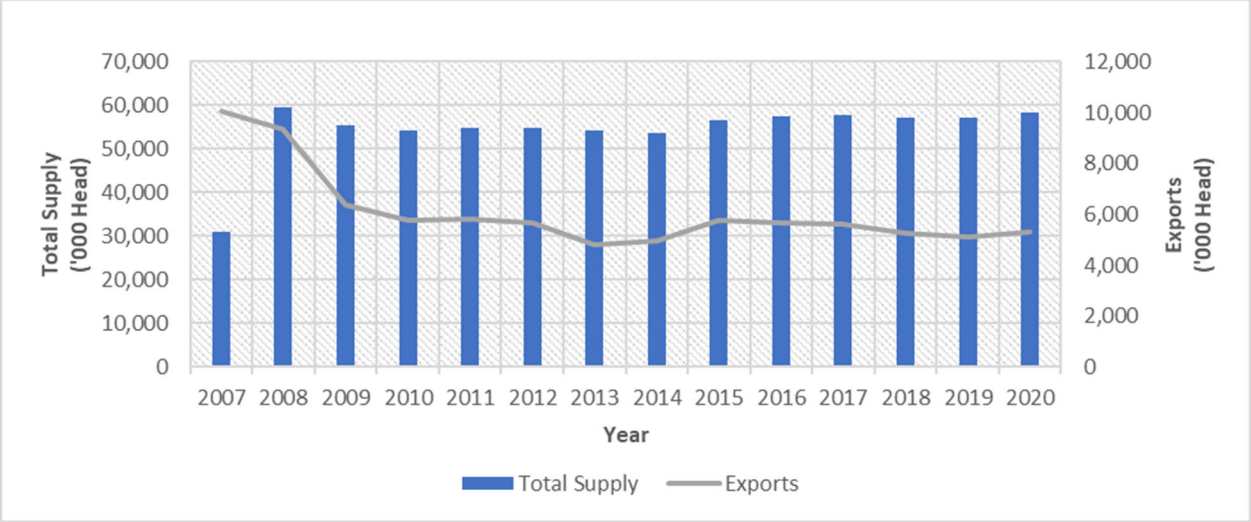

Figure 22: Canada total supply and exports of live hogs, 2001-2020
Sources: Statistics Canada (2021a; 2021d)

g. Pork

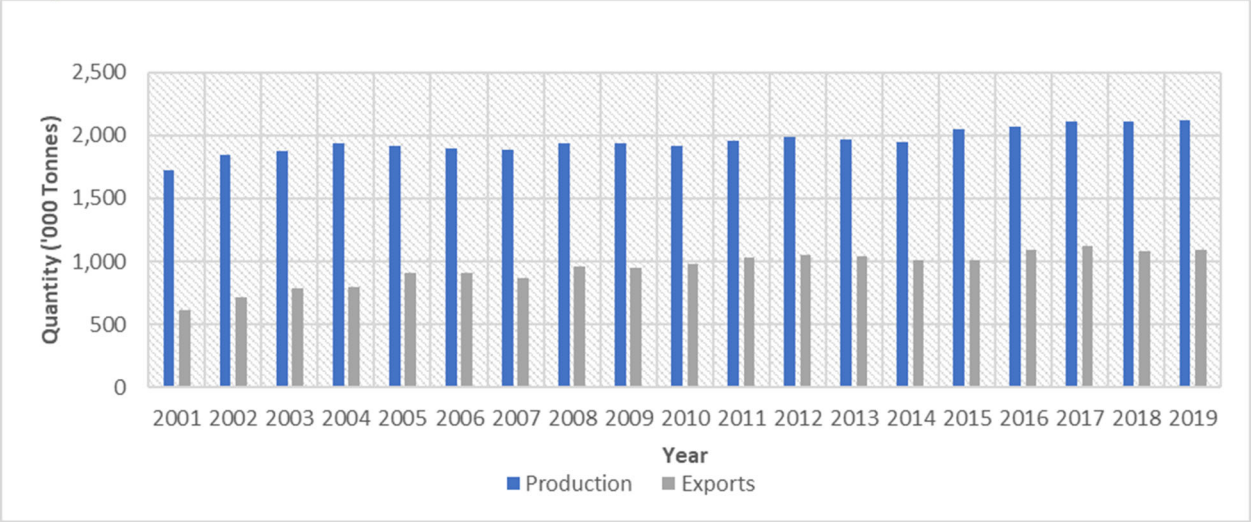

Figure 23: Alberta pork production and exports, 2001-2019

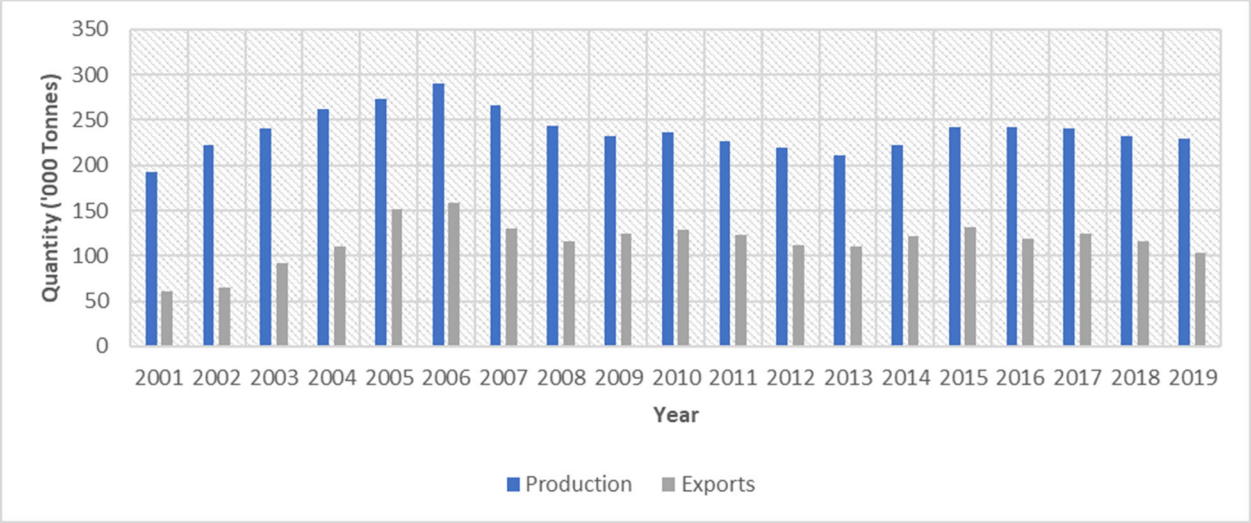

Figure 24: Canada pork production and exports, 2001-2019
Sources: Alberta Agriculture and Forestry (2020); Statistics Canada (2021a; 2021b)

Top Markets for Alberta and Canada

The top five markets for Alberta's and Canada's major agri-food products over the last three decades are presented in Figures 25-38 based on the data obtained from the Canadian International Merchandise Trade Database.

Between 1990 and 2020, Alberta exported $1.1 billion of beef annually to the world; the United States being the top market, accounting for 76 per cent ($851 million). Between 2012 and 2020, Alberta also exported $615 million of live cattle (excluding purebred) annually to the United States. Between 1990 and 2020, Alberta exported $291 million of pork annually; Japan being the top market, accounting for 45 per cent ($131 million), followed by the United States, accounting for 30 per cent ($89 million).

Alberta exported $1.5 billion of wheat annually over the last three decades. The top five markets include the United States, Japan, China, Indonesia, and Mexico, collectively accounting for one third of Alberta's wheat exports. Alberta exported $921 million of canola seed annually; Japan and China being the largest markets, accounting for 33 per cent ($304 million) and 32 per cent ($291 million), respectively. Other markets include Mexico, Pakistan, and the United States, representing 16 per cent ($145 million), nine per cent ($87 million), and seven per cent ($68 million), respectively. Alberta exported $402 million of canola oil per year; China being the top market, representing 58 per cent ($233 million), followed by the United States, representing 32 per cent ($129 million). Alberta exported $149 million of pulses annually; China being the top market, representing 31 per cent ($45 million), followed by India, representing 19 per cent ($28 million). Other markets include the United States, Bangladesh, and Colombia, representing 15 per cent ($22 million), 11 per cent ($17 million), and 4 per cent ($4 million), respectively.

a. Beef

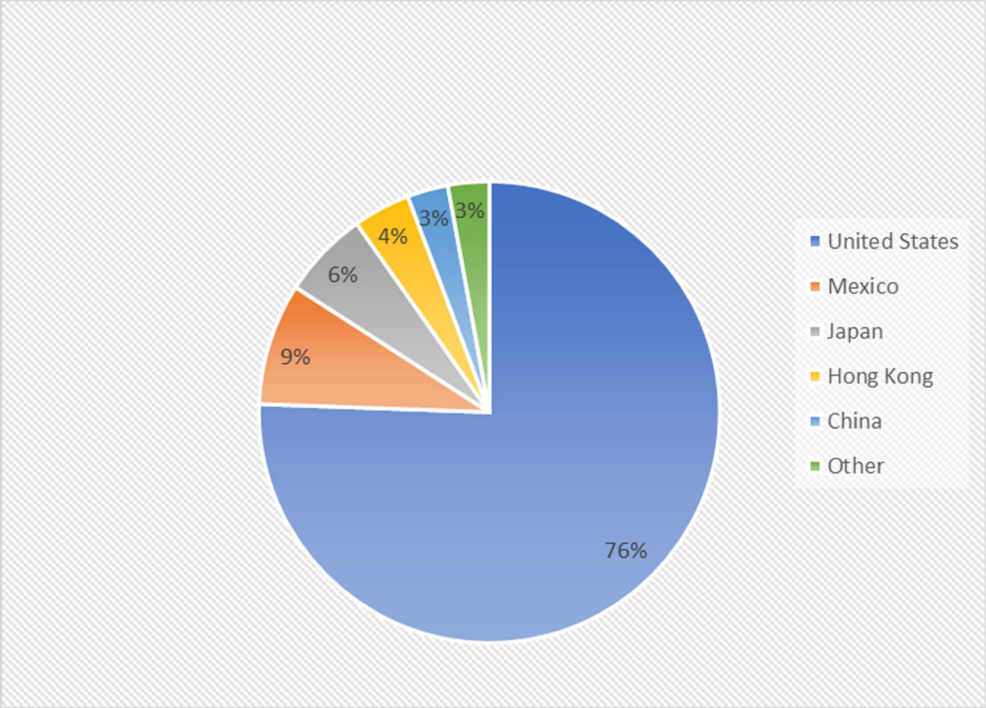

Figure 25: Top five markets for beef exports in Alberta, average 1990-2020

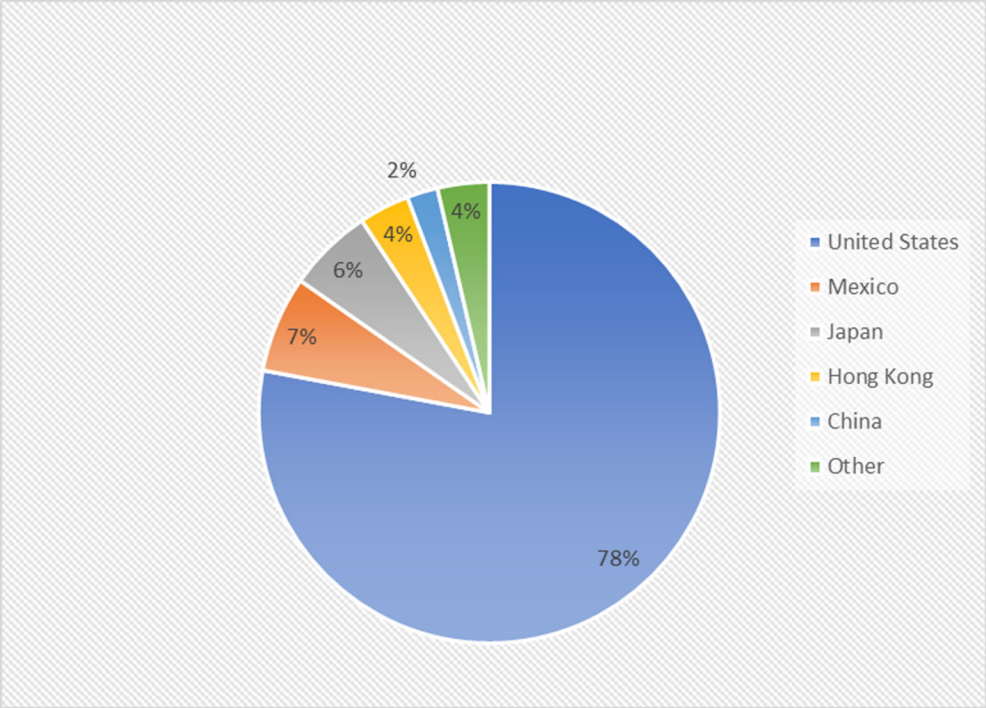

Figure 26: Top five markets for beef exports in Canada, average 1990-2020
Source: Statistics Canada (2021a)

b. Wheat

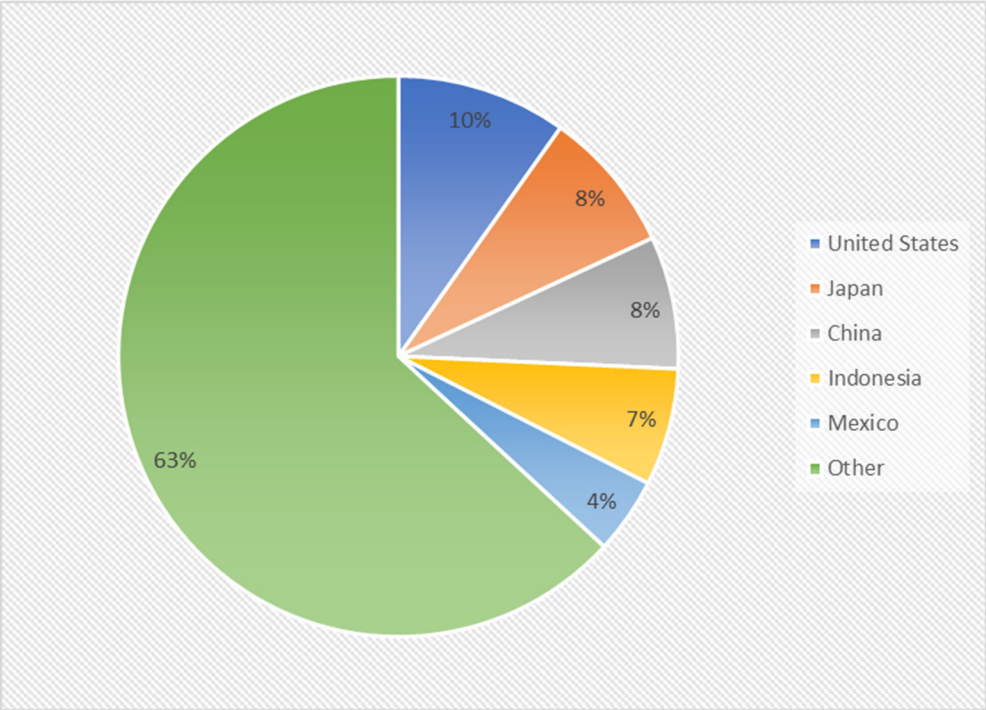

Figure 27: Top five markets for wheat exports in Alberta, average 1990-2020

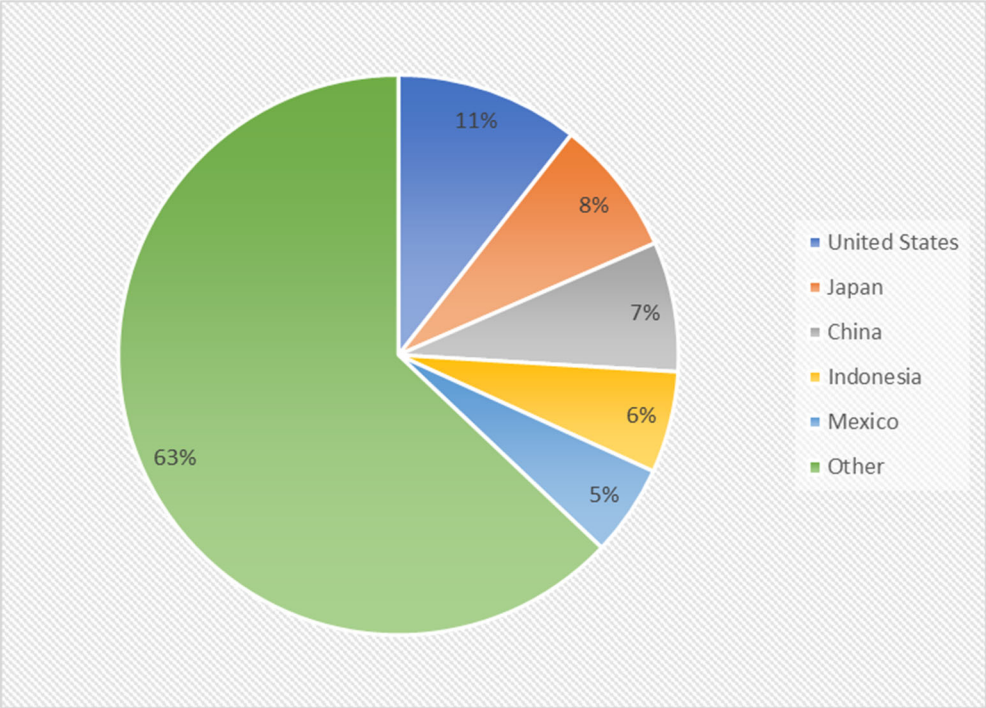

Figure 28: Top five markets for wheat exports in Canada, average 1990-2020
Source: Statistics Canada (2021a)

c. Canola Seed

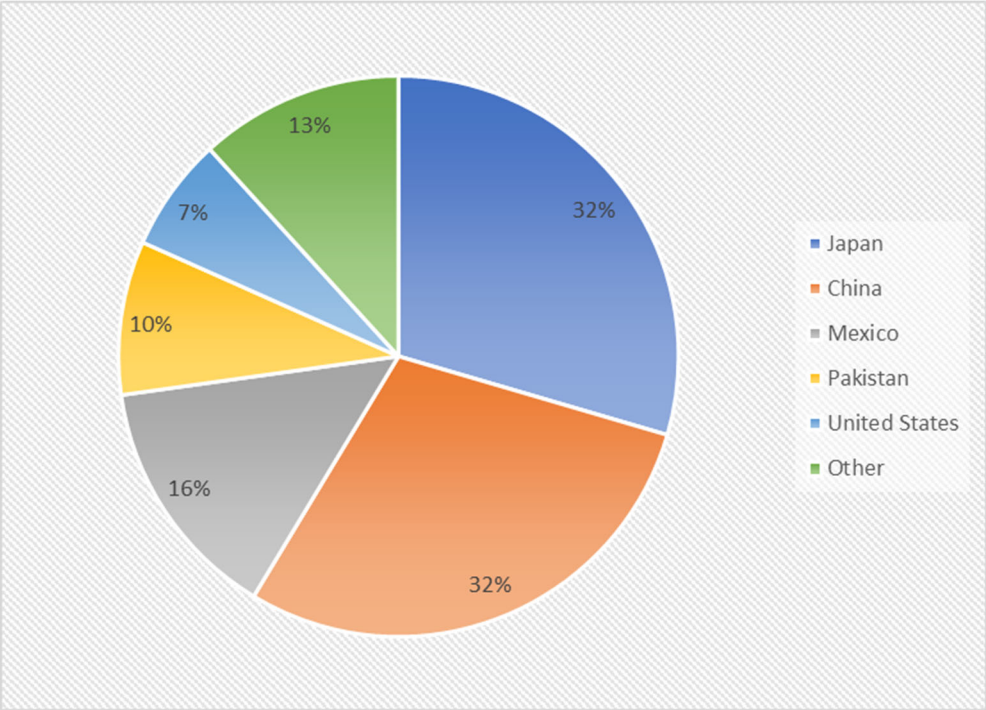

Figure 29: Top five markets for canola seed exports in Alberta, average 1990-2020

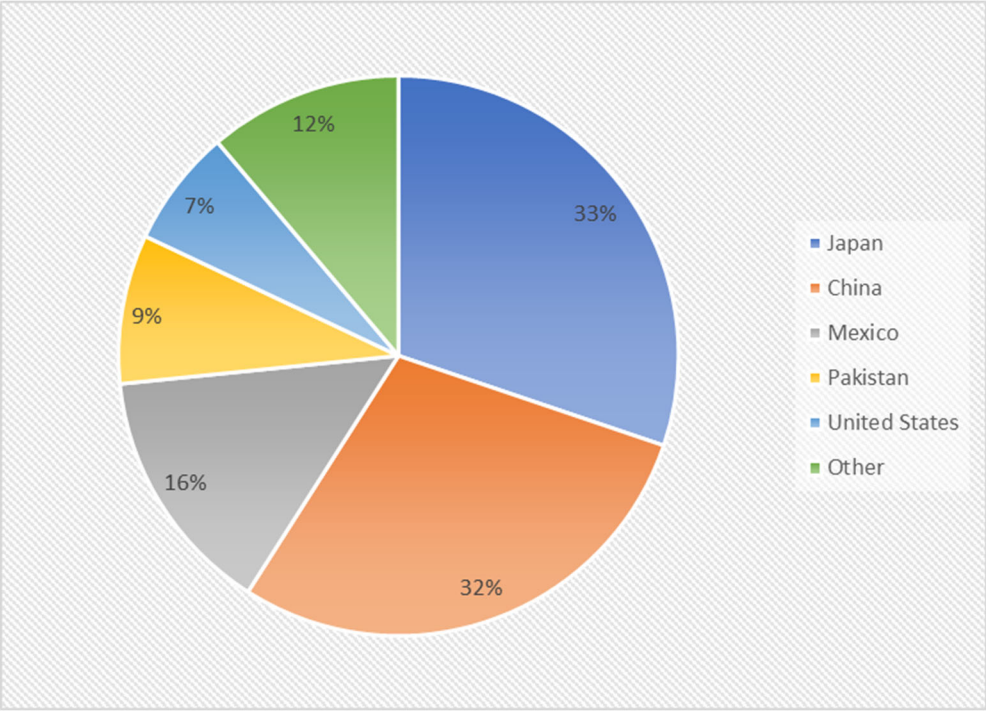

Figure 30: Top five markets for canola seed exports in Canada, average 1990-2020
Source: Statistics Canada (2021a)

d. Canola oil

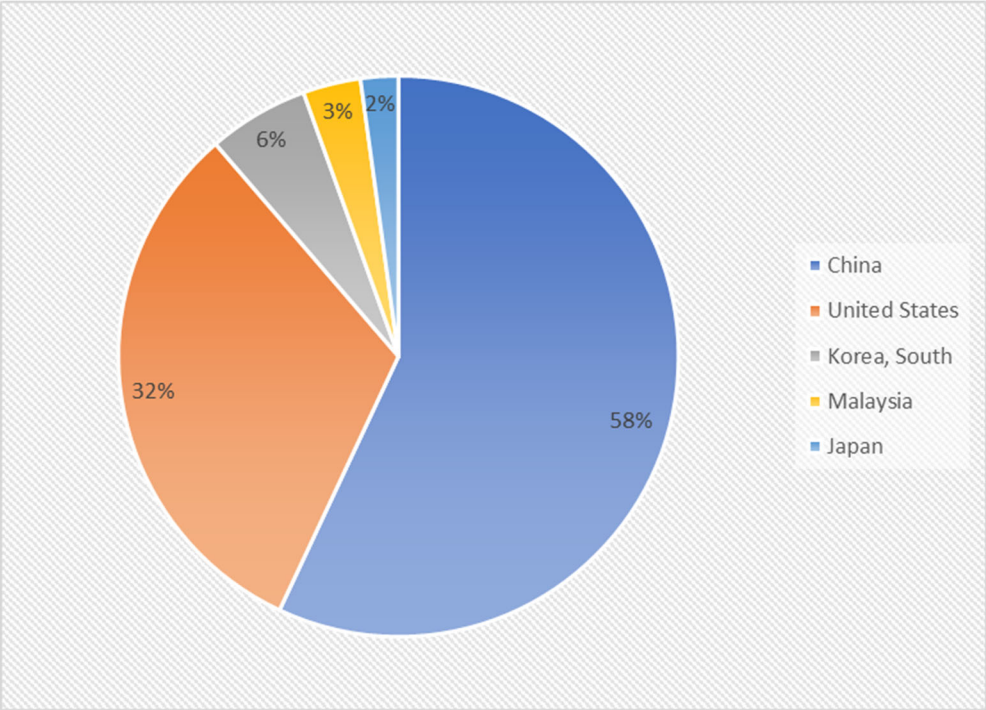

Figure 31: Top five markets for canola oil exports in Alberta, average 1990-2020

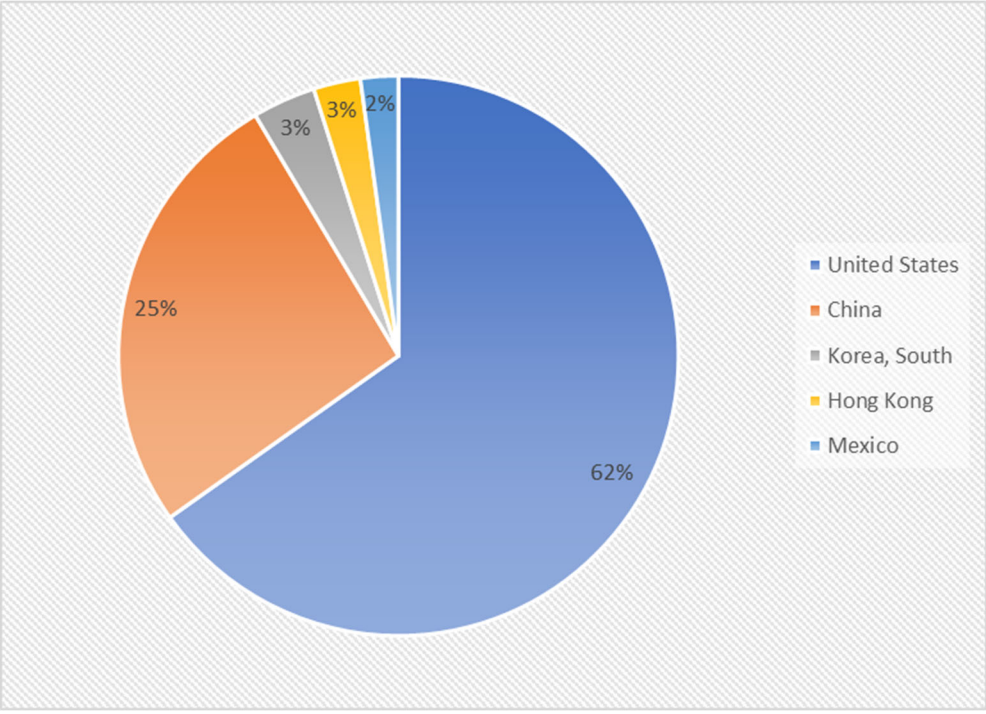

Figure 32: Top five markets for canola oil exports in Canada, average 1990-2020
Source: Statistics Canada (2021a)

e. Pulses

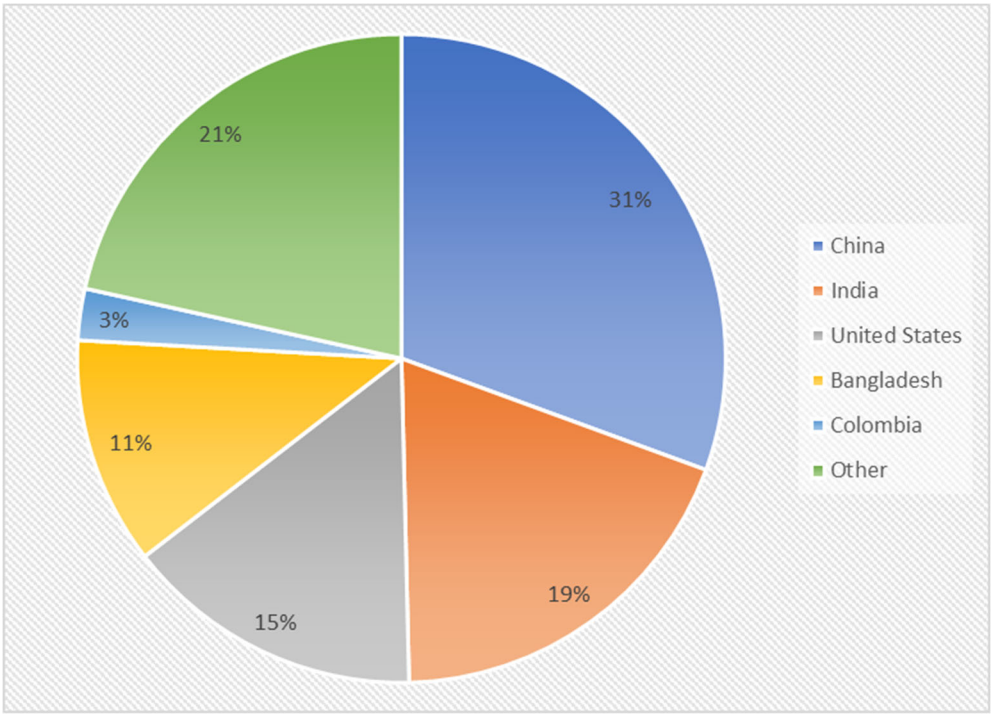

Figure 33: Top five markets for pulse exports in Alberta, average 1990-2020

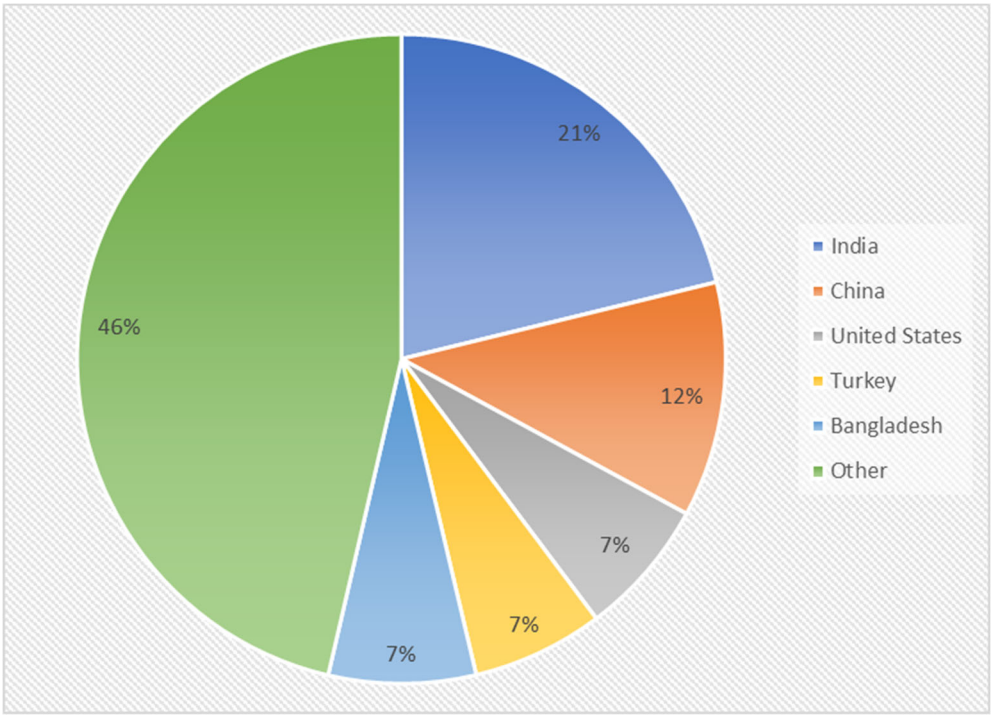

Figure 34: Top five markets for pulse exports in Canada, average 1990-2020
Source: Statistics Canada (2021a)

f. Live cattle

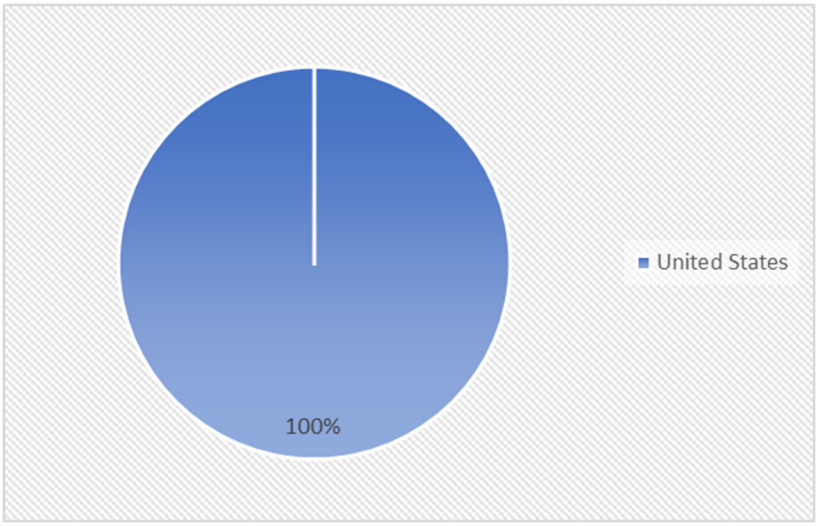

Figure 35: Top market for live cattle exports in Alberta, average 2012-2020

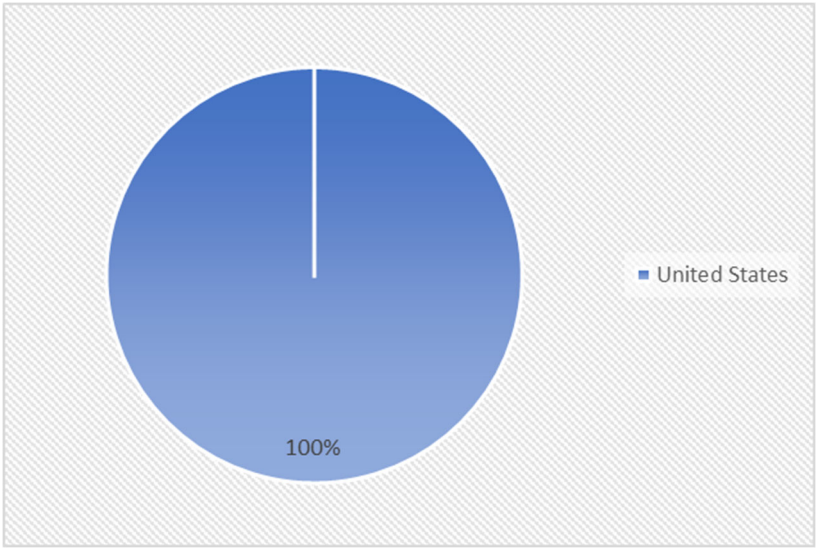

Figure 36: Top market for live cattle exports in Canada, average 2012-2020
Source: Statistics Canada (2021a)

g. Pork

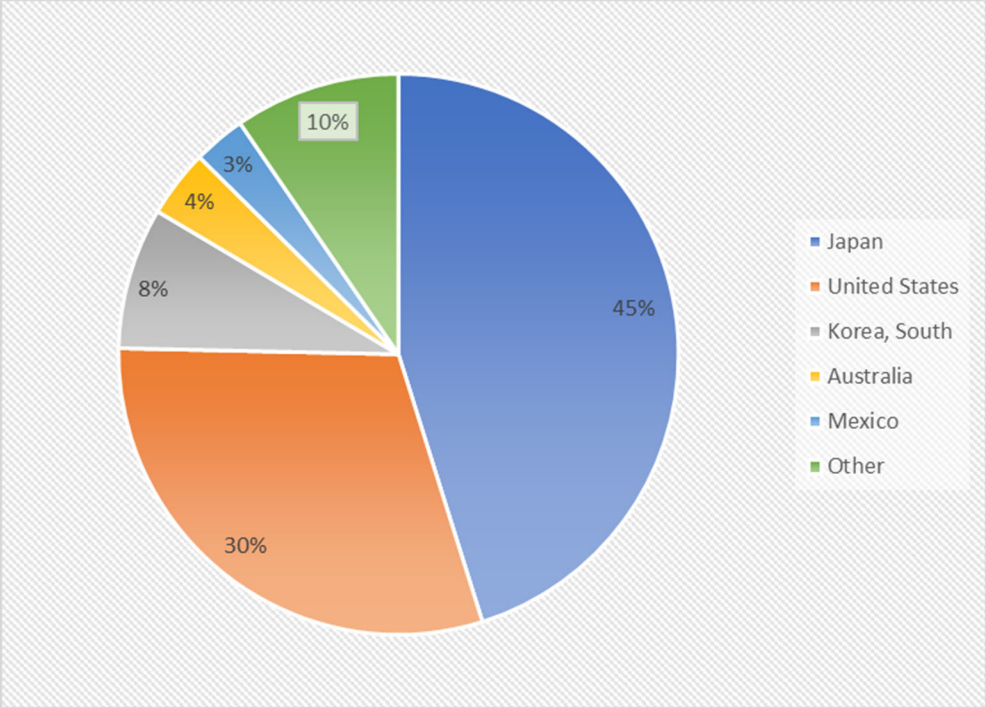

Figure 37: Top five markets for pork exports in Alberta, average 1990-2020

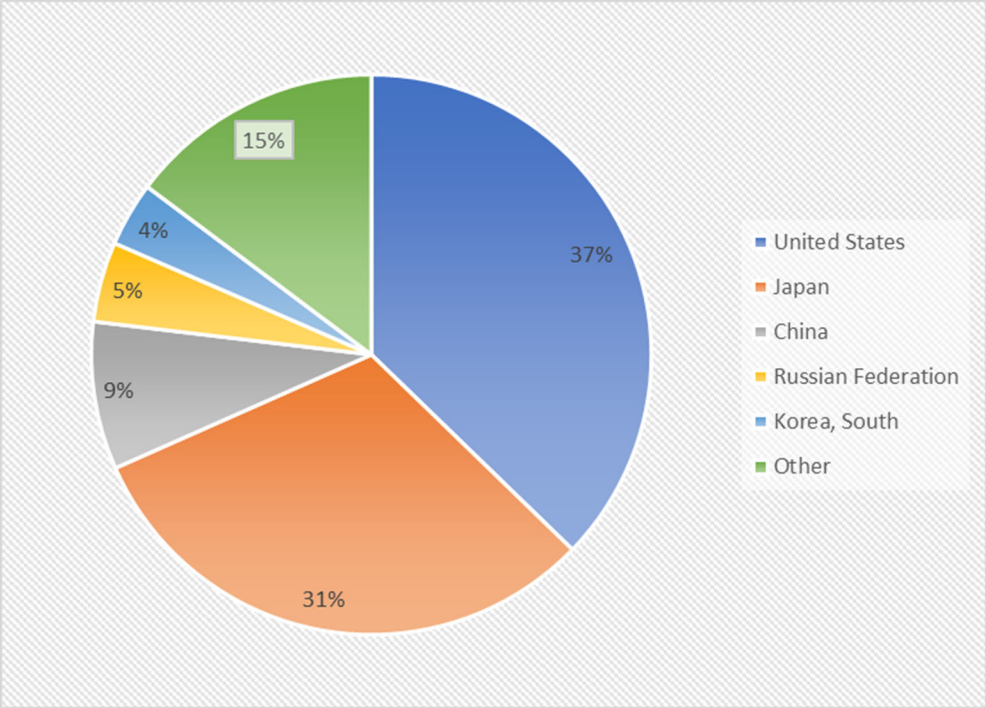

Figure 38: Top five markets for pork exports in Canada, average 1990-2020
Source: Statistics Canada (2021a)

Top Exporting Countries in the World

The world's top exporters of agri-food products over the last three decades (1990-2020) are presented in Figure 39-45 based on exports data obtained from the United Nations Comtrade Database. The role of Alberta to the global agri-food exports was also introduced by using its contribution to the national exports for each product based on the data obtained from the Canadian International Merchandise Trade Database.

Between 2011 and 2020, Canada was the world's number one exporter of canola seed, canola oil, and pulses, the second largest exporter of wheat and live cattle, the fifth largest exporter of pork, and the eighth largest exporter of beef. Alberta contributed 14 per cent (US$ 1.4 billion) to the global exports of canola seed, nine per cent (US$ 652 million) to the global exports of canola oil, eight per cent (US$ 511 million) to the global exports of live cattle, three per cent (US$ 1.3 billion) to the global exports of beef, three per cent (US$ 228 million) to the global exports of pulses, two per cent (US$ 1.8 billion) to the global exports of wheat, and one per cent (US$ 369 million) to the global exports of pork.

Between 2011 and 2020, the value of global exports of beef was US$ 47 billion annually on average, Canada being responsible for four per cent (US$ 1.8 billion). The value of global exports of live cattle (excluding purebred) was US$ 6.1 billion, Canada being responsible for 18 per cent (US$ 1.1 billion). The value of global exports of wheat was US$ 41.6 billion, Canada being responsible for 14 per cent (US$ 5.9 billion). The value of global exports of canola seed was US$ 10.5 billion, Canada being responsible for 42 per cent (US$ 4.4 billion). The value of global exports of canola oil was US$ 6.9 billion, Canada being responsible for 39 per cent (US$ 2.7 billion). The value of global exports of pulses was US$ 10.1 billion, Canada being

responsible for 26 per cent (US$ 2.6 billion). The value of global exports of pork was US$ 34.2 billion, Canada being responsible for eight per cent (US$ 2.8 billion).

a. Beef

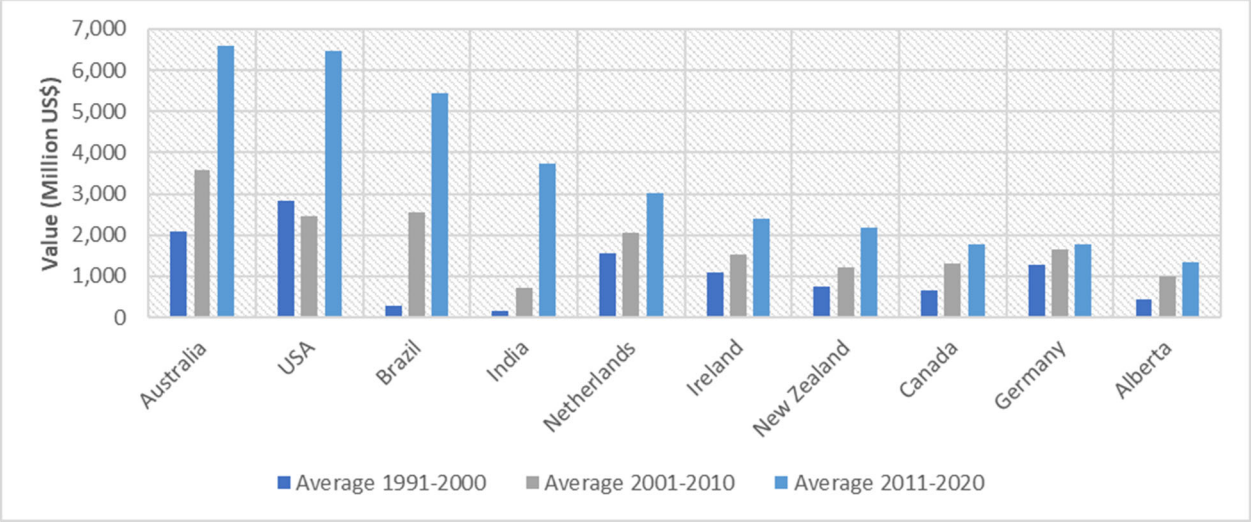

Figure 39: Top exporters of beef to the world, sorted by average 2011-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

b. Wheat

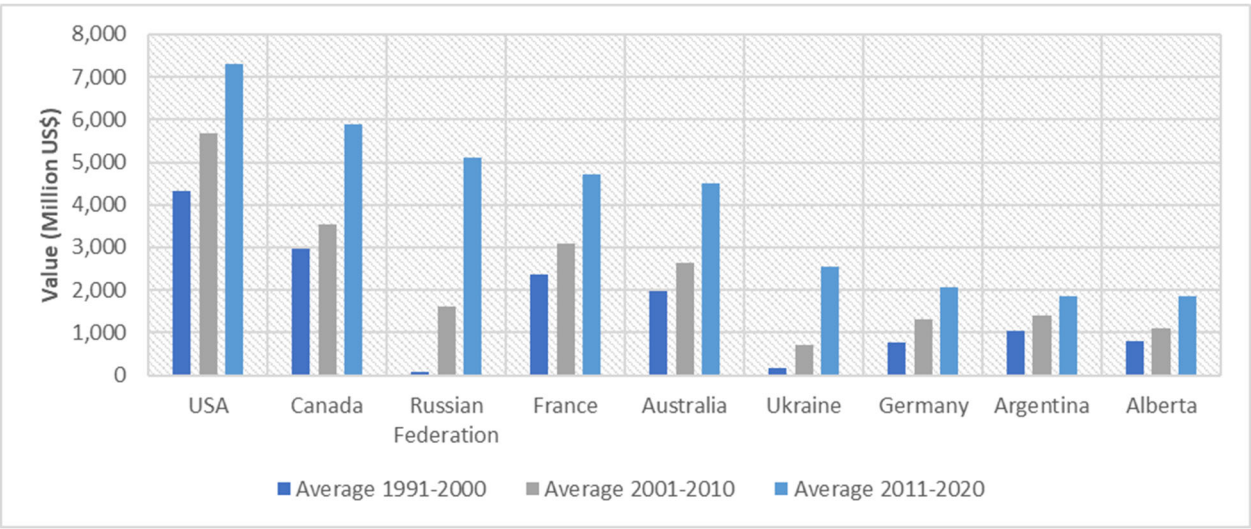

Figure 40: Top exporters of wheat to the world, sorted by average 2011-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

c. Canola Seed

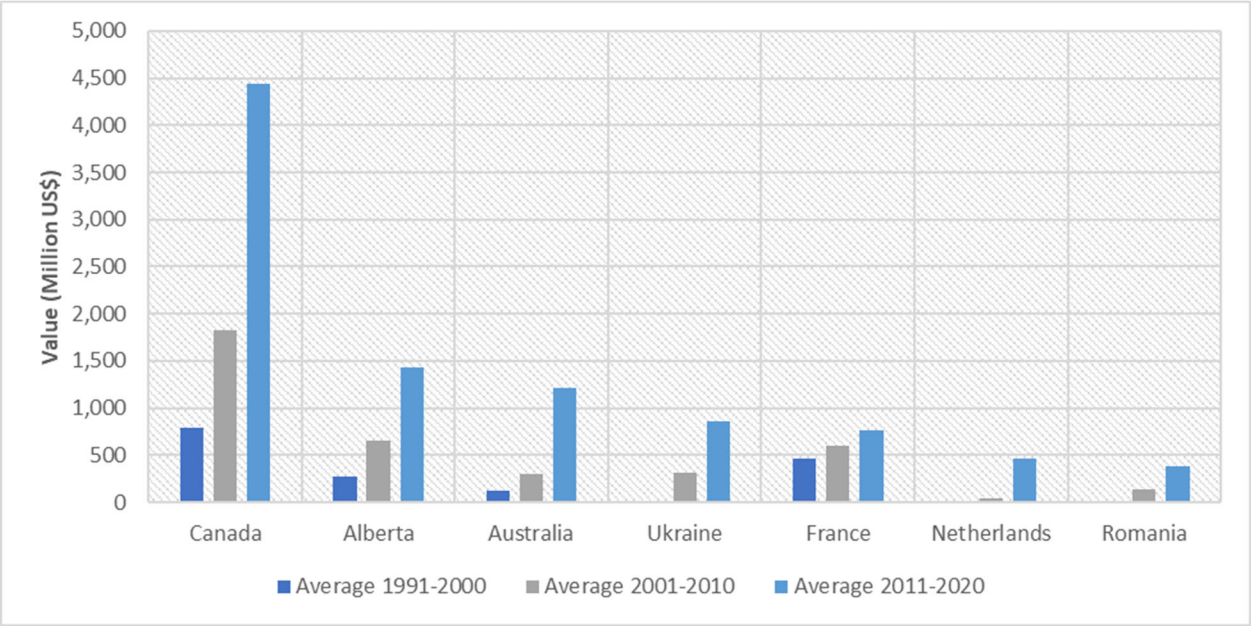

Figure 41: Top exporters of canola seed to the world, sorted by average 2011-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

d. Canola oil

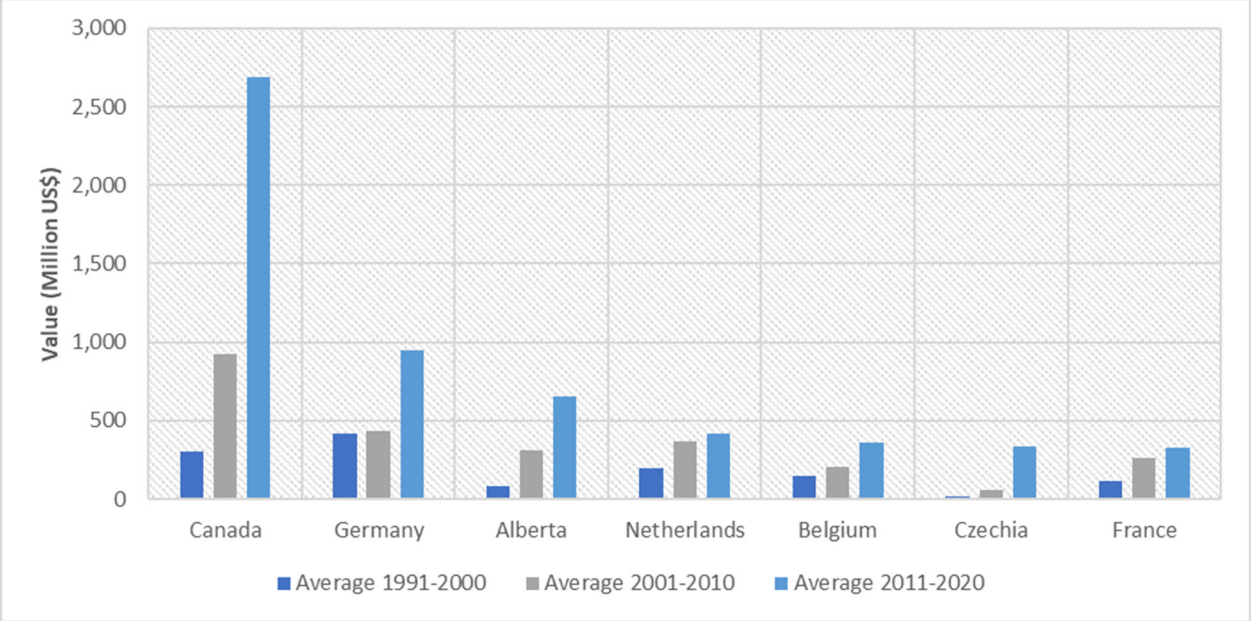

Figure 42: Top exporters of canola oil to the world, sorted by average 2011-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

e. Pulses

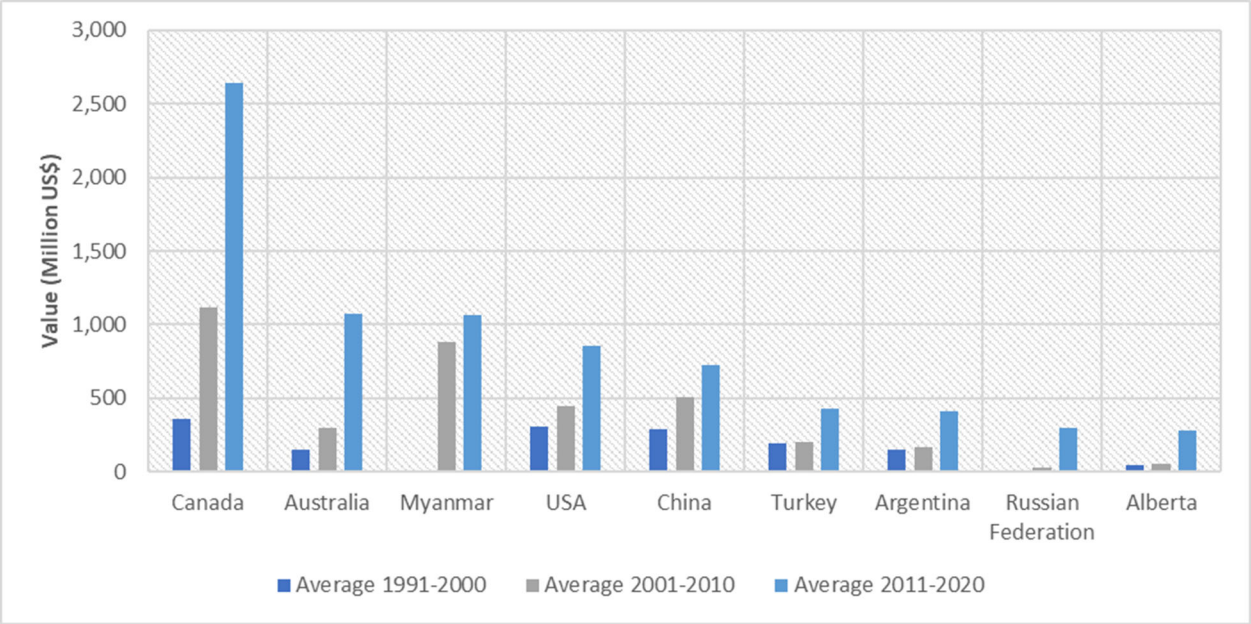

Figure 43: Top exporters of pulses to the world, sorted by average 2011-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

f. Live cattle

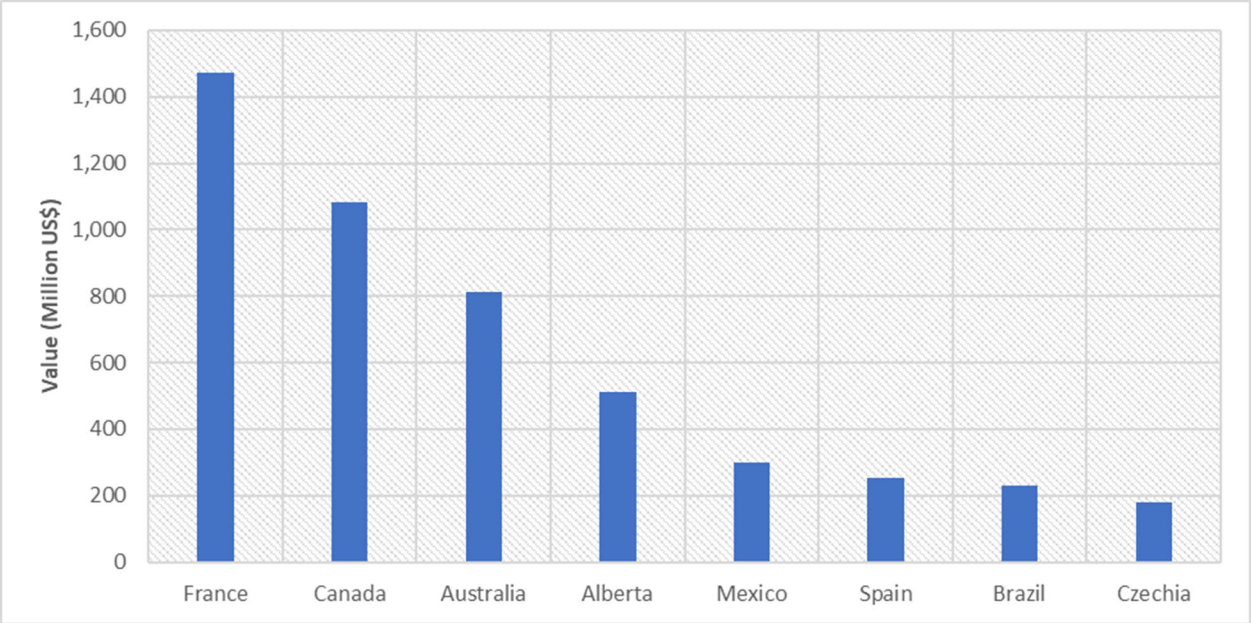

Figure 44: Top exporters of live cattle to the world, sorted by average 2012-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

g. Pork

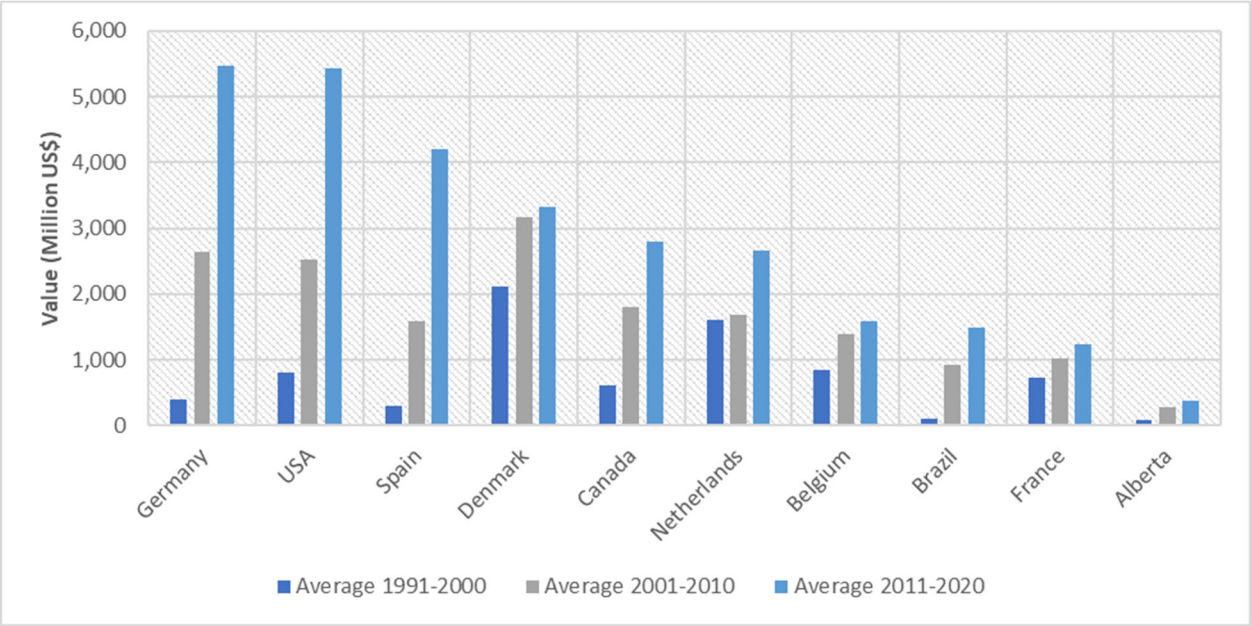

Figure 45: Top exporters of pork to the world, sorted by average 2011-2020, nominal terms
Sources: United Nations Comtrade Database; Statistics Canada (2021a)

Top Competitors for Alberta's Agri-food Markets

By focusing on Alberta's top markets identified for each product earlier, the market shares of Canada and other potential competing countries to each top market for the period 2011-2020 are presented in Figures 46-67. When a given market imports a certain product from many countries, the market share of each exporting country can be measured a ratio of how much a country exported to that given market over how much that market imported in total from all countries across the word (Chen and Duan 2001; Davie and Veeman 2007; Bojnec and Fertő 2014). For example, the market share of Canada to the imports of beef in the United States market can be calculated as a ratio of the value of beef that the United States imported from Canada over the total value of beef that the United States imported from all countries across the world. The market shares were determined based on the imports data obtained from the United Nations Comtrade Database.

a. Beef

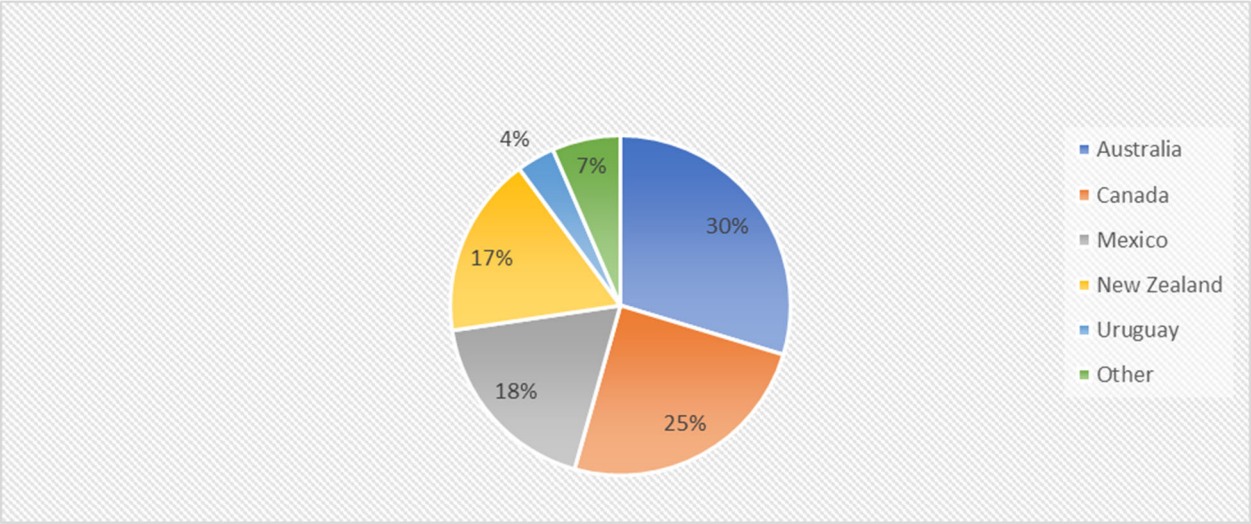

Figure 46: Market shares of Canada and its competitors to the United States beef imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of beef that the United States imported from a country divided by the total value of beef that the United States imported from all countries across the world for the period 2011-20.

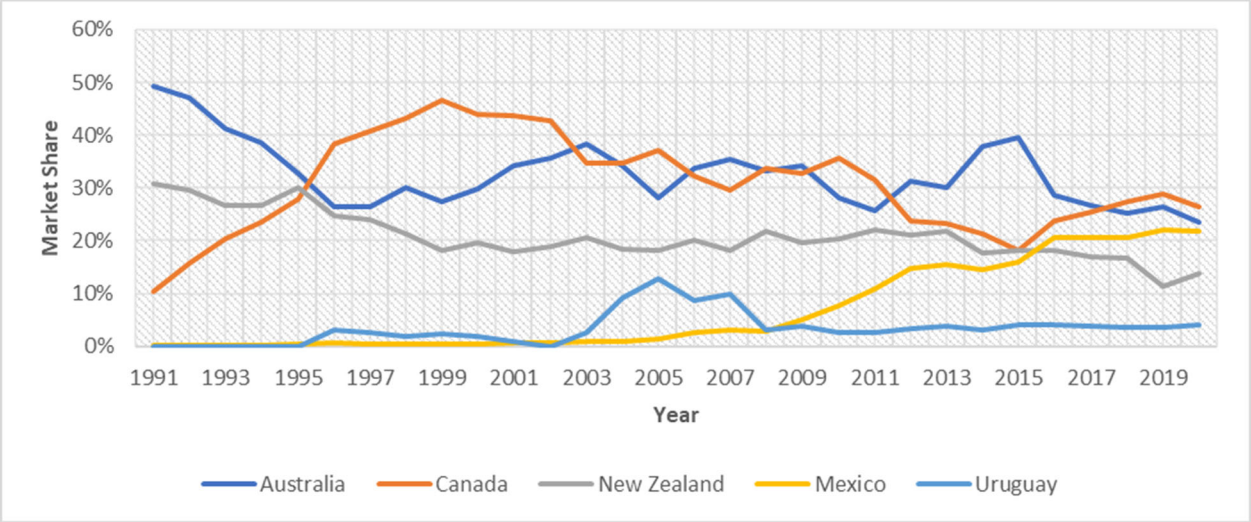

Figure 47: Market shares of Canada and its competitors to the United States beef imports, 1991-2020
Source: United Nations Comtrade Database

b. Wheat

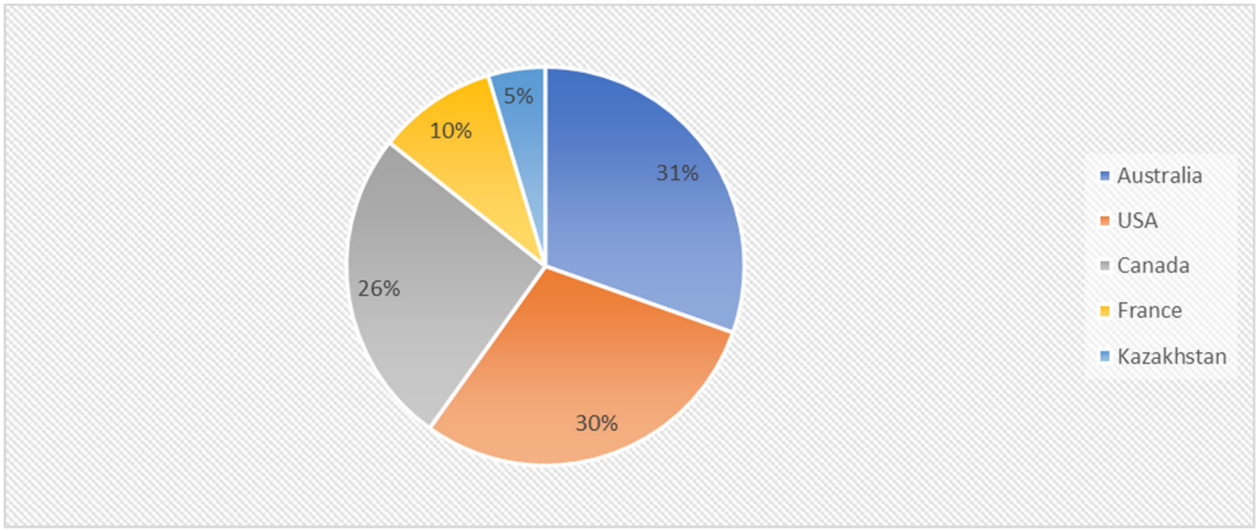

Figure 48: Market shares of Canada and its competitors to China's wheat imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of wheat that China imported from a country divided by the total value of wheat that China imported from all countries across the world for the period 2011-20.

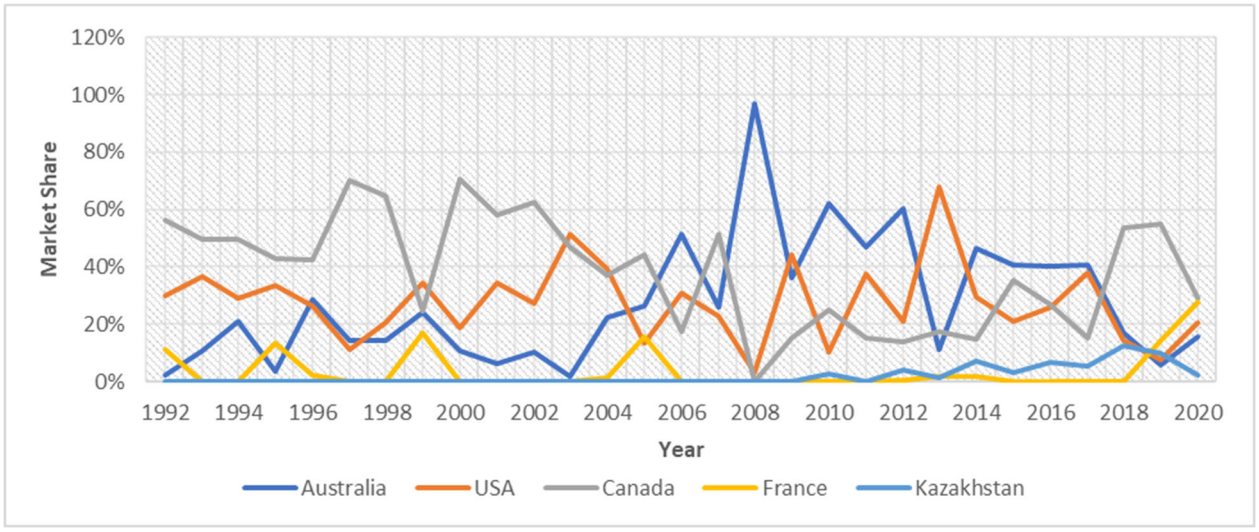

Figure 49: Market shares of Canada and its competitors to China's wheat imports, 1992-2020
Source: United Nations Comtrade Database

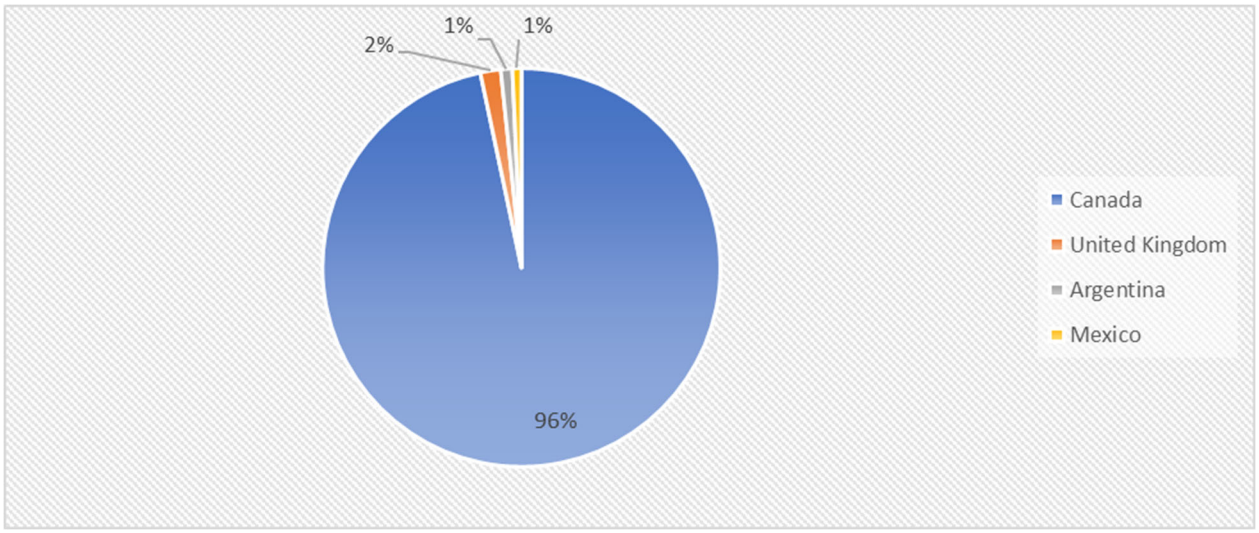

Figure 50: Market shares of Canada and its competitors to the United States wheat imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of wheat that the United States imported from a country divided by the total value of wheat that the United States imported from all countries across the world for the period 2011-20.

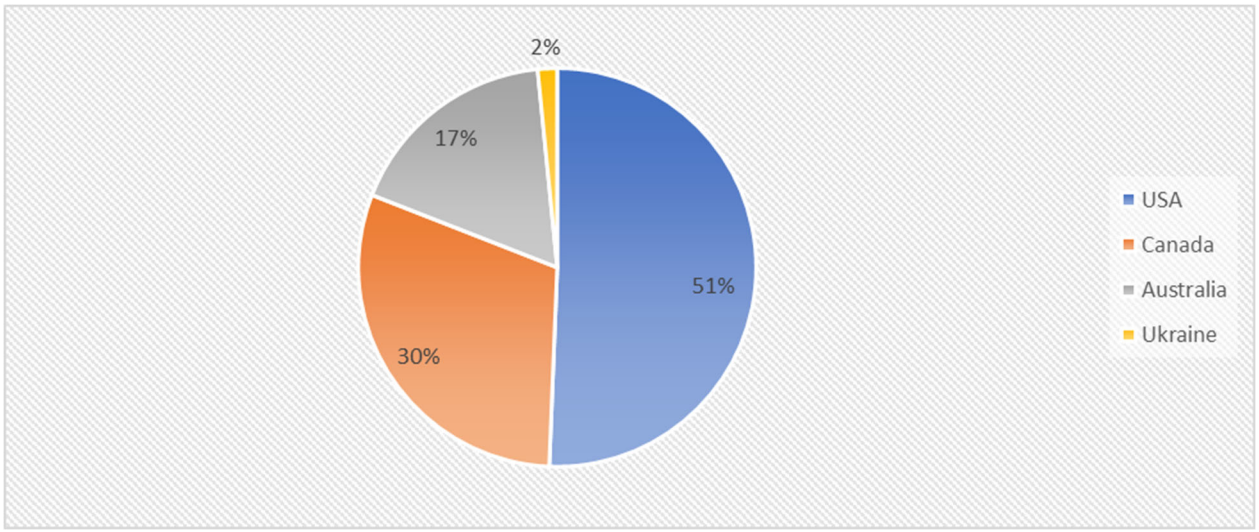

Figure 51: Market shares of Canada and its competitors to Japan's wheat imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of wheat that Japan imported from a country divided by the total value of wheat that Japan imported from all countries across the world for the period 2011-20.

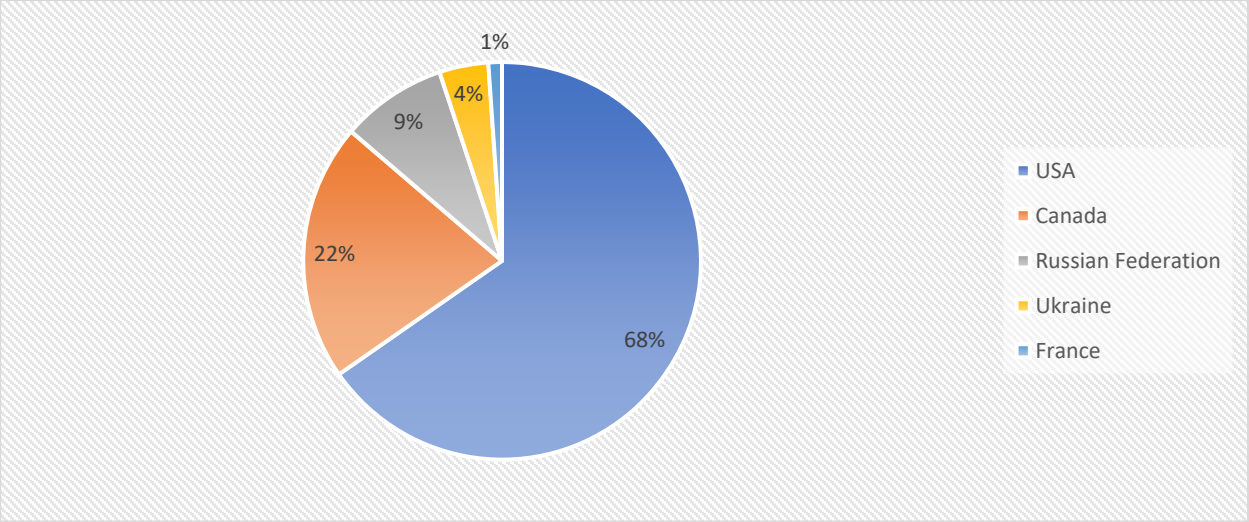

Figure 52: Market shares of Canada and its competitors to Mexico's wheat imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of wheat that Mexico imported from a country divided by the total value of wheat that Mexico imported from all countries across the world for the period 2011-20.

c. Canola Seed

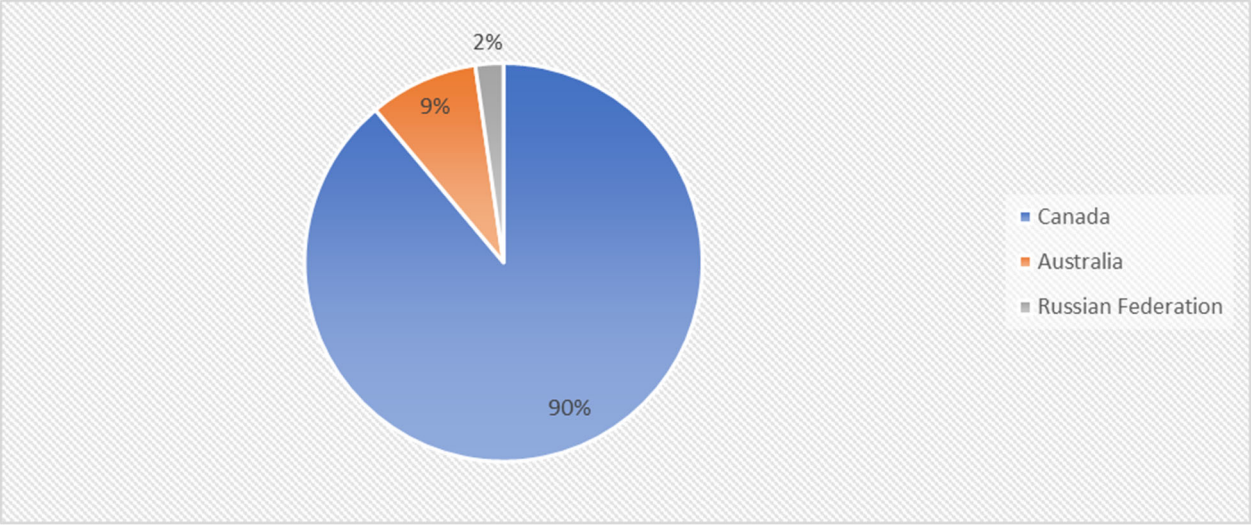

Figure 53: Market shares of Canada and its competitors to China's canola seed imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of canola seed that China imported from a country divided by the total value of canola seed that China imported from all countries across the world for the period 2011-20.

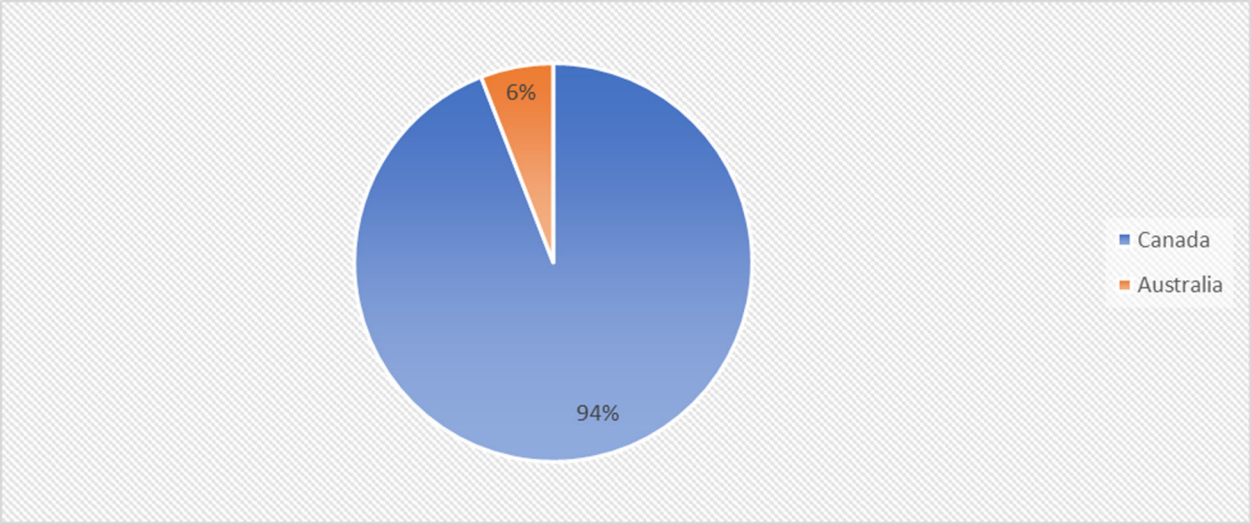

Figure 54: Market shares of Canada and its competitor to Japan's canola seed imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of canola seed that Japan imported from a country divided by the total value of canola seed that Japan imported from all countries across the world for the period 2011-20.

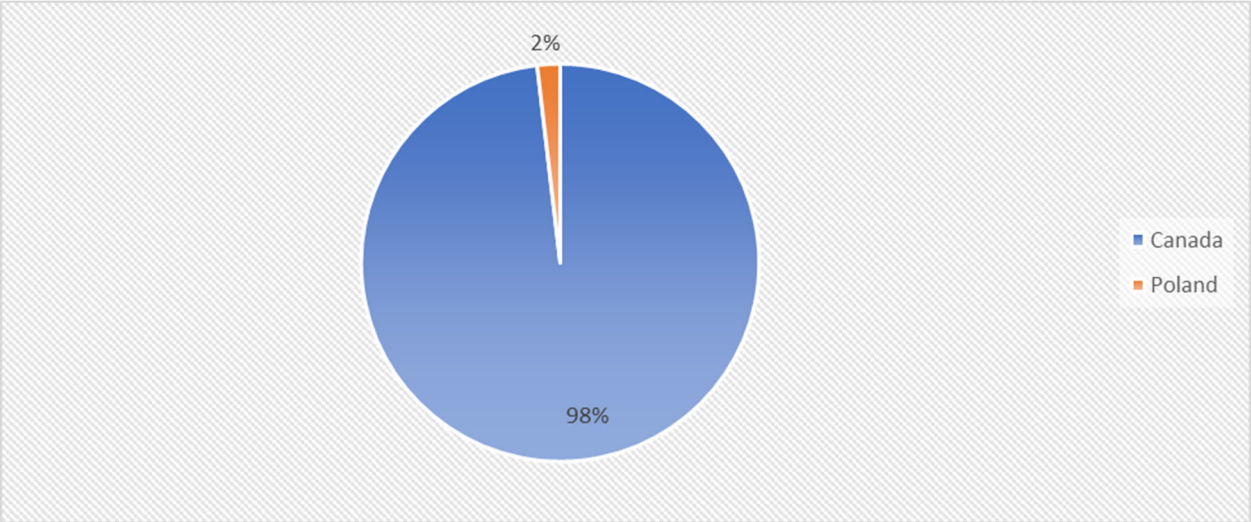

Figure 55: Market shares of Canada and its competitors for the Mexico canola seed imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of canola seed that Mexico imported from a country divided by the total value of canola seed that Mexico imported from all countries across the world for the period 2011-20.

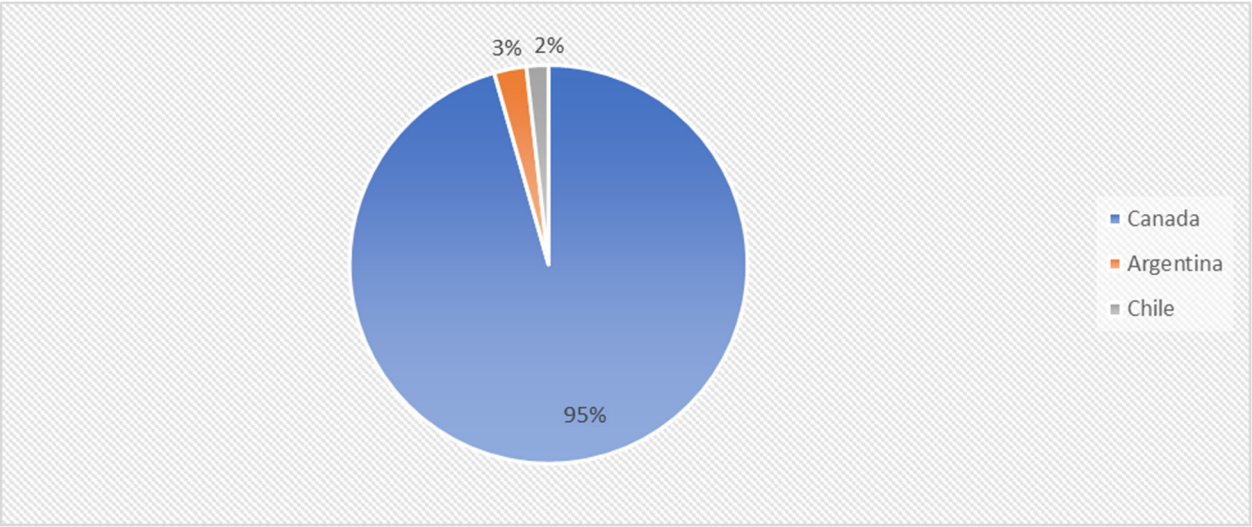

Figure 56: Market shares of Canada and its competitors to the United States canola seed imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of canola seed that the United States imported from a country divided by the total value of canola seed that the United States imported from all countries across the world for the period 2011-20.

d. Canola oil

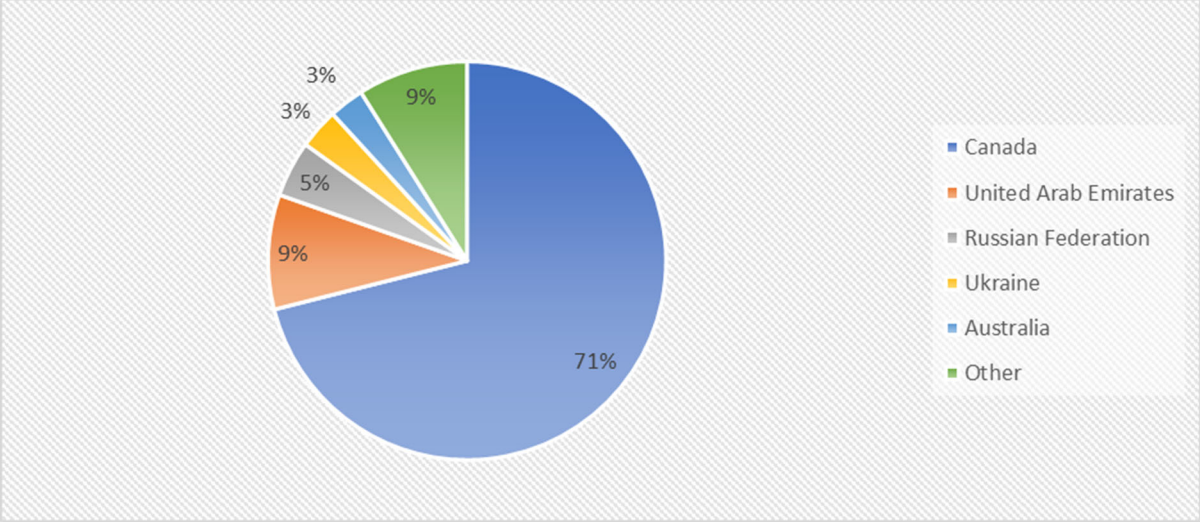

Figure 57: Market shares of Canada and its competitors to China's canola oil imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of canola oil that China imported from a country divided by the total value of canola oil that China imported from all countries across the world for the period 2011-20.

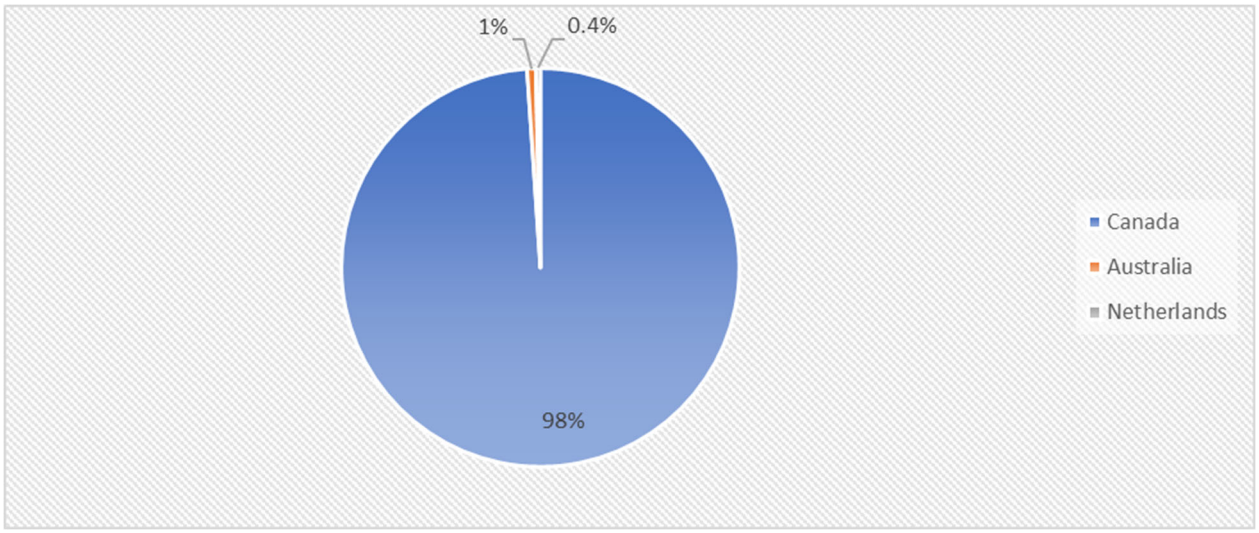

Figure 58: Market shares of Canada and its competitors to the United States canola oil imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of canola oil that the United States imported from a country divided by the total value of canola oil that the United States imported from all countries across the world for the period 2011-20.

e. Pulses

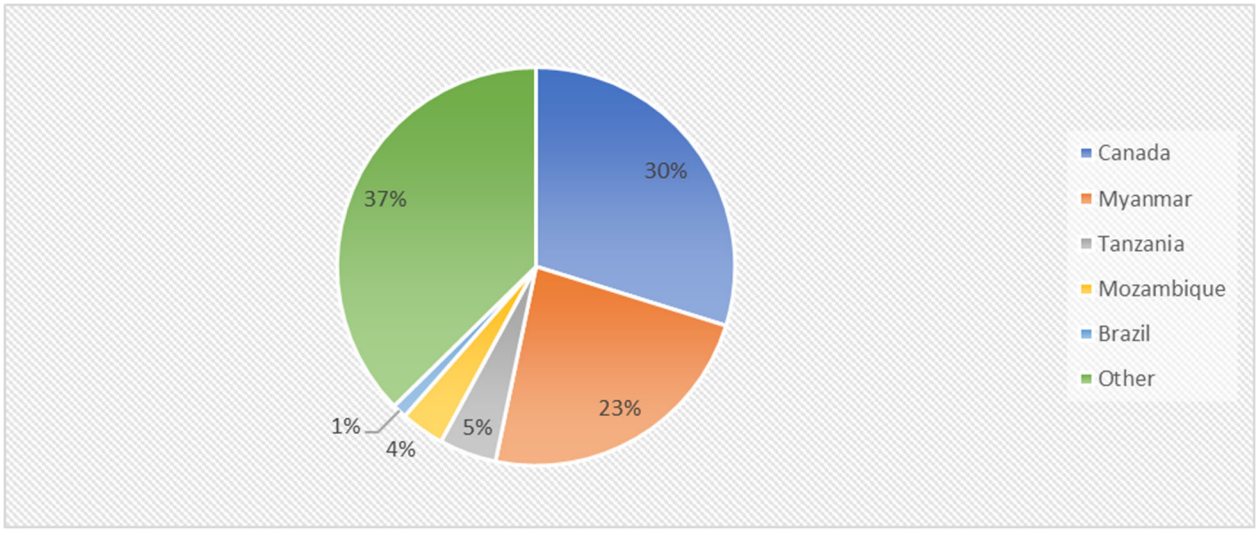

Figure 59: Market shares of Canada and its competitors to India's pulses imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pulses that India imported from a country divided by the total value of pulse that India imported from all countries across the world for the period 2011-20.

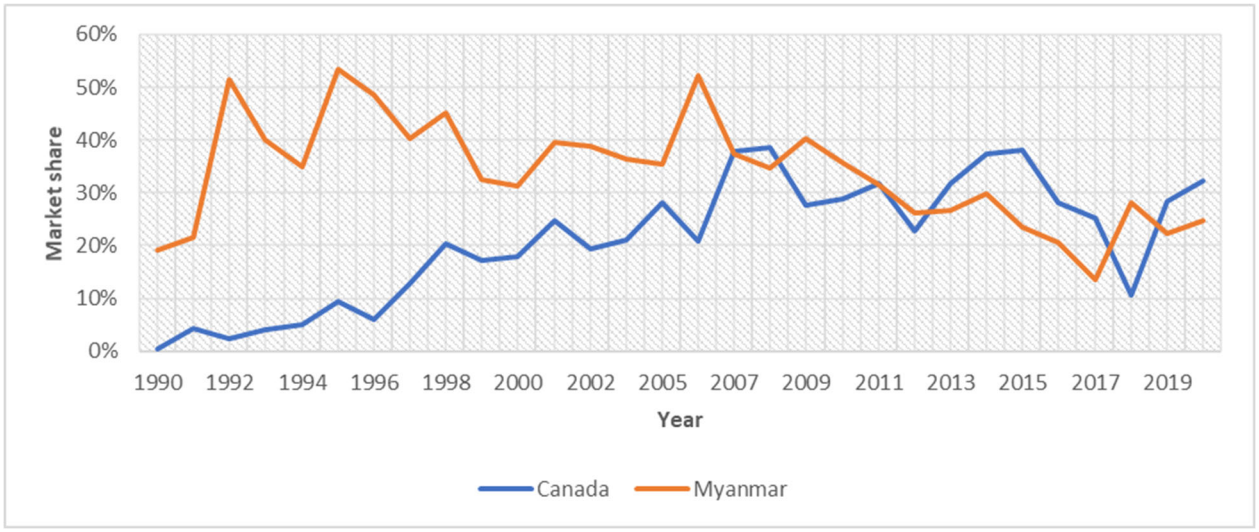

Figure 60: Market shares of Canada and its competitors to India's pulses imports, 1990-2020
Source: United Nations Comtrade Database

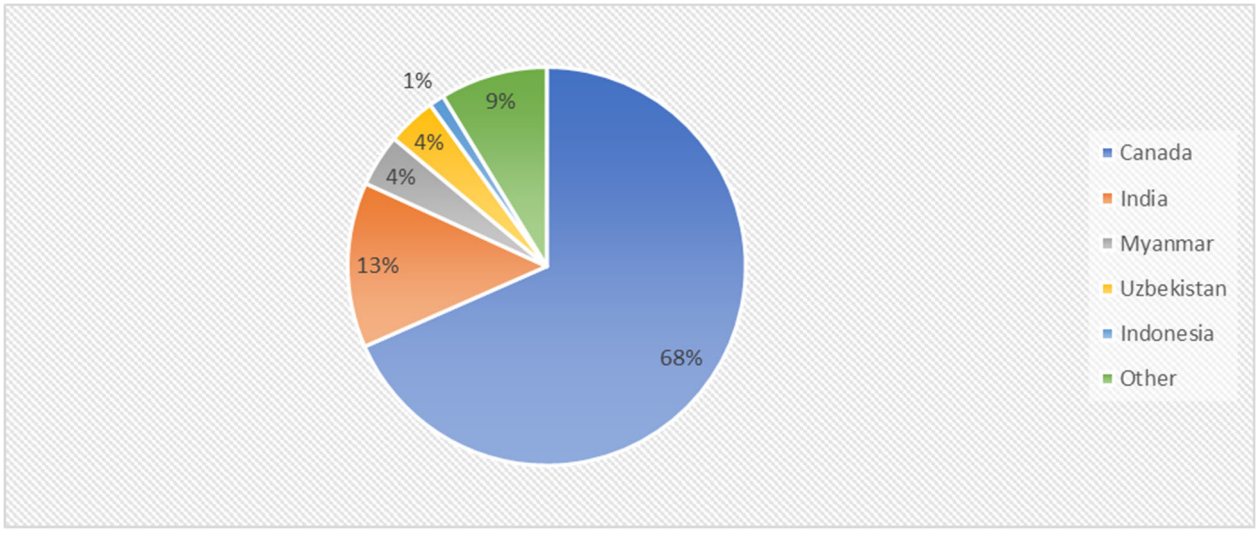

Figure 61: Market shares of Canada and its competitors to China's pulse imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pulses that China imported from a country divided by the total value of pulses that China imported from all countries across the world for the period 2011-20.

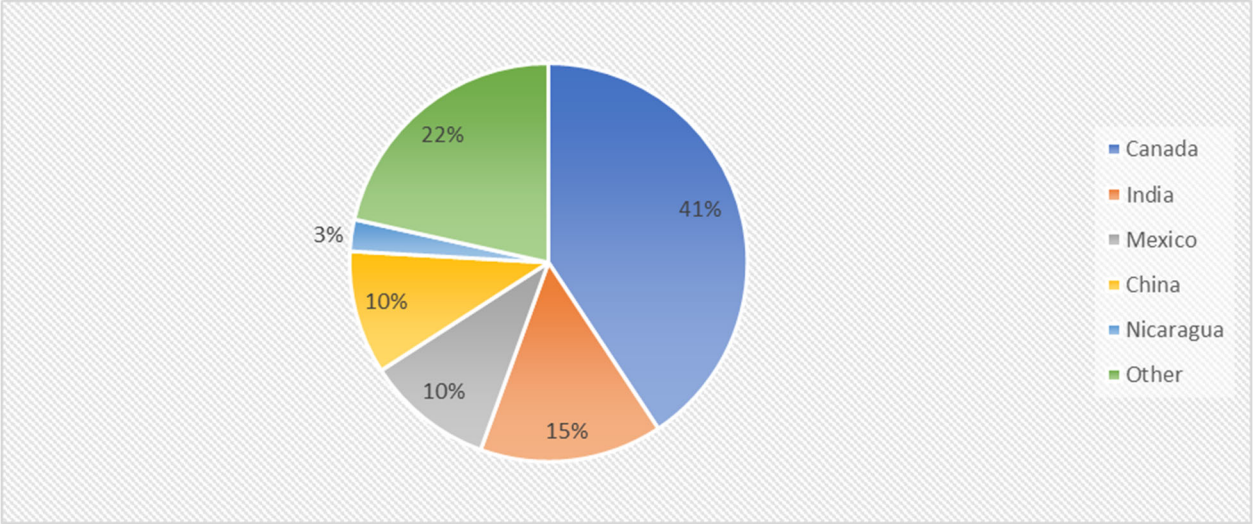

Figure 62: Market shares of Canada and its competitors to the United States pulse imports, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pulses that the United States imported from a country divided by the total value of pulses that the United States imported from all countries across the world for the period 2011-20.

f. Live cattle

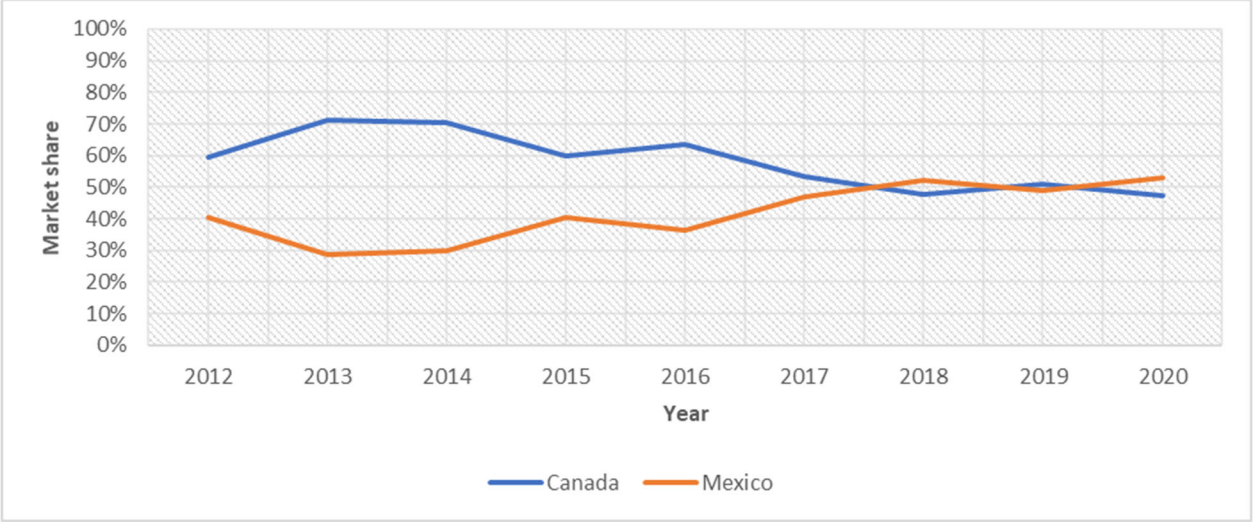

Figure 63: Market shares of Canada and Mexico to the United Sates imports of live cattle (excluding purebred), 2012-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of live cattle that the United States imported from a country divided by the total value of live cattle that the United States imported from all countries across the world for the period 2011-20.

g. Pork

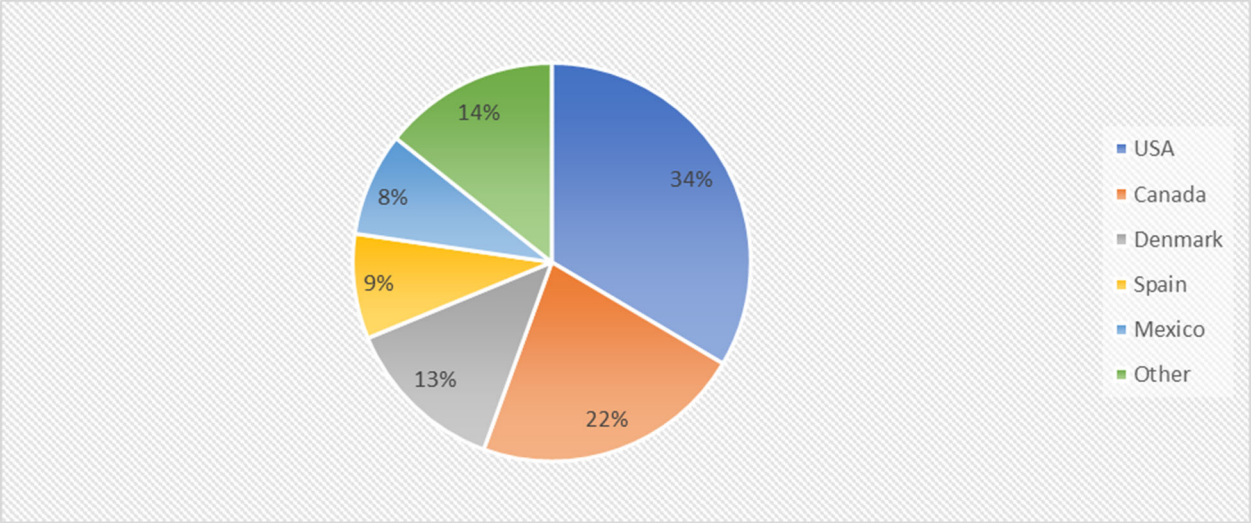

Figure 64: Market shares of Canada and its competitors to Japan's imports of pork, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pork that Japan imported from a country divided by the total value of pork that Japan imported from all countries across the world for the period 2011-20.

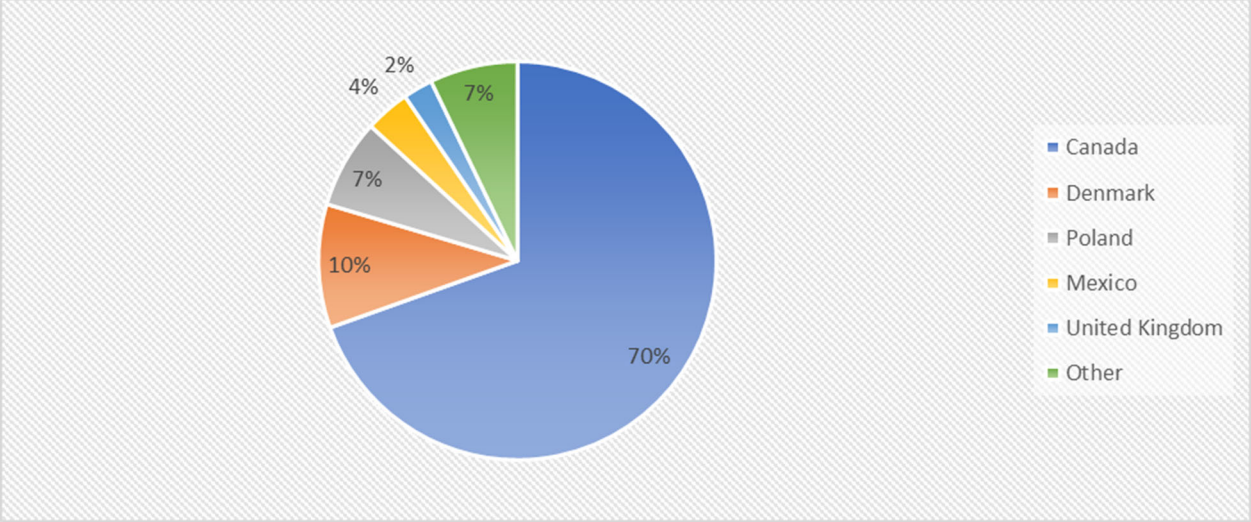

Figure 65: Market shares of Canada and its competitors to the United Sates imports of pork, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pork that the United States imported from a country divided by the total value of pork that the United States imported from all countries across the world for the period 2011-20.

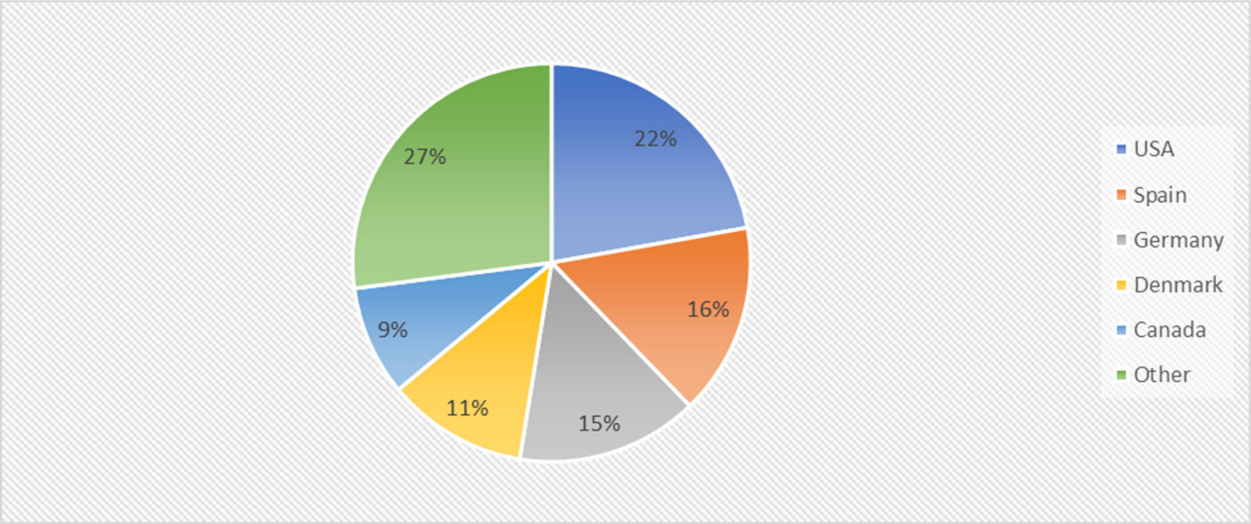

Figure 66: Market shares of Canada and its competitors to China's imports of pork, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pork that China imported from a country divided by the total value of pork that China imported from all countries across the world for the period 2011-20.

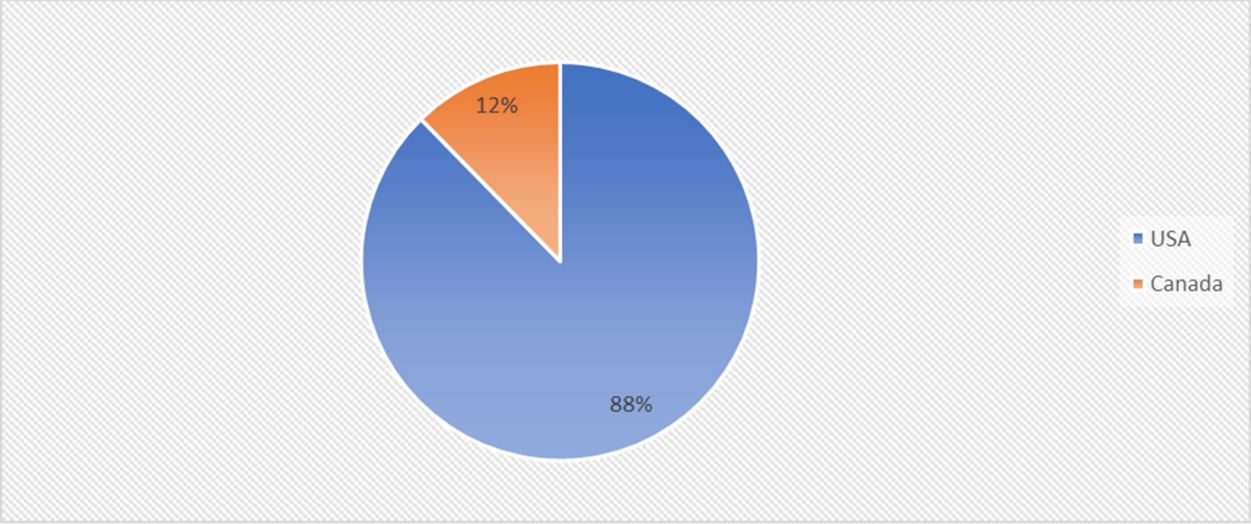

Figure 67: Market shares of Canada and the USA to Mexico's imports of pork, average 2011-2020
Source: United Nations Comtrade Database
Note: The market share of each country was calculated as the value of pork that Mexico imported from a country divided by the total value of pork that Mexico imported from all countries across the world for the period 2011-20.

Forecast of Agri-food Products in Canada and the World

The OECD-FAO Agricultural Outlook provides projections for agricultural products over the coming decade (2020-2029) at the national and global levels covering consumption, production, trade, and prices. While both population growth and economic growth were considered to be the main drivers of demand for agricultural commodities, both productivity growth and resource availability were considered to be the main factors shaping the production of agricultural commodities (OECD/FAO 2020).

Based on the data obtained from the OECD-FAO Agricultural Outlook 2020-2029, Table 8 below presents projected growth in the production and exports of selected agricultural products in Canada and the world over the coming decade (2020-29) by comparing the projection with the condition in last ten years (2010-19). In general, slower growth of production and exports are expected globally and in Canada for all considered agricultural products except pork and beef over the coming decade relative to the last ten years.

Canadian beef exports are projected to grow by 1.2 per cent per year over the coming decade, higher than that of the world (0.7 per cent). Canadian pork exports are projected to grow by 1.1 per cent per year while the world's pork exports are expected to fall by 0.1 per cent per year. Canadian wheat exports are expected to grow by 0.6 per cent per year, lower than that of the world (2 per cent). Canadian oilseeds exports are expected to grow by 2 per cent per year, higher than that of the world (1.5 per cent). Canadian pulses exports are expected to grow by 1.3 per cent per year, higher than that of the world (0.7 per cent).

Table 8: Projected growth of production and exports of selected agricultural products in Canada and the world over the coming decade (2020-29) compared with the last ten years (2010-19)

		Last 10 years (Average 2010-19) Growth Rate Per Year (%)		Coming Decade (Average 2020-29) Growth Rate Per Year (%)	
Commodity	**Variable**	**Canada**	**World**	**Canada**	**World**
Beef and veal	Production	-0.2	0.8	0.5	0.7
	Exports	0.7	3.2	1.2	0.7
Pigmeat	Production	0.8	0.1	0.6	1.6
	Exports	1.4	3.7	1.1	-0.1
Wheat	Production	4.9	1.9	0.8	0.9
	Exports	4.8	3.7	0.6	2.0
Other oilseeds*	Production	5.1	2.8	1.9	1.4
	Exports	4.2	4.6	2.0	1.5
Pulses	Production	4.4	2.5	1.3	1.5
	Exports	5.1	3.8	1.3	0.7

Source: OECD-FAO Agricultural Outlook 2020-2029
*Note: Other oilseeds represents rapeseed (canola), sunflower seed, and groundnuts (peanuts).

Table 9 below presents the projections of production and exports of agricultural products in Canada and the world over the coming decade by comparing with the condition in the last ten years. The proportion of Canadian beef exports to its production is projected to grow to 58 per cent over the coming decade, significantly higher that that of the last ten years (49 per cent). It also appears that Canada's role in the global beef exports will increase from 6.4 per cent to 7.2 per cent. Similarly, the proportion of Canadian pork exports to its production is expected to grow to 77 per cent over the coming decade, significantly higher than that of the last ten years (72 per cent). However, the proportion of Canadian oilseed exports will decrease from 53 per cent to 51 per cent; for wheat it will increase only marginally from 71 per cent to 72 per cent; and for pulses it will remain constant at 87 per cent. As such, Canada's role to the global exports of primary agricultural commodities is expected to fall over the coming decade.

The projected annual production and exports of selected agricultural products in Canada and the world are presented in Figure 68-77.

Table 9 : Projection of production and exports of selected agricultural products in Canada and the world over the coming decade (2020-29) compared with the last ten years (2011-19)

		Last 10 Years (Average 2010-19) (Tonnes, Thousands)			Coming Decade (Average 2020-29) (Tonnes, Thousands)		
Commodity	**Variable**	**Canada**	**World**	**Canada/World (%)**	**Canada**	**World**	**Canada/World (%)**
Beef and veal	Production	1,409	67,302	2.1	1,591	73,406	2.2
	Exports	692	10,862	6.4	916	12,670	7.2
	Exports/Production (%)	49	16		58	17	
Pigmeat	Production	2,000	115,793	1.7	2,174	119,371	1.8
	Exports	1,450	8,927	16.2	1,684	10,325	16.3
	Exports/Production (%)	72	8		77	9	
Wheat	Production	29,758	721,778	4.1	33,725	802,816	4.2
	Exports	21,273	161,413	13.2	24,351	199,647	12.2
	Exports/Production (%)	71	22		72	25	
Other oilseeds*	Production	17,510	140,349	12.5	20,832	165,801	12.6
	Exports	9,267	19,062	48.6	10,678	22,330	47.8
	Exports/Production (%)	53	14		51	13	
Pulses	Production	6,587	78,538	8.4	8,326	96,084	8.7
	Exports	5,755	14,925	38.6	7,247	17,519	41.4
	Exports/Production (%)	87	19		87	18	

Source: OECD-FAO Agricultural Outlook 2020-2029

*Note: Other oilseeds represents rapeseed (canola), sunflower seed, and groundnuts (peanuts).

a. Beef

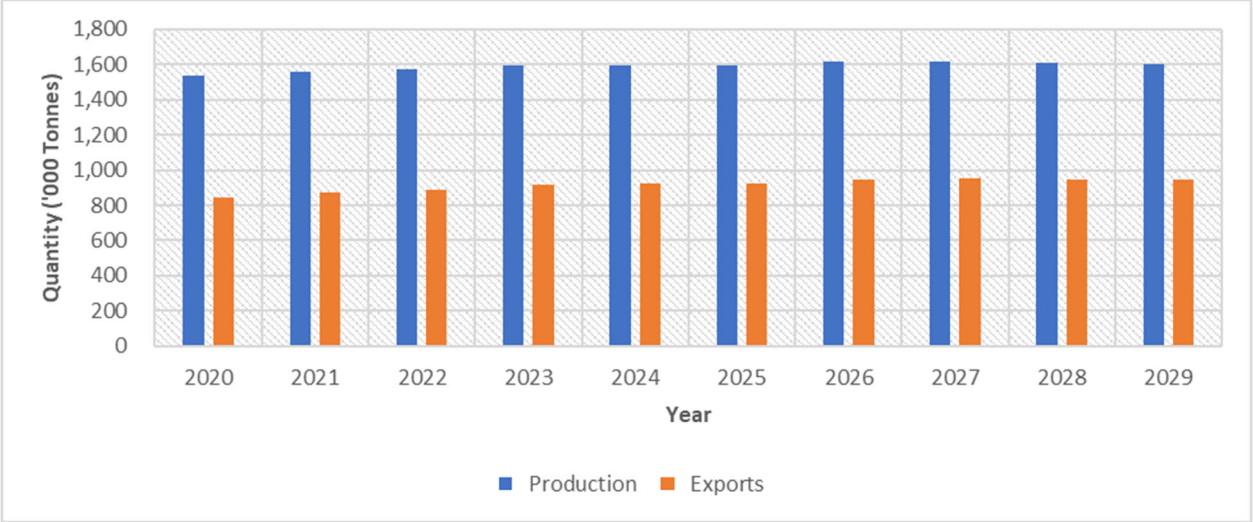

Figure 68: Forecast of beef and veal production and exports in Canada, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

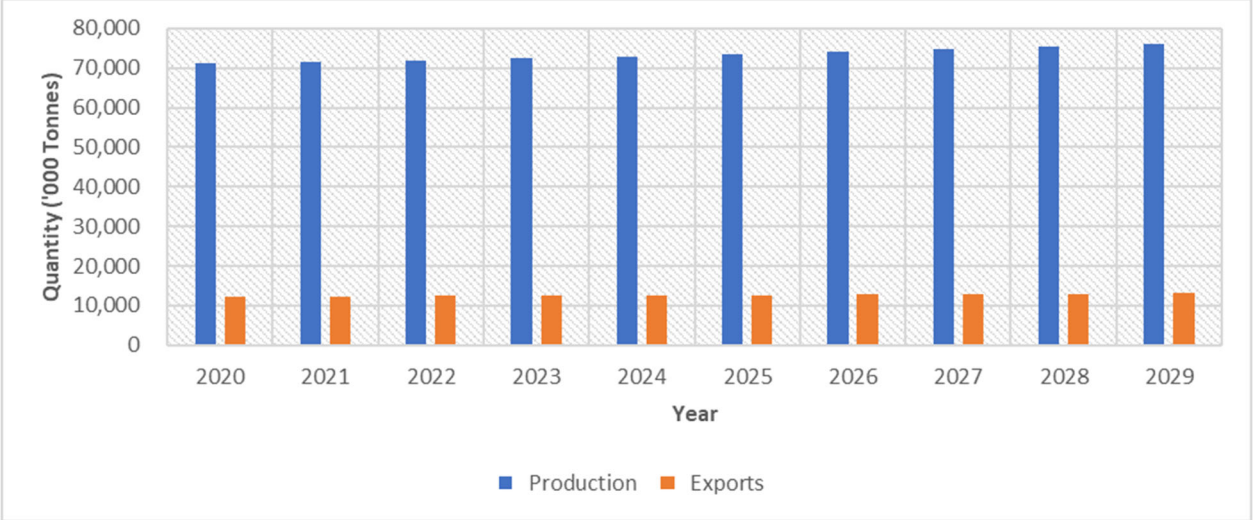

Figure 69: Forecast of beef and veal production and exports in the world, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

b. Wheat

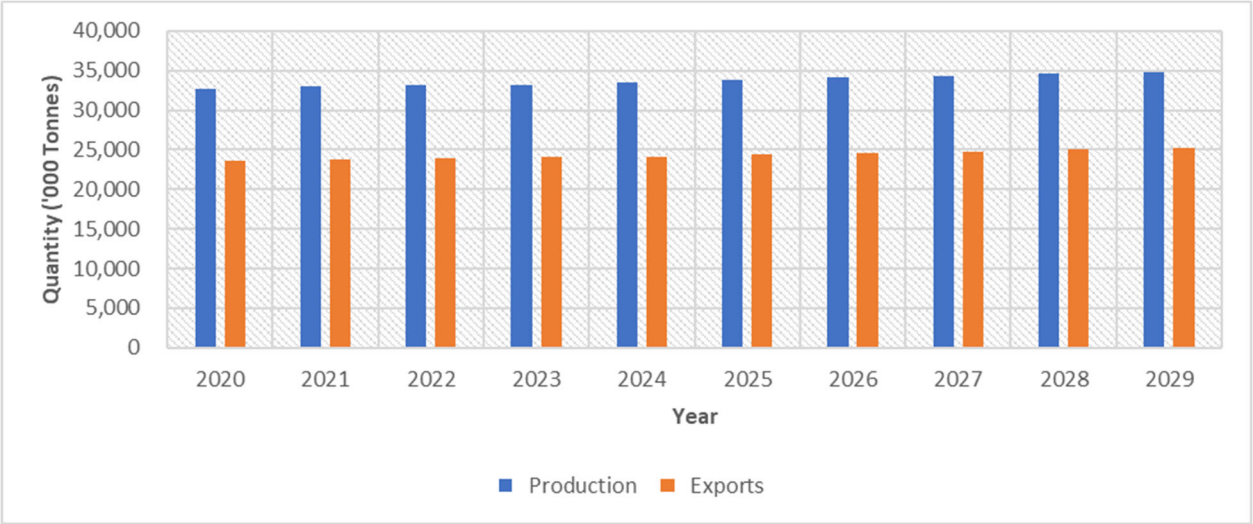

Figure 70: Forecast of wheat production and exports in Canada, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

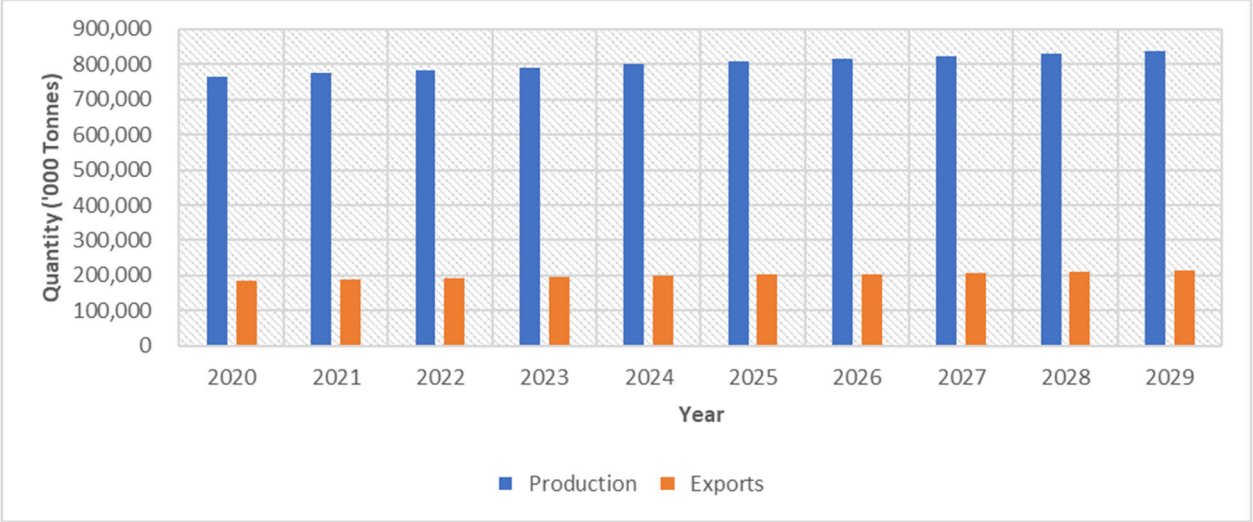

Figure 71: Forecast of wheat production and exports in the world, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

c. Oilseeds

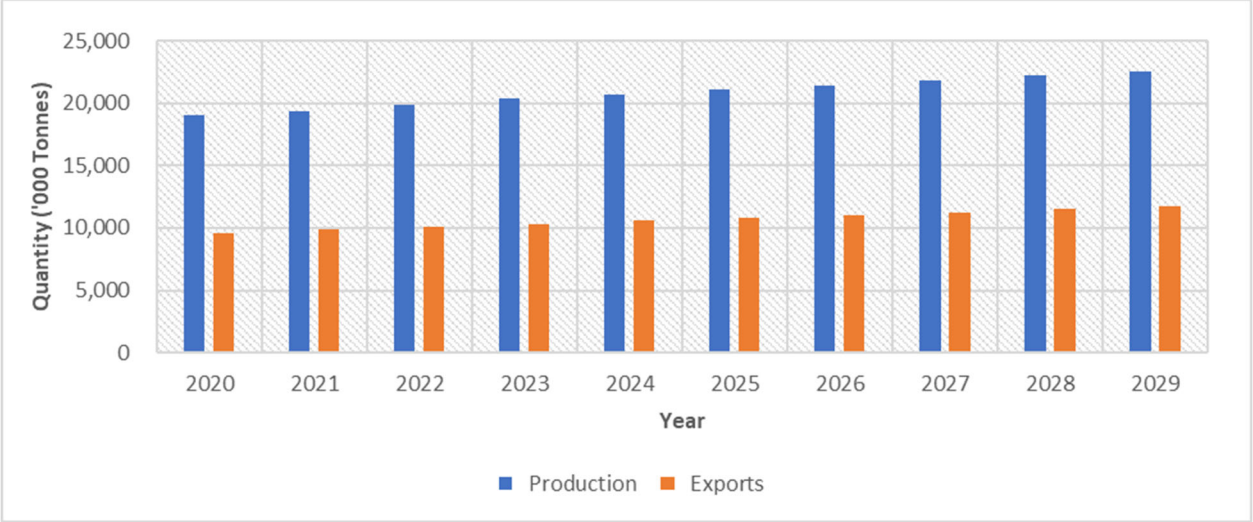

Figure 72: Forecast of oilseeds production and exports in Canada, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

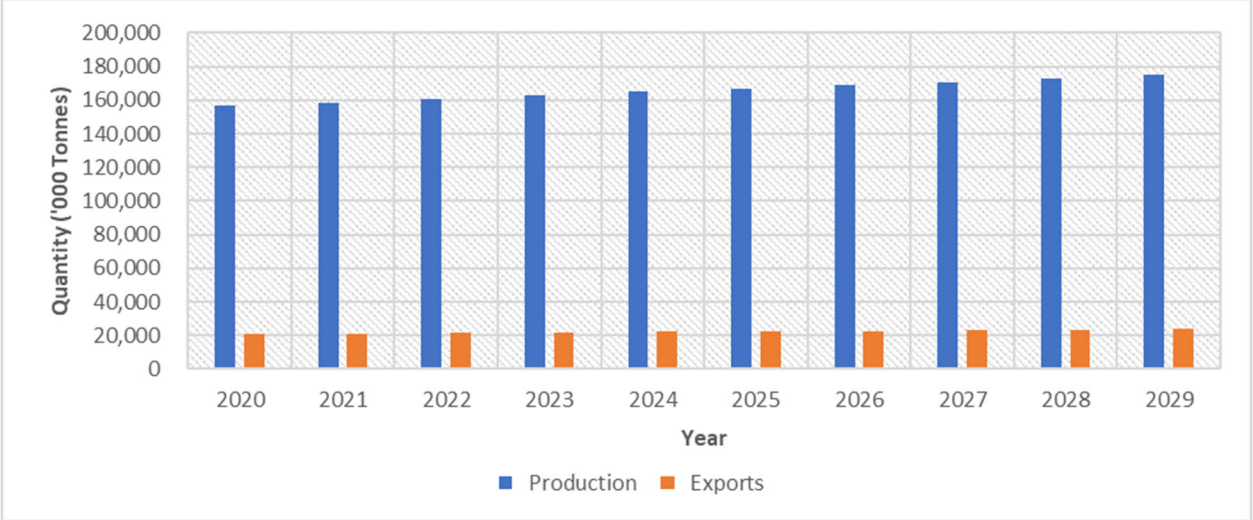

Figure 73: Forecast of oilseeds production and exports in the world, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

d. Pulses

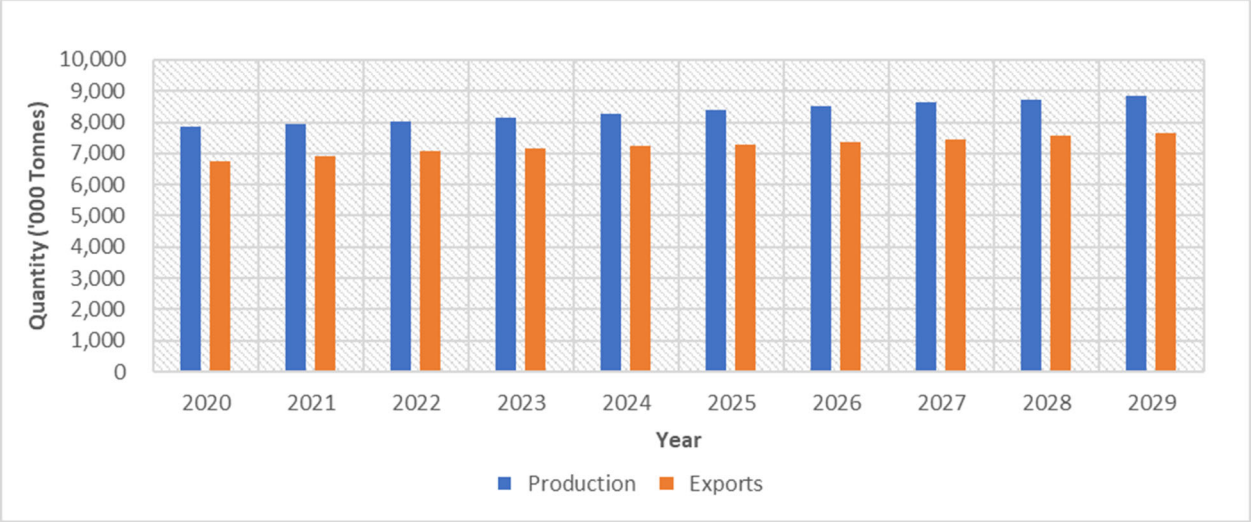

Figure 74: Forecast of pulses production and exports in Canada, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

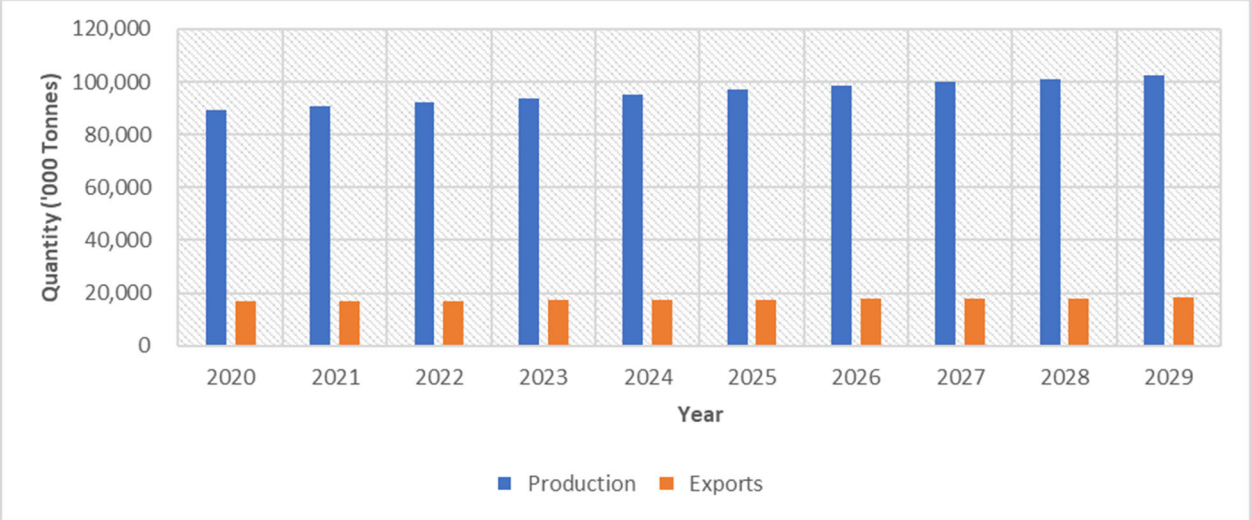

Figure 75: Forecast of pulses production and exports in the world, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

e. Pork

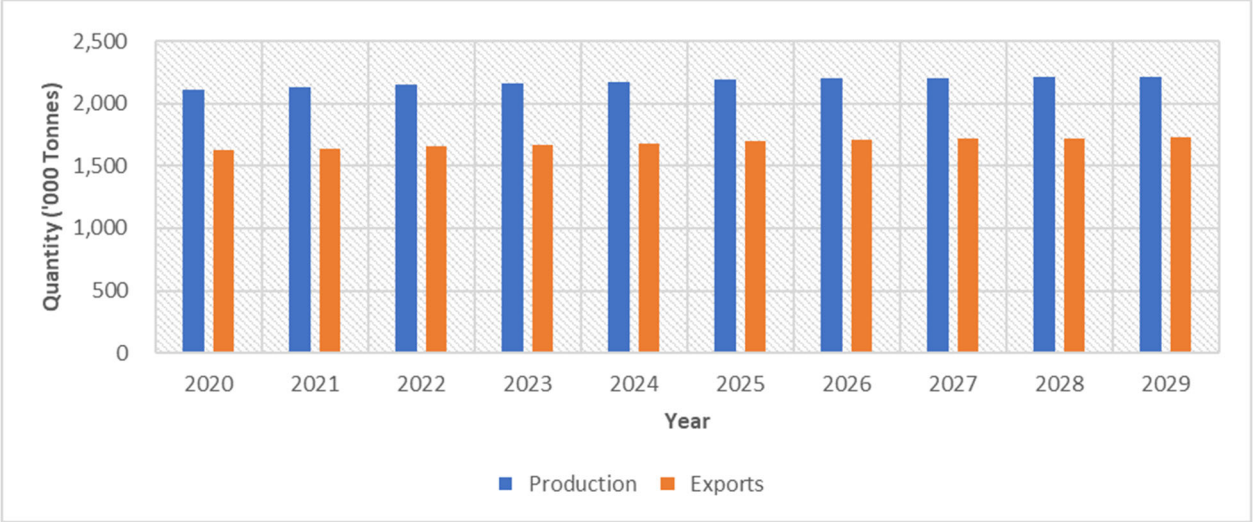

Figure 76: Forecast of pigmeat production and exports in Canada, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

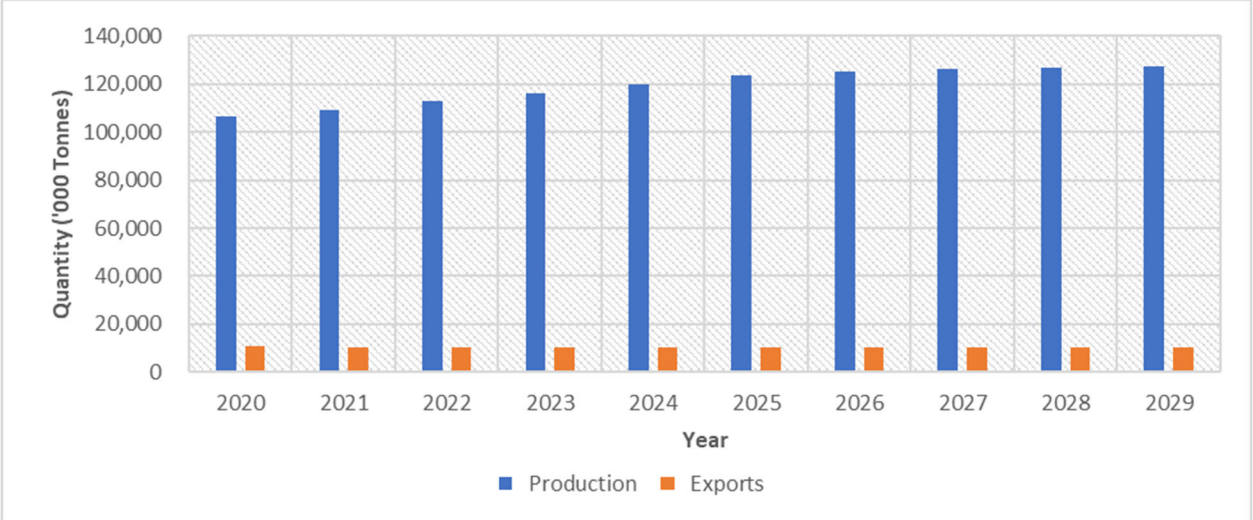

Figure 77: Forecast of pigmeat production and exports in the world, 2020-2029
Source: OECD-FAO Agricultural Outlook 2020-2029

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