CREATING A MARKET ACCESS STRATEGY FOR PEI ORGANIC PRODUCTS

Final Report

MARCH 2021

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PEI Certified Organic Producers Co-operative

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EXECUTIVE SUMMARY

Today, in the spring of the year 2020, the Organic Farmers of Prince Edward Island should be in an enviable position. They are part of an Industry with an compound annual growth rate of 15%, they are producers in a Country (Canada) that is the largest trading partner to the largest market for organic food (USA), and they live in a province with a long tradition and a well-known reputation for great food.

On the Island, organic acreage has increased form 900 acres in 2003 to 12,222 acres in 2019. This shows a compound annual growth of almost 18%. If this trend continues – and past performance suggests it will - organic acreage on PEI can reach 80,000 acres in ten years – the current acreage of the PEI potato industry.

Every ten years or so, a study is being commissioned to look into market opportunities for the local organic farmers. Their conclusions can be summed up in the following quote from the 2011 study: "Donna Youngdhal, Organic Marketing Director with the Canadian Wheat Board: "For the Maritimes, you should be looking only at the North Eastern States and the Quebec mills, otherwise it's too costly to ship products that are already being grown out West."

For many crops, this statement still holds true, but there are new opportunities opening up as well. During one of the phone interviews with an organic trading house in Western Canada, after describing the PEI situation, their comment was: "this reminds me of the situation we were in 10 years ago". Western Canada is now a powerhouse for organic farming selling to markets from China to Egypt.

The question is not if PEI organic farming will grow, but how it will grow to maximise market opportunities, manage risk and create opportunities for adding value at home.

The objective of the study was to identify market opportunities for PEI grown organic product, but what product? The first step in that exercise was to define a product list. This list was inspired by crops currently grow, crops currently exported by Canada and crops that have been identified as being of interest to the COPC.

This list can be divided into five groups:

1. Grains: Wheat, Barley, Oats, Rye, Buckwheat, Spelt and Triticale
2. Pulses: Lentils, Dry Peas, Dry Beans, Chickpeas and Faba Beans
3. Oilseeds: Canola, Soy, Sunflower, Mustard, Hemp, Carmelina and Pumpkin Seed
4. Forage, Potatoes, Blueberries and Tomato
5. Livestock

Each product or crop was examined according to the following criteria: Development of world production, trends and development in international trade, Canadian market position and development, the organic sub-segments and its particularities and developments on PEI. Finally, a list of buyers for these products was compiled on an Excel Database.

The success of every commercial venture depends on how a product finds its market. For commodity marketing three questions are key: Can a quality standard be met? Can the product be produced at a competitive cost? Does the market want the product and at what price?

The sequence in which the answers should be provided begins with the last question first. Every good business starts with the market opportunity and works it back from there. This interim report will provide answers to the question of market dynamics. It will be up to the final report to answer the second question and it will be the combination of field research and trial and error to answer the first.

This first glance at the secondary research available begins to point to specific crops that rise to the top of the priority list.

1. Cereals have been the mainstay for PEI organic farmers ever since they started selling to a regional market. The growth in acreage from the past ten years is mostly due to their ability to successfully market to organic mills in the Maritimes and Ontario. **Wheat, Barley and Oats** will always be a crop grown on PEI and the markets for those crops may lack excitement, but they are steady, provide the regional population with organic flour and they make important rotational crops. One recommendation would be to expand the marketing activity to Quebec and New England. Having just characterized cereals as reliable but a bit dull, there is however one crop that shows growth that shows more than just promise. Even though technically not a cereal, **Buckwheat** is showing great promise. It is a great crop for organic farming and not only are the markets showing strong growth, they are also situated on the East Coast of the US.
2. Pulses are an attractive option for PEI organic farmers. Their high price to weight ratio makes the transport cost less punishing on shipping the crops to markets beyond Ontario and New York. The market shows signs of overheating, but with realistic expectations, these crops, especially **lentils and dry peas** should become part of an organic rotation on PEI. The arrival of WA Grain & Pulse solutions on PEI appears to be very timely. Although they are not yet marketing organic product, their expertise in the pulses market will be an invaluable addition to the PEI collective know how.
3. Oilseeds are showing the greatest potential for organic expansion. Organic oilseed products from Canada are feeding organic livestock in the US and the Island should position itself as a supplier. **Soy** has been grown on PEI for some time already and there are crush facilities, albeit small ones. **Canola** offers an extraordinary opportunity to position PEI as one of the few growing regions that can guarantee reliable supply should there be enough political will to enact a moratorium on GM Canola. **Mustard** too is a high potential crop as is the superstar of the group: **Hemp**. Even without the growth shown by hemp due to the very volatile CBD oil markets, the traditional hemp seed market looks strong and sustainable.
4. Both **Forage** and **Potatoes** should be added to this priority list for different reasons: Potatoes should be on the list simply because of the existing learning curve in the industry. Hay should be added because there is growing market demand, especially because pulses and oilseeds too are looking to supply the organic livestock industry in Quebec, Ontario and New England. PEI farmers would be able to offer not only crops, but organic animal feed solutions to their clients. The Bleu Blanc Coeur experience in France shows how such animal feed solutions can be branded and thus strengthen the relationships between buyers and growers.
5. Certain products are not yet treated in this interim report: Blueberries, Tomatoes, Pumpkin Seeds and Camelina. Other crops may be added as this study enters the stage of interviews with industry experts and potential buyers.

This interim report was to also include a report of conversations with buyers and industry experts. While such conversations have taken place, we felt there was not enough knowledge base, in particular regarding cost of production and cost of transportation to have productive conversations. They will be included in the final report.

PROJECT BACKGROUND

The PEI Certified Organic Producers Cooperative (PEI COPC) is an industry organization currently representing 50 certified organic producers, approximately 12,000 acres of certified organic production and $ 12 million in farm gate receipts.

In 2017-2018, the PEI COPC undertook a sector impact study with findings indicating that organics in the province is largely characterized by export-oriented field crops with producers expressing difficulty finding committed buyers for some crops and often unable to independently achieve sufficient volumes to access additional markets.

As a result, the PEI COPC has focused strategies to expand the sector on field crop and livestock production. Further research is ongoing and has been initiated in a three-phased approach:

1. Quantifying production potential in the organic field crop and beef sectors in PEI*
2. Developing relationships and securing commitments with qualified buyers; and
3. Determining infrastructure and investment requirements.

Phase 1 has been completed.

The PEI COPC is now seeking a qualified contractor to work on the second phase of the project (developing buyer relationships).

Responsibilities of the contractor will include but not be limited to, the following:

- Identifying local and regional sales opportunities as part of an export focused and import replacement sales strategy.
- Providing full supply chain descriptions.
- Collecting data regarding quality specification, potential crop requirements and distribution channels.
- Identifying broader national and international sales opportunities.
- Meeting/ connecting with national/ international buyers and maintaining connections with local and regional buyers.
- Compiling buyer information in a format usable for producers.
- Providing gathered information and knowledge to Prince Edward Island producers.
- Initiating infrastructure analysis to compare market needs to potential supply.
- Reporting specified data points and metrics.

OBJECTIVES

Deliverable 1: Establishing specific knowledge about regional, national and global markets, trends, prices and product demands This deliverable will rely mainly on statistics gathered from industry sources. They will remain general in nature (like the few examples given above), but they permit opening up the debate and prepare for the next step. Another factor to consider for this study is the complexity of modern supply chains: While Canadian organic wheat may end up in Holland, it could still be bought by a trading company in Ontario (that may be US owned) and it is this trading company that Island growers want to talk to.

Deliverable 2: Having a good understanding of the supply chain for the key priority products. During the first phase of the study, this supply chain information will be general in nature. After the interview with buyers, there will be a more specific, second part to it.

Deliverable 3: Developing a product priority list suitable for scale up. This will include a database of growers, cost of production goals and limitations of varieties. Given the available data within the Co-op, this should not be a very time-consuming task, but once potential buyers have been contacted, demands for more specifications may arise. Interviews are also planned with Agriculture Canada to identify opportunities linked to their research findings.

Once product priorities have been established, the core of the study will be the exploration of market opportunities. This will be done through one-on-one interviews, either on the phone or in person, trying to answer key questions that will help us answer the best product-market combination. Persons to be interviewed will be buyers as identified by the supply chain analysis: Trading companies, wholesalers, retailers and processors, not only of organic product, but also conventional (many buy both).

Deliverable 4: Developing a key contact database and transmitting direct industry knowledge. This deliverable shall represent the core of the study as it needs to function as a lead generation tool for individual or groups of growers / producers as they integrate the results of this study into their sales activity. It will also include an updated understanding about the dynamics of the supply chain.

Deliverable 5: Developing a list of key infrastructure or processing partners. This part will include conversations with government agencies, crown corporations and select processors. Infrastructure can also be human infrastructure. The deliverable will look at best practises on how a producing region the size of PEI can grow their production and sales capacity.

METHODOLOGY

DATA SOURCES

This interim report is the result of secondary research only. It is a compilation of data that is available from free or paying sources such as: FAO and National Statistics Bureaus such as Statistics Canada, USDA, etc.

Other sources are: Trade statistics: FAO, Harmonized Trade Data, UN Comtrade
Conventional Trends: General Research, Special reports, Articles and published interviews
Global Organic Production and Acreage: FIBL
National Organic Production: Various Provincial organic production data, such as OTA and COTA (specifically the report by Diana Zeidan, Canada Organic Trade Association)
Organic Trends: General Research, Special reports, Articles and published interviews
PEI News: General Research, Special reports, Articles and published interviews and, of course, COPC.

Previous studies: Two previous studies have been commissioned to look at markets for organic farmers:

2004: Organic Grains & Cereal Market Study (McArthur Group)
2011: Maritime organic field crops Market Study (Theresa Richards)

MARKET PRIORITIZATION

Ultimately, the objective of this study is to identify and facilitate access to potential buyers, but the first question that needed an answer was where these markets were and what the factors are that help us determine market potential:

a. Growth. Growth does wonderful things to those wanting to enter new markets. Buyers are generally open to try new suppliers. In times of growth, they need supply. Buyers are also open to new relationships and prices can be favourable. Even if prices eventually settle in at lower levels, times of growth can be important windows of opportunity that give growers a few years of a head start to become more efficient.

b. Conventional vs. Organic: Organic products have completely different demand generators than their conventional cousins. They generally exhibit stronger growth (CAGR) than conventional products due to increased consumer demand, so they can breathe life into industries long believed to be mature or shrinking (i.e. potates)
Organic product is often so different from its conventional cousin, it can no longer be compared. Organic oilcake for example cannot be compared to the same product on the conventional side which has undergone chemical extraction methods commonly used in the conventional world.
Organic product also has a different cost structure and value chain than conventional crops. Generally organic product is twice as expensive as conventional. This reflects lower yields and the sometimes-higher input cost for organic crops. The higher unit cost however, it can make a difference in terms of transportation cost per shipment dur to its higher value per weight ratio.
We cannot however completely ignore the market realities on the conventional side. New market trends usually affect conventional crops before organic opportunities start opening

up. Pulses for example start to be increasingly used in pet food and meat replacement products and snacks. As these uses are becoming more mainstream, the market demand for an organic version soon follows.
This is a long way to say organic markets are linked to the conventional markets and in many ways dictated by them, but they are certainly not the same.
The competitive landscape too is very different. This is due to different countries adopting different policies toward organic agriculture. While Brazil and the US are competitors for Canadian conventional soybean, India is the most prolific producer of organic soy. This may not appear to be too big of an issue, but when you look at the potential of these countries to expand production and their closer proximity to key markets, such dynamics can make or break market opportunities.

c. Geographic position: Agricultural commodity trading is a global activity. Canada has taken full advantage of overseas markets, especially in Asia, but a lot of these opportunities are the result of excellent supply lines from the Canadian prairies to the port of Vancouver and to processing facilities right across the border in the US. Ever since the loss of their privileged position during the age of wooden sailboats, where most markets were in England or in New England, the Canadian Maritimes are no longer in a privileged geographic position. Today most goods have to be trucked out of PEI and trucking is the most expensive form of transportation. Also, most food processing has moved closer to where the resource is: The Canadian Prairies and the American Mid-west. At the same time, countries such as Kazakhstan and Ukraine are gaining in efficiency and will certainly benefit from China's belt and road initiative, a vast project to improve supply lines to and from China, especially their access to the Asian steppes. Part of the objective is to make China less dependent on imports from North America. The second phase of this study will look at cost of production, cost of transportation and opportunities for infrastructure development to ensure these competitive advantages are not offset by a cumbersome supply chain.

d. Expect the unexpected: Market dynamics can change very rapidly due to trade disputes and/or climate change. In the last three years, these changes have accelerated. Some key crops, such as Canola and Lentils have seen sudden changes in demand due to tariffs and other trade barriers. As one crop becomes less viable because it was the target of a trade dispute, farmers switch to other crops, potentially flooding the market and driving down prices of that crop. Other disruptions caused by the African Swine Fever will affect demand for animal feed and the Corona Virus outbreak will certainly affect supply chains in the biggest agricultural markets. Generally, organic products are seeing less volatility, especially when the markets are regional or national, but they are certainly not immune to these disruptions and especially for PEI, regional (a radius of 2,000km), is also international. For this reason, we are looking at long term trends in production and overall pricing to guide us through this study. If we didn't, the recommendations would not be strategic, but tactical. One of the recommendations however will certainly be the establishing of a marketing structure that can assess short term opportunities and make planting recommendations, all the while pursuing strategic objectives.

Both previous studies were tasked to look at local production realities and match them with market opportunities. Both studies identified buyers with a given radius, the furthest reaching into Ontario.

Their conclusions can be summed up in the following quote from the 2011 study:

“Donna Youngdhal, Organic Marketing Director with the Canadian Wheat Board, confirmed this fact: “For the Maritimes, you should be looking only at the North Eastern States and the Quebec mills, otherwise it’s too costly to ship products that are already being grown out West.”

THE LIST OF BUYERS

We have compiled a list of potential buyers that was compiled from several sources: OTA (The Organic Trade Association), COTA (The Canadian Organic Trade Association), the Quebec Organic Trade Association, The Cornucopia Institute, The Non-GMO sourcebook and contacts scraped from the many reports and articles that have been consulted for this study.

The list has been organized into different data fields: Name, Contact Person, Address, Phone number, FAX, e-mail, Website and description. Added are observations about position in the value chain, a list of crops and notes from the initial interview.

This list should be considered a list of preliminarily qualified leads until they can be vetted further through questionnaires and interviews.

Special attention was given to companies within the radius of 2,000km: The Maritimes, Quebec, Ontario, New England and Mid-Atlantic, but western companies are not excluded.

CHAPTER 1: PRODUCT PRIORITY LIST

For any scenario regarding market development for a food product, special consideration always needs to be given to the product/market mix, meaning that each product, even each variety has a different market dynamic with different intervening competitive forces.

It became clear early on that there are no markets for "PEI Organic Product", but that there are markets for organic canola, organic barley or organic dried peas.

This means that as a first step, this consultant, with the help of the steering committee, had to identify a shortlist of products to be closely examined. This shortlist would be a combination of crops currently grown but also potentially grown and it would be the basis for an ongoing strategic discussion.

Further to the discussions around product, as organic producers, the group also felt they were not in the business of selling specific crops. Because of crop rotation demanded by the organic standards, they see themselves as marketers of a succession or family of products.

The exact selection of what products to market would therefore be determined by market demand, market prices, cost of production, cost of transportation and crop rotation.

This interim report will focus on market opportunities for the products that have been identified by the initial short list of crops.

The products to be considered for this study were a mix of products that are currently grown and marketed, products that can be grown, but have not yet been marketed and products that could be of interest because markets show high demand for them.

During interim presentations, other products were added and will appear in the final report.

They can be combined into the following groups:

Group 1: Grains: Wheat, Barley, Oats, Buckwheat, Spelt, Triticale and Rye

Group 2: Pulses: Lentils, Dry Beans, Dry Peas, Chickpeas and Fava Beans (or Horsebeans)

Group 3: Oilseeds: Canola, Soy, Sunflower, Mustard, Hemp, Carmelina and Pumpkin Seed

Group 4: Forage, Potatoes, Blueberries and Tomato

Group 5: Livestock

The final report will include a compilation of interviews with many leads identified on the excel spreadsheet as well as comparative tables that include cost of production, yields, cost of transportation and recommendations for infrastructure development.

The final study will also examine crops that were not originally on the priority list: Blueberries, Carmelina, Pumpkin seed, and other crops that may become of interest.

CHAPTER 2: CEREALS

Cereals, or grains, were the first plants to be grown in an agricultural setting. They are the most planted crops in the world, and they have adapted to almost every climate and growing zone.

In their natural, unprocessed, whole grain form, cereals are a rich source of vitamins, minerals, carbohydrates, fats, oils, and protein.

They are one of the most important foods for humans and feed for animals.

For organic agriculture, cereals and grasses are frequent cover crops because of the many advantages they supply to soil quality and structure. The dense and far-reaching root systems give ample structure to surrounding soil and provide significant biomass for soil organic matter.

Grasses and cereals are key in weed management as they compete with undesired plants for soil space and nutrients.

As such, cereals will always be part of the product mix being produced on PEI. Finding markets is not so much a choice but a necessity.

Back in 2011, a study was commissioned by Acorn to explore market opportunities for Organic Maritime Farmers. Most crops being considered then were cereals. The most important takeaway from this study can be summarized in the following excerpt:

"Canadian markets beyond Quebec are just too far. Donna Youngdhal, Organic Marketing Director with the Canadian Wheat Board, confirmed this fact: "For the Maritimes, you should be looking only at the North Eastern States and the Quebec mills, otherwise it's too costly to ship products that are already being grown out West."
In addition, it appears that beyond Quebec, any markets that might be interested in purchasing from Atlantic Canada would very likely be looking for quantities that Maritime organic producers cannot supply. Minimum shipments are by the container or full tractor-trailer load (20-30 tonnes). Increased shipping amounts make it more economically viable and the Maritimes simply are not producing the volumes to fill this market"

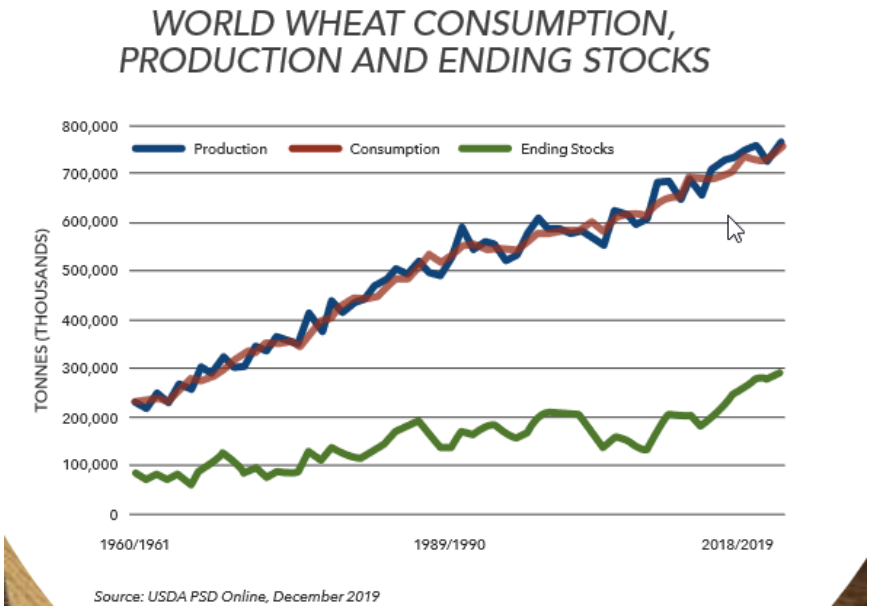
This situation has changed. PEI Farmers are looking to fulfill needs in regional, national and international markets.

The challenge for cereals is that their "value per weight ratio" is on the low end of what can be grown on PEI. This means that transportation cost will have a stronger influence on how far the product can be shipped than for other product such as Canola.

WHEAT

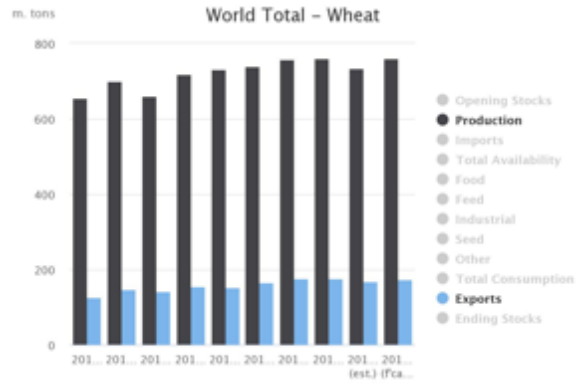
Conventional Production and Trading Data:

“The global wheat industry represents an important commodity both in terms of food security and in the development of other goods, including animal feed and high-value food products. Despite its importance, less than 25% of annual wheat production is traded across borders, the remainder being utilized domestically” (Murphy, Burch et al. 2012, FAO 2013).

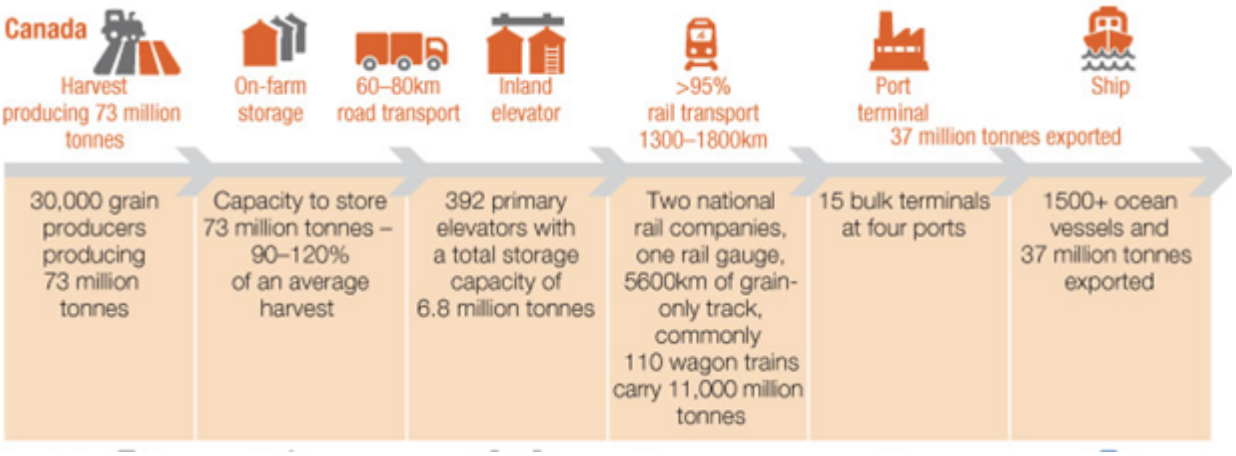


As the above graph shows, is one of the most important crops world-wide and its growth roughly tracks to the general growth in global population.

Because of the food security aspect of Wheat, it mostly services local and national markets with the notable exception of Russia, Canada, the US and France who supply net importing countries led by Egypt, Indonesia, Algeria and Italy.



Most Canadian wheat makes it to Indonesia, Japan, the United States, China and Bangladesh. Asian shipments go through the port of Vancouver, shipped through a competitive supply chain as depicted below:



Wheat is one of the cheapest Canadian exports from the short list of products mentioned in section one according to Comtrade (average per ton price received = $US 218 / ton). Because of the high proportion of transport costs in the final price to the consumer, the supply chain for grains needs to be most efficient in order to compete.

By that measure, all the other cereals are under the same competitive pressure as their average cost/ton range from US$217/ton for Triticale to US$238/ton for oats.

Conventional Trends

The global wheat production was valued at a volume of 732 million metric tons in 2018, and it is expected to witness a CAGR of 1.3% during the forecast period of 2020-2025. This is modest growth and in line with general population growth.

According to conversations with buyers, export markets are mature and North American markets are under pressure from negative perceptions and reactions about gluten.

Organic Production

The vast majority of Canadian organic cereal production is located in the Prairies where production has mostly trended evenly, except for an increase in wheat production in 2018.

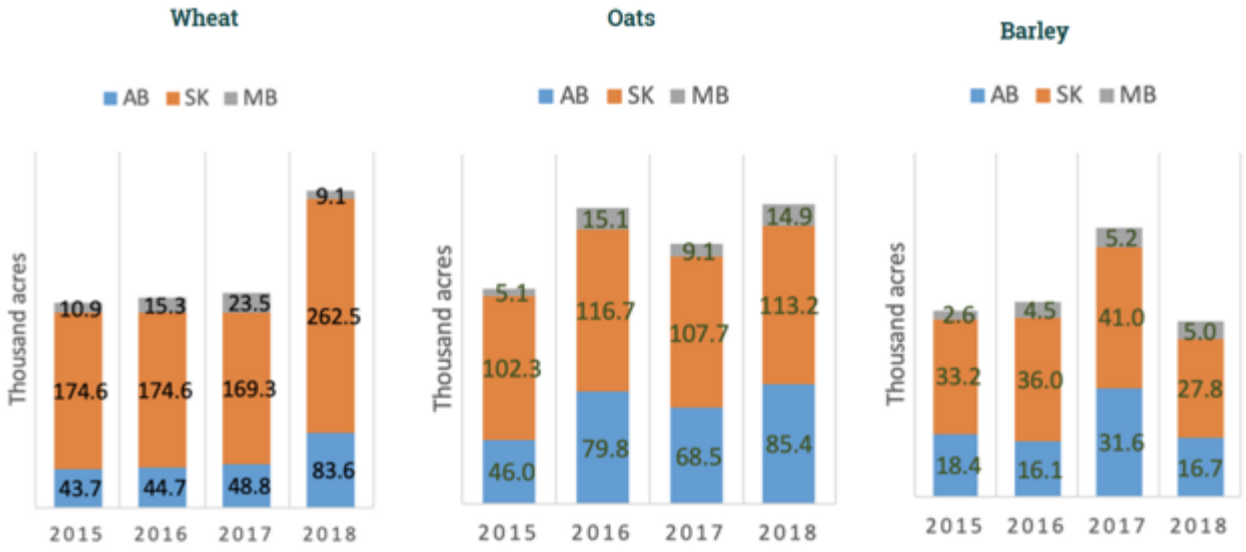
The best summary is that organic cereals are not setting the world on fire in terms of growth. However, as a must-grow rotational crop, they will be an indispensable part of any crop rotation of an organic farm.

TABLE 3 | ORGANIC CEREAL ACREAGE BY PROVINCE, 2018

	AB	SK	MB	Prairie Total	Cdn Total	% Cdn Total
Barley	16,669	27,780	4,992	49,441	58,519	85%
Oats	85,173	112,510	13,670	211,354	234,717	90%
Rye	2,343	10,669	2,315	15,326	21,857	70%
Wheat	83,566	262,451	9,097	355,113	399,500	89%
Other cereals*	355	2,770	446	3,572	22,851	16%
CEREAL TOTAL	**188,106**	**434,204**	**30,519**	**652,830**	**745,658**	**88%**

** Other cereals include millet, quinoa and other cereals with no details listed.*

Source: Diana Zeidan, Canada Organic Trade Association



In terms of export destinations, 20,000 ton of wheat (mostly Spring Wheat) was exported to Asia with the United States receiving the bulk of shipments for Organic Durum Wheat at 21,743 tons.

Europe received the other 19,700 tons, most of it going to the Netherlands and Belgium, roughly splitting organic Wheat exports into three equal parts.

Canada Exports to the World Organic Spring Wheat Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	13,371,889	100.00
South Korea	4,242,754	31.73
Malaysia	2,588,933	19.36
China	1,424,964	10.66
Netherlands	1,290,041	9.65
Vietnam	973,552	7.28

Canada Exports to the World Organic Spring Wheat Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	26,524	100.00
Malaysia	7,402	27.91
Korea, South	5,995	22.60
China	3,473	13.09
Vietnam	2,923	11.02
Netherlands	1,403	5.29

Canada Exports to the World Organic Durum Wheat Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	26,382,342	100.00
United States	17,200,623	65.20
Belgium	8,559,450	32.44
Italy	317,366	1.20
South Korea	138,000	0.52
United Kingdom	95,463	0.36

Canada Exports to the World Organic Durum Wheat Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	38,425	100.00
United States	21,743	56.59
Belgium	15,838	41.22
Italy	383	1.00
South Korea	239	0.62
United Kingdom	169	0.44

Canada Exports to the World Organic Wheat & Meslin Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	1,352,253	100.00
Netherlands	704,522	52.10
Switzerland	500,312	37.00
Germany	95,783	7.08
Italy	34,335	2.54
Hong Kong	17,301	1.28

Canada Exports to the World Organic Wheat & Meslin Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	1,804	100.00
Netherlands	876	48.56
Switzerland	629	34.87
Germany	216	11.97
Italy	76	4.21
Hong Kong	7	0.39

Source: COTA

The organic premium to farmers is: 284% for milling wheat and 150% for feed grade.

Organic trends:

Most organic cereals are destined for flour mills with graded out grains selling as animal feed.

COTA mentiones 66 organic flour processors in Canada (all types of flour), with 19 in ON and 13 in SK in 2018. The majority of the organic flour is sold wholesale to bakers, not at retail.

Organic millers process a variety of grains to meet specific needs of the artisanal and organic baking sector. They use a wide range of raw ingredients, ranging from hard red spring, winter and soft wheats, ancient grains such as Emmer, Einkorn, Red Fife Wheat and spelt as well as oats, flax, buckwheat and other grains.

Artisanal millers tend to market whole grain flours and place less emphasis on protein levels than on gluten qualities when purchasing organic wheat. One organic miller told us that the company blends lower protein hard red winter wheat with hard red spring wheat as its gluten structure performs better with the long fermentation times associated with artisanal baking."

Recommendations:

We reviewed the list of current buyers for organic product from PEI. Most of the buyers are buying cereals and most of them are within the 2000km radius of PEI.

Speerville Organic Flour Mill is a cleaning facility, mill, and organic food distributor, based out of Speerville, NB, who ship product all over the Maritimes. It is the most mentioned buyer of PEI product and it is also mentioned in the two previous marketing reports.

Reviewing the data above, PEI lacks the supply chain infrastructure to access international markets except for New England and the Mid-Atlantic states.

There are enough organic flour mills in that region to allow PEI organic farmers to build up their capacity.

A notable mention would have to go to Quebec. We have noticed before that Quebec often gets overlooked as a potential client for PEI products. This is could be explained by different business practices and sometimes language barrier.

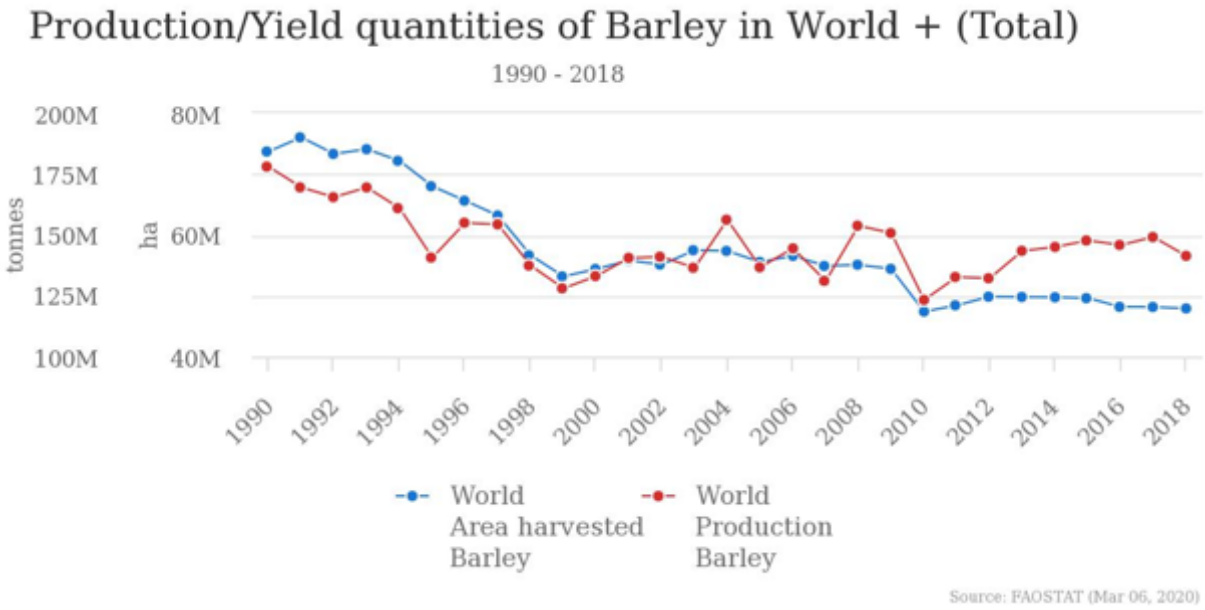
BARLEY (FEED), BARLEY (MALTING)

Since the 1990's world-wide production of barley has declined and has not seen much of an increase, settling in at 150-million-ton global production, even though yield has seen steady improvements.

Barley as feed has not kept pace with the growth of the livestock industry it supplies. Competition from faster growing corn and soybeans is often cited as the reason Barley for alcohol production too is not seeing much of an increase. Alcohol production internationally is declining.

Since 2010, consumption of barley has expanded again, and is expected to grow at the rate of 1.1% until 2024. Europe accounts for more than 30% of share in global barley consumption. The major barley consuming countries are China, Saudi Arabia, Canada, and Turkey.

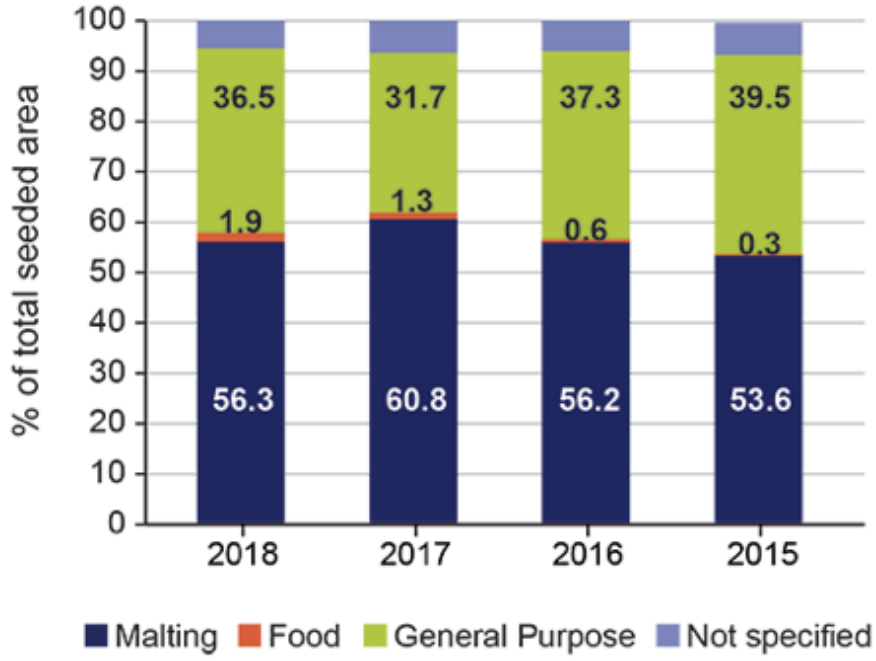
There are early rumblings of Barley as a key ingredient for a milk replacement drink. It remains to be seen if this use will revive the fortunes of barley as a crop.



On the basis of grade, according to FAO, barely market can be segmented into malt grade (21%), food grade (6%) and feed grade (70%).

Malt grade dominates the overall barley market due to excellent extract feature with low moisture grade and rich enzyme obtainability. Malt grade is also known for its high sweeting level as a food ingredient. However, feed grade and food grade will keep on losing their barley market share due to decrease in their consumption over the past years. In addition, there is a modest use of barley grain for the production of biofuels.

In Canada, the majority of barley graded out as malting barley (see below). Seed barley is used domestically by producers raising livestock for meat and dairy production. However, historically there has been demand for Canadian feed barley in Japan and Saudi Arabia along with a recent emergence in the Chinese market.

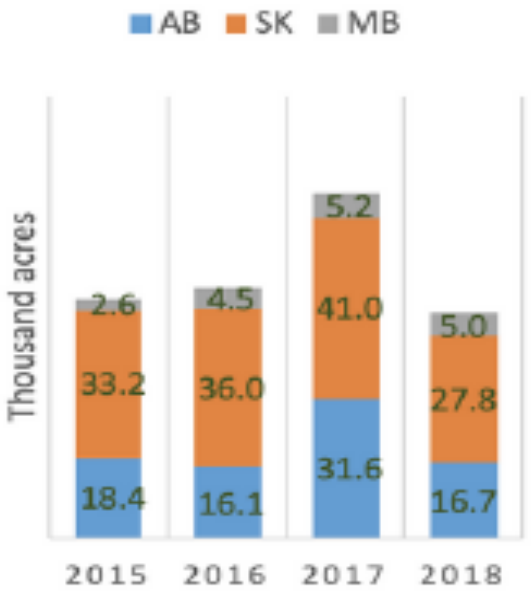


Source: Candian Grain commission (Stats represent Western Canada only)

The following graph shows the supply chain for Barley in North America:

Organic Barley

In 2018, Western Canada grew 49,500 acres of organic Barley while Canada grew a total of 58,519 acres. This represents a decline of 4,700 acres sown in barley since 2015.



Source: Diana Zeidan, Canada Organic Trade Association

Organic Barley seems to follow the downward trend set by conventional Barley. Exports in organic Barley are modest. Only slightly more than 10,000 tons were shipped with over half going to the United States.

Canada Exports to the World Organic Barley		
Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	2,356,110	100.00
United States	1,567,976	66.55
South Korea	626,231	26.58
Japan	153,243	6.50
Cote d Ivoire	8,660	0.37

Canada Exports to the World Organic Barley		
Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	5,029	100.00
United States	3,062	60.89
South Korea	1,507	29.97
Japan	436	8.67
Cote d Ivoire	24	0.48

Source: COTA

There are a few silver linings for this crop in its organic form:
Organic beer is still nascent, with only ten organic beer processors (3 in BC, 5 in ON, and 2 in QC).
The U.S. market for organic beer is worth $79 million, with a 20.7% increase in organic craft beer sales between December 2013 and 2014 (Nielson, 2015).
A micro malting industry has also been developed to provide specialized malt ingredients for the micro-brewery market.
Organic beer is present in the marketplace, but locally sourced ingredients trump organic. Some craft breweries are using some organic ingredients when they can source them, but they are not taking all of the steps to go organic.

Demand for craft malt is also generating demand for heritage barley varieties. Mainstream malting is consolidated.

Canada Malting is the largest commercial scale malting house with processing facilities in BC, AB, ON and QC, with organic barley and wheat malt processing in the Thunder Bay facility.
Some of the organic micro-malteries include: Harvest Hop and Malt in Ontario, Malterie Frontenac in Quebec, Gambrinous Malting Corp. in British Columbia and Horton Ridge in Nova Scotia.

Organic Prices:

Prices for organic Barley have stayed within the band of $10-12 / bushel for malting barley during the last seven years. This represents a 170% premium for organic.

For the same time frame, feed grade organic Barley has moved within a band of $7-9 / bushel. The organic premium also settles in at 170%.

Recommendations:

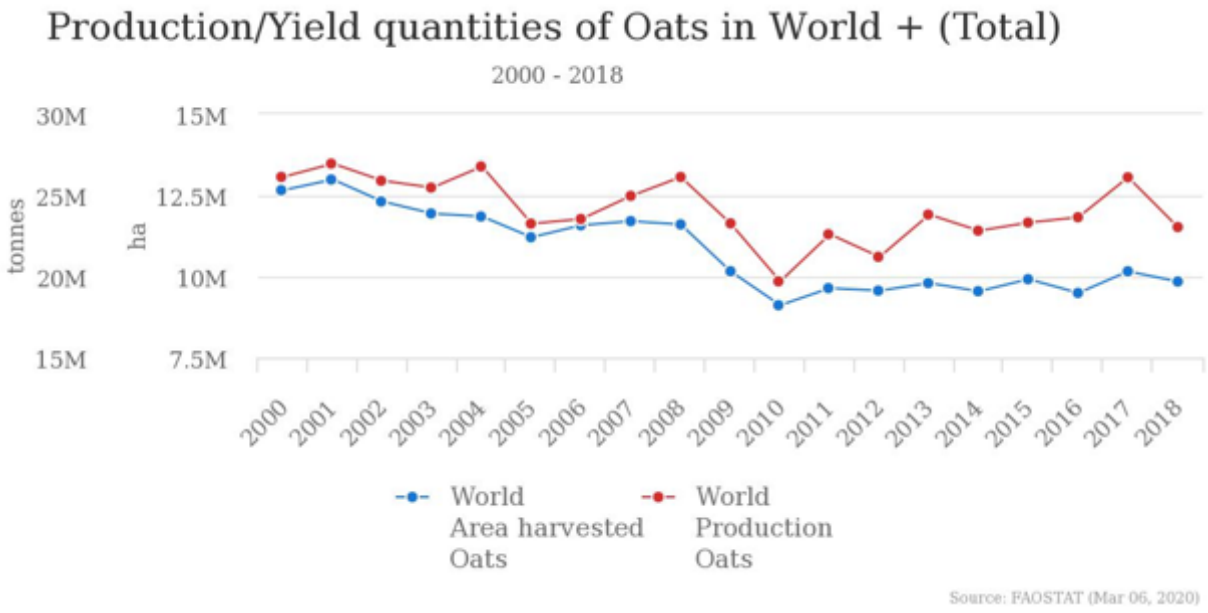
Barley is not a crop that is showing much growth. Neither as a conventional crop nor as an organic one. The malting market is stagnant due to mature sales in Alcohol. The feed market too is mature.

The reality however is that Barley will always be part of a sustainable crop rotation. It makes therefore sense to identify the best possible use for this crop.

Finding a malting house and building a relationship based on providing a reliable supply of heritage barley varieties appears an effort to be pursued. With craft alcohol production moving away from mainstream supply lines and going more local, there may indeed be good uses for PEI frown barley.

OATS

Oats are grains obtained from the Avena Sativa plant which belongs to the Poaceae family. They are consumed by humans in the form of oatmeal or rolled oats and are also used as an ingredient in animal feed. With the availability of low-cost substitutes, along with changing farming practices, the usage of oats as a feed grain has significantly declined over the past three decades.



But after this long-term decline in the production of oats, this crop has seen a reversal of fortunes in the last decade.

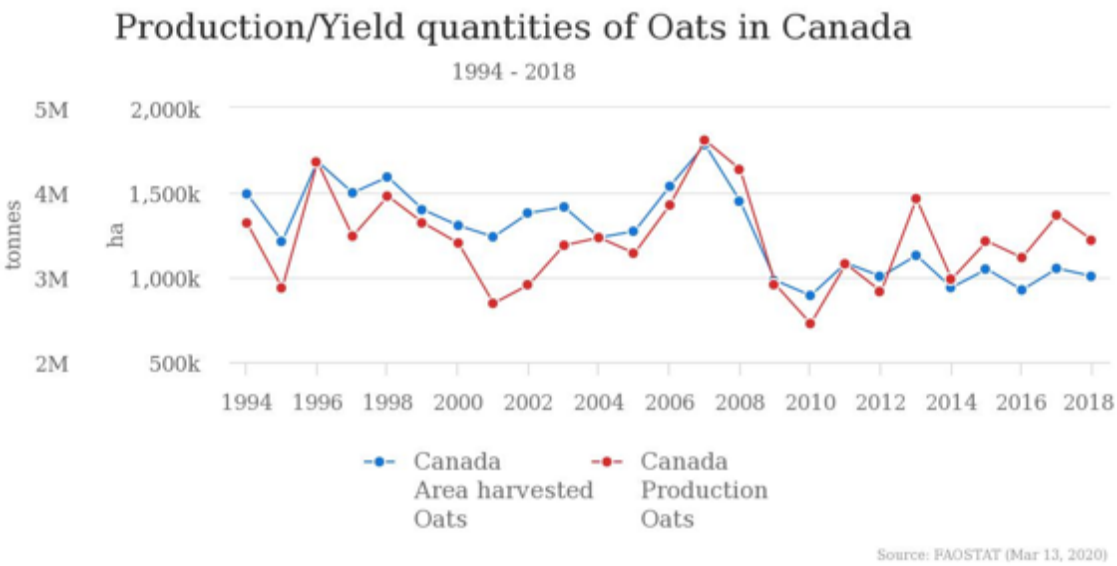
On the human side, increasing awareness about the health benefits offered by oats has boosted their inclusion in healthy breakfast foods and snacks like granola bars, muesli, oats biscuits and oatmeal.

Apart from this, manufacturers are constantly expanding their product portfolio by introducing oat-based beverages and bakery products in the market. Research and development in the oats market by the leading players and frequent launch of newly formulated products have further boosted the market growth. For instance, Chobani, a US-based yogurt company, launched oat-based milk and yogurt in 2018.

However, the availability of substitute products such as quinoa, buckwheat, brown rice, and cornflakes are expected to hamper the growth of the oats market. In Europe, since 2016, almost 70% of the cereals launched are oat-based. With the approval of the EU for oat products, health claim in 2013 increased the demand for oatmeal across Central Europe. Most of the oats consumed in Europe are produced within the region and imported across neighboring countries

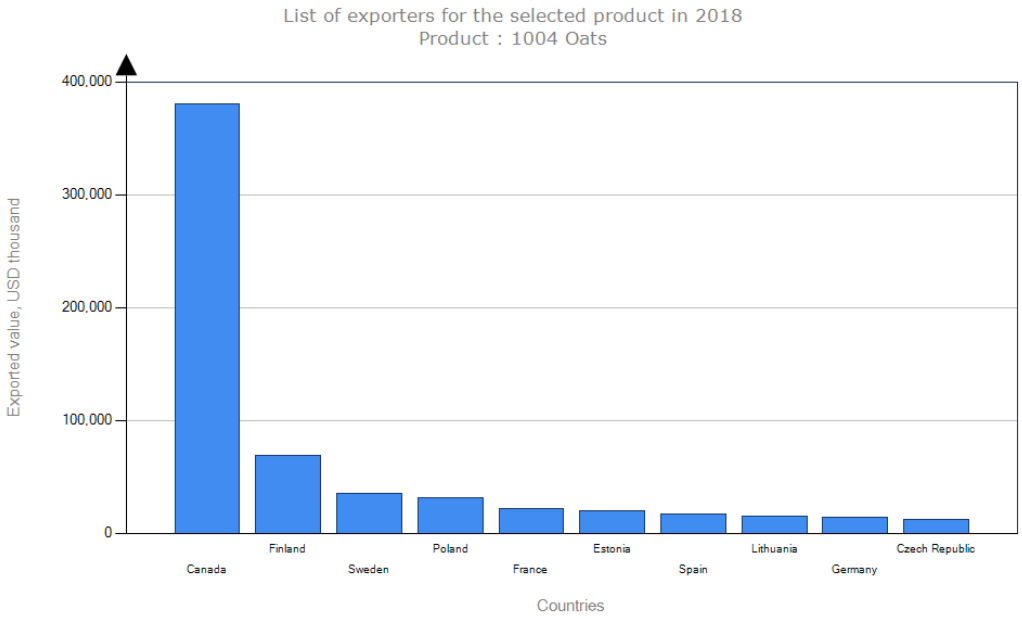
The global oatmeal market at US$ 9.86 Bn in 2018 and is expected to grow at a CAGR of 4.2% during the forecast period 2019 – 2027, to account to US$ 14.08 in 2027.

Another demand generator in its infancy is the use of oats for oat milk. In terms of product needs, about 500 MT (about 1.1M pounds) of oats can be used produce about 5M litres of oat milk. Right now, Farm Lead is estimating that oat milk accounts for about 100,000 Metric Tons of total raw oats, but with growing market share in the alternative/non-dairy ”milk” market (almond and soy milk currently have 64% and 13% respectively), then this demand could rise. The oat-milk market is expected to grow at a rate of 15.8% in the forecast period 2020 to 2027.



In 2018/19, the global harvested area of oats came in at 23.3 million acres. This is down slightly from 2017/18 levels of 23.5 million acres. The top five producers are: Russia with 6.79 million acres, the European Union with 6.58 million acres, Canada with 2.47 million acres, Australia with 1.58 million acres and the United States with 864,500 acres

While Canada is number three in terms of production, it is by far number one when it comes to exports with 83% of the volume shipping to the United States.



The supply chain for oats is more complex than that for wheat or barley. Here is a summary of the process as described by the North American Millers association:

Raw oats used by the oat milling industry undergo initial processes of cleaning and hulling. Cleaning removes the unwanted materials from the milling quality oats.

The next step is the hulling process, where the outer shell (hull) is removed from the inner kernel, called the groat. The hull is removed by large machines that fling the oats against a rubber ring, knocking the hull off without damaging the groat.

These groats are then further processed to make an edible food product from a raw grain. The mixture of groats and loose hulls flow into a set of aspirators, where the much lighter hulls are blown off. The groats enter scouring machines where brushes clean the groats.

In the conditioning process, moisture content is increased before the groats pass through a kiln where they are heated. During the heating process, steam inactivates enzymes present in raw grain and the groats are given a roasted nutty flavor.

The product then enters the sizing system where width graders are used to size the individual pieces. Large groats enter the groat stream, while small groats and broken pieces are sent to the cutting system. In the cutting system, steelcut is produced from the groats and broken pieces.

The flaking system uses steelcut or groats as raw material and produces flakes. Before flaking, the products must be steamed to increase the moisture and elasticity. Whole oat groats are rolled into various old-fashioned type flakes.

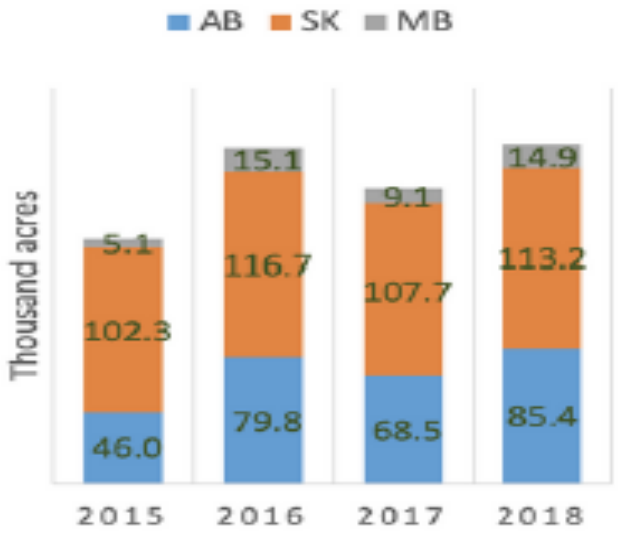
Following rolling, the flakes are dried to approximately 11% moisture on a bed dryer before being packaged.

The flour and bran system produce whole oat flour, or a combination of low bran oat flour and oat bran. Rollstands and hammermills are used to grind the product into flour or bran.

Crushed oat products are produced using an attrition mill. Steelcut, groats, or flakes can be milled into crushed oat products. Granulation requirements determine which product to mill, and how to set the mill.

Organic:

The acreage of organic oats in Canada has grown from 153,400 acres planted in the prairies in 2015 to 213,500 acres in 2018. Total acreage in 2018 of organic oats in Canada was 234,757 acres.



Source: Diana Zeidan, Canada Organic Trade Association

Canada exports to the World Organic Cereals		
Calendar Year: 2017		
Description	CAD Dollars	Quantity (Tons)
CAN Organic Cereals	**53,291,474**	**96,757**
CAN Organic Wheat	14,724,142	28,328
CAN Organic Barley	2,356,110	5,029
CAN Organic Oats	9,828,880	24,975
Organic Durum Wheat	26,382,342	38,425

Canada Exports to the World Organic Oats Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	9,828,880	100.00
South Korea	3,903,214	39.71
United States	2,994,510	30.47
Japan	2,363,286	24.04
China	271,308	2.76
Cuba	268,098	2.73

Canada Exports to the World Organic Oats Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	24,975	100.00
South Korea	10,014	40.10
United States	9,000	36.04
Japan	4,673	18.71
China	623	2.49
Cuba	616	2.47

South Korea and Japan are both important buyers of organic oats from Canada. It remains to be examined if PEI organic oats can be competitive with those grown in Western Canada to be shipped to Asia.

Exports of organic oats to the U.S. more than doubled from $US 2,296,000 in 2017 to $US 4,697,000 in 2018.

This is the result of a growth market in North America, estimated to keep an average CAGR of 6.4% due to the healthy aspects of oats. Oats as breakfast cereals are still the most common use for organic oats. Increasingly, however, organic oats are used in healthy snack options and milk replacements that have been launched recently.

In Quebec, Ferme Olofée grows oats and other grains on 2,500 acres and contracts its grain supplies with 50 farmers, grain centres and co-ops in the region. The farm has 30 employees, the majority working at the oat-processing plant that produces oat products for human and animal consumption.

They also supply Biscuits LecLerc, a cookies company, but also provides its quality flakes to about 10 clients including Boulangerie Vachon (Canada Bread), Boulangerie St-Méthode and Les Moulins de Soulange.

Grain Millers is another major oat processor: “You can make good money on organic oats, and it’s a staple on almost every organic farm,”

Organic oats on PEI:

Summary In response to the visit by Grain Miller’s in 2015,where they indicated they were interested in procuring organic oats from PEI at a then indicated price of $400.00 /tonne, an organic oat cultivar evaluation trial was initiated on certified organic land at the Harrington Research Farm of the Charlottetown Research and Development Centre in 2016

Recommendations: Similar to the recommendation for other cereals, oats are on the watchlist for PEI organic farmers, especially due to the recent focus of oats as human food, vs animal feed. This switch should create demand on the organic side, but this growth has yet to materialize.

BUCKWHEAT

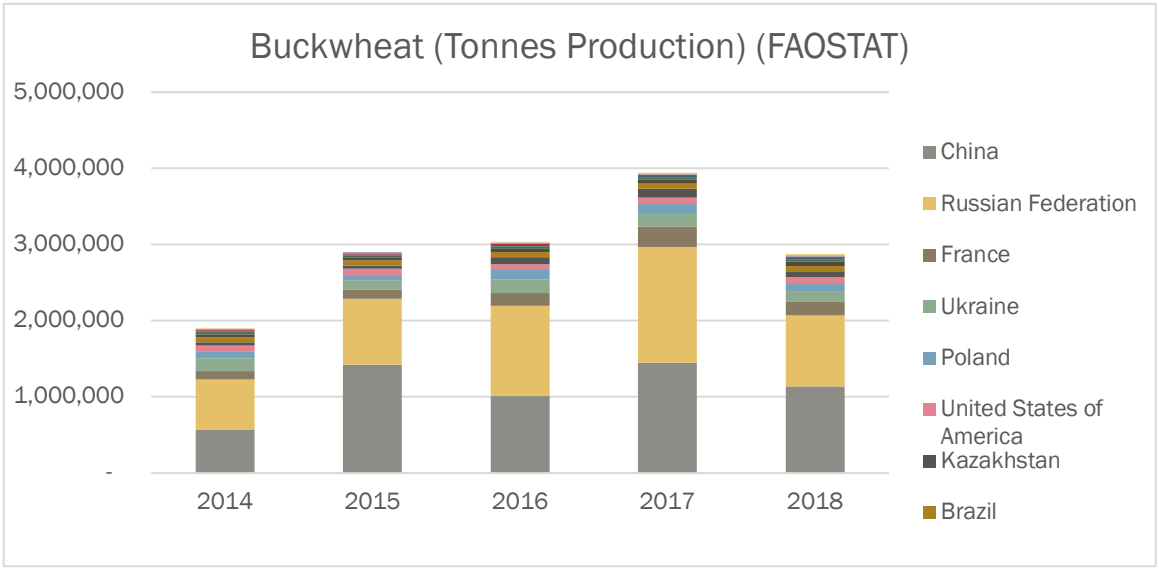
Buckwheat is a relatively low input crop that has relatively high yields even in marginal soil. Because it adds nutrients to the soil, it makes a good cover crop or rotational crop. While the environmental benefits of buckwheat are difficult to measure, some studies have been done to show that it is cost effective as a double crop.

Buckwheat grows quickly, with a 30-day maturity rate that allows it to kill off most competing weeds. Due to its fast growth, it is a good candidate for a catch crop when others have failed, and it also fits well into rotations. In addition, it is economical to produce because it requires no pesticides and few herbicides, draws phosphorus efficiently from the soil, and needs less nitrogen

Buckwheat, which is gluten free, has been traditionally used for both human consumption and livestock feed. While buckwheat flour is mostly used for pancakes, it can also be used in baked goods, as long as it is mixed with semolina or wheat flour, both of which contain gluten. Buckwheat is also used for soba noodles, which are long, spaghetti-like noodles that are a staple of the Japanese diet. Cracked buckwheat groats can be sold as grits, while roasted groats can be sold as kasha, which is popular in Eastern Europe and Russia. Beer and ice cream manufacturers also use buckwheat in their products.

Whole buckwheat grain can be used in poultry scratch feed mixtures. Because the middlings are high in protein, they are good for livestock feeds, such as hog and chicken feeds. Buckwheat straw is also higher in protein than grass grain straw, though it is lower in digestible carbohydrates. Flattened buckwheat hulls can be sold for landscaping mulch, packing material, heating pads, mattresses, and lightweight hull-filled pillows that are popular for firm neck support.

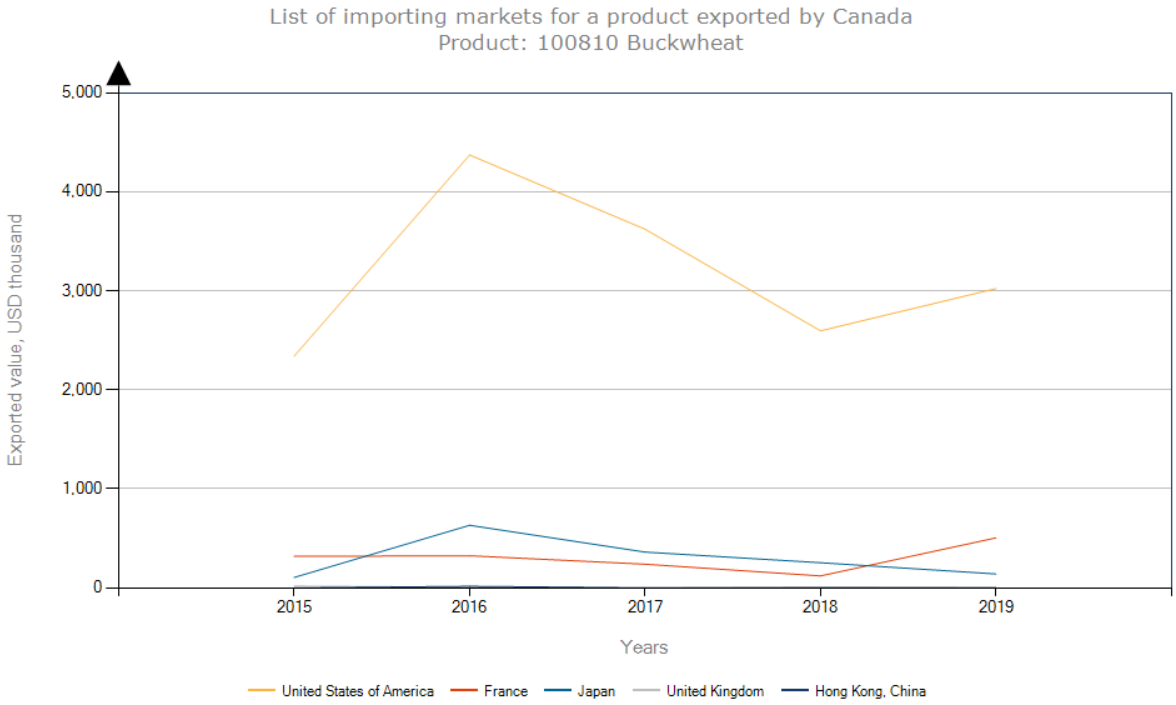
Buckwheat is known as a nutritional powerhouse, giving it much potential for pharmaceutical and nutraceutical possibilities. Seventy-four percent of the protein in buckwheat is available to the human body, making it one of the best sources of plant-based protein. It also contains eight essential amino acids, vitamin E, and almost the entire vitamin B complex spectrum. Buckwheat is also virtually fat free, with complex carbohydrates that can slow the development of obesity.



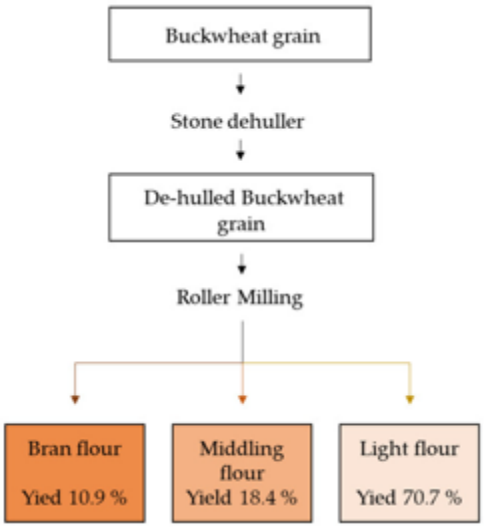
Conventional buckwheat has seen significant growth in the last five years. Production doubled between 2014 and 2017, just before a correction in 2018.

Top producers also match top exporters with Russia, China and the US exporting just under 60% of all buckwheat worldwide.

The biggest importer of conventional Buckwheat by far is Japan importing over 30% of all traded buckwheat. As for Canadian exports, 77% go to the United States.



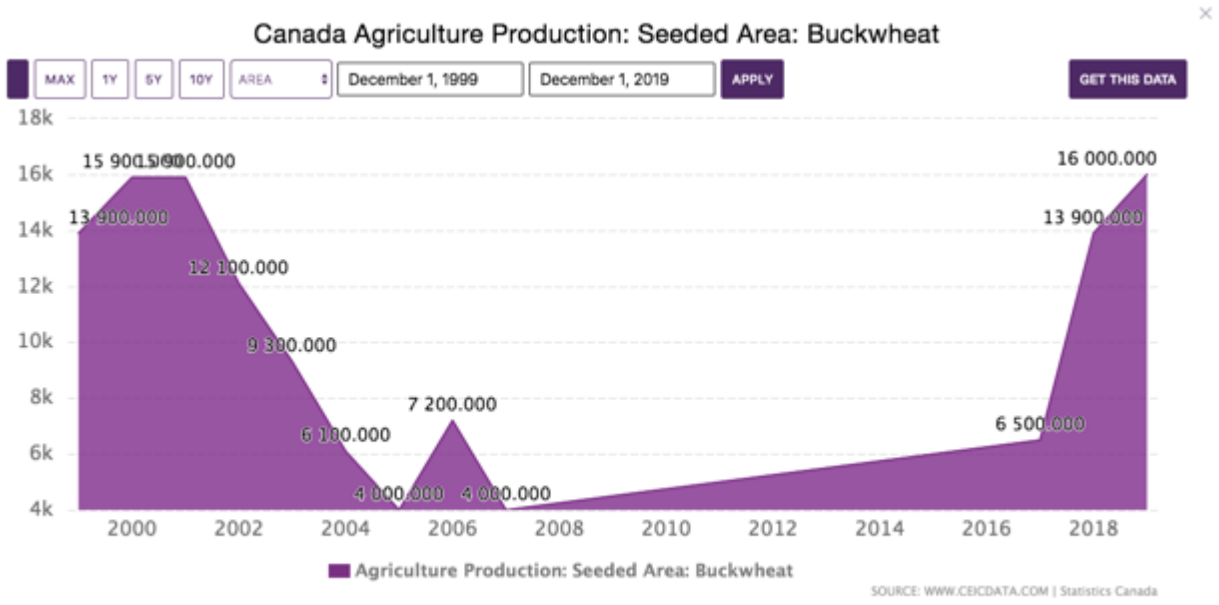
The supply chain for Buckwheat is similar to that of milling cereals.



Buckwheat in Canada:

Historically, Manitoba has produced about 70 per cent of Canada's buckwheat crop, while Ontario and Quebec grow the other 30 per cent between them. In the late 1970s, national buckwheat production peaked at about 150,000 acres. Average production in Manitoba hovered between 20,000 to 30,000 acres over the next two decades or so, then dropped steeply in 2007. Several factors have contributed to buckwheat's downfall: China's buckwheat supply, lower production costs, and geographical convenience have eroded Canada's share of the Japanese market. This led Farmers to turn to more lucrative crops such as canola and soybeans.

Since then, Buckwheat has come back with a vengeance:



There has also been a shift of production from Western Canada to the East:

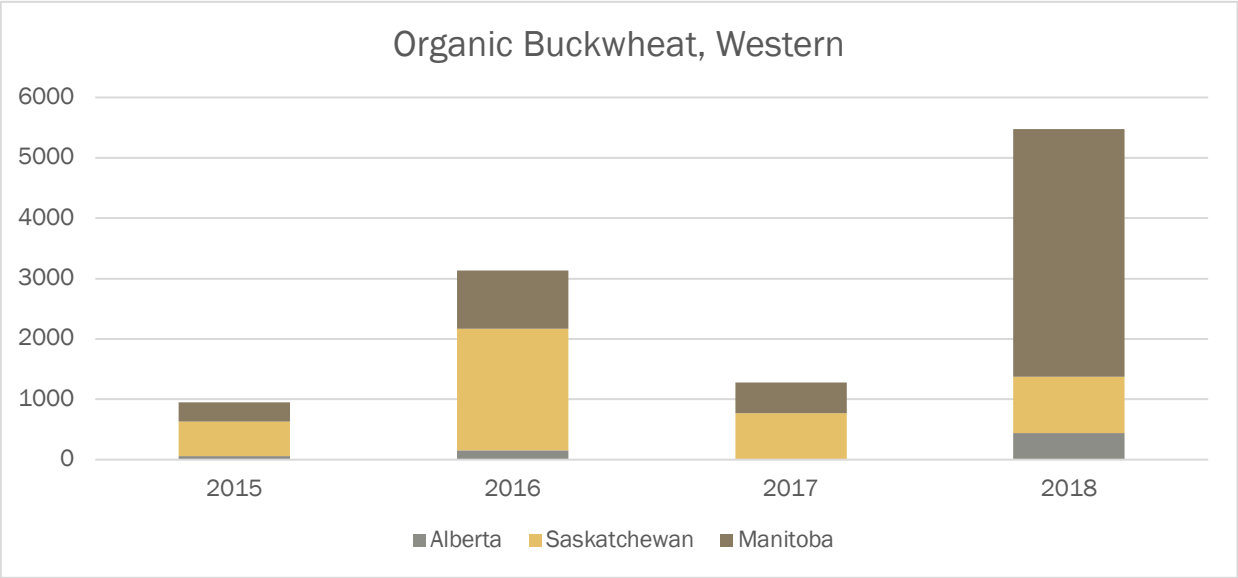
Data from Agricorp, the provincial crop insurer, shows that Ontario had 10,622 insured acres of buckwheat in 2016. In comparison, Manitoba had 5,645 acres in 2017 and acreage has been stuck in the 4,000 to 7,000 range for about a decade,

Buckwheat production has shifted to Ontario and Quebec because demand is strong in eastern North America.
Birkett Mills, a company in New York state that produces buckwheat flour, groats and other products, buys a large percentage of the buckwheat grown in Ontario.
The company also contracts buckwheat production in Quebec, New York state, North Dakota and Manitoba.
Another sign for bullish markets for Buckwheat is the news that a group of investors are planning to build a $15 million buckwheat processing plant near Ethelbert, Man. Don and Ben Fyk, who farm near Ethelbert, are leading efforts to build the facility, which will need 30,000 to 50,000 acres of buckwheat to operate at full capacity.

Organic

Buckwheat grows quickly, with a 30-day maturity rate that allows it to kill off most competing weeds. Due to its fast growth, it is a good candidate for a catch crop when others have failed, and it also fits well into rotations. In addition, it is economical to produce because it requires no pesticides and few herbicides, draws phosphorus efficiently from the soil, and needs less nitrogen. While it requires little care from sowing to harvest, good seedbed preparation is important. Buckwheat is used as a cover crop or a rotational crop because it can grow in even poor soil; it also is often used to prepare organic crop soil because it can eliminate weeds. It can add up to 3,000 pounds of organic matter per acre back into the soil when tilled.

Production of organic Buckwheat in Canada sees a similar comeback as does production of conventional Buckwheat:



Marc Durand (Durand Seeds) confirms a lot of seed going to Ontario and Quebec which means a lot of production moving there too.

Birkett Mills, a company in New York state that produces buckwheat flour, groats and other products, buys a large percentage of the buckwheat grown in Ontario. Statements made by the company point to 8,000 to 10,000 acres being contracted there.
The company also contracts buckwheat production in Quebec, New York state, North Dakota and Manitoba.
The contract price for 2019 was $23.50 per cwt. for conventional grain and $29.75 per cwt. for certified organic buckwheat

Organic Premium

Buckwheat is relatively easy to grow with little weed or pest pressure. Because of this, the organic premium is relatively low: 126% in 2018

Recommendation:

Buckwheat shows a lot of promise for the Organic Farmers of PEI. Not only are conventional and organic markets recovering after a slump, but processing capacity seems to be building as well.

The move of the “epicentre” of buckwheat growing from west to east, especially holds a lot of promise for PEI farmers. The closeness of processors, the high cost to weight ratio and the important place buckwheat holds for organic farmers, make this crop one of the top recommendations for 2020.

SPELT

Most spelt is grown in Eastern Europe and Ukraine as fall-seeded cereal. In Germany, it is known as Dinkel wheat or hulled wheat. It can be used as a feed grain alternative to oats and barley.

Ohio and Ontario are established production areas in North America, and the University of Saskatchewan has developed spring-planted spelt varieties for the Prairies.

Global production and trade statistics are hard to come by as Spelt is listed as combined with Wheat.

The exception for data availability is on the organic side:

Country

Item	Spelt				
Element	Organic area [ha]				
Year	2013	2014	2015	2016	2017
Country					
Argentina				76.00	
Austria	7'174.62	8'010.00	9'403.00*	14'065.02	11'621.60
Bosnia and Herzegovina				0.30	1.00
Canada	2'812.88	4'555.16	6'809.83	7'446.21	
Czech Republic					2'782.01
Estonia	436.00	497.00	1'102.00	1'546.00	
France	4'814.95				
Germany	17'500.00	17'000.00	24'000.00	29'000.00	27'000.00
Kazakhstan	793.00	793.00	793.00	793.00	
Moldova			75.03	649.60	649.60
Montenegro			2.00	2.92	5.01
Russian Federation	700.00	700.00	700.00*	700.00*	755.14
Serbia					289.90
Switzerland	896.12	919.26	969.81	1'142.39	1'205.34
Ukraine	1'800.00	3'017.00	5'500.00	10'000.00	8'670.00*
United States of America				2'789.90	2'789.90

FIBL shows Germany, Austria and the Ukraine leading in production over Canada with 7,000 acres in organic spelt production.

According to COTA, the spelt market is much smaller than the quinoa market. It is mostly known as an organic grain and processed into flour. Consumers can find spelt products in health food stores and in a few supermarket aisles, and they are becoming popular at private artisan bakeries.

Organic growers seem to like spelt. It's a very leafy crop and very competitive against weeds. But conventional farmers have a difficult time with finding a market for spelt. To quote an expert: "If you have organic spelt, you sell it by the bag, but not by the truckload. You pretty much have to do your own marketing. It is tough and it is definitely a niche crop. It can be very profitable, once you have established your niche. And, once you find a market, you ordinarily zip your lips about it."

The same expert recalls visiting an organic flour mill in British Columbia in about 2015. They wanted semi-loads of spelt weekly and offered to buy as much as Pollock would sell. Shortly after that, she says, "a huge glut of spelt was grown somewhere in the Ukraine area. They flooded the market and the price absolutely tanked."

On the other hand, the spelt market may just be undeveloped and need a 'pioneer' with vision to take it another direction. Options could include non-organic production for conventional bakeries and non-conventional uses, such as cover crops.

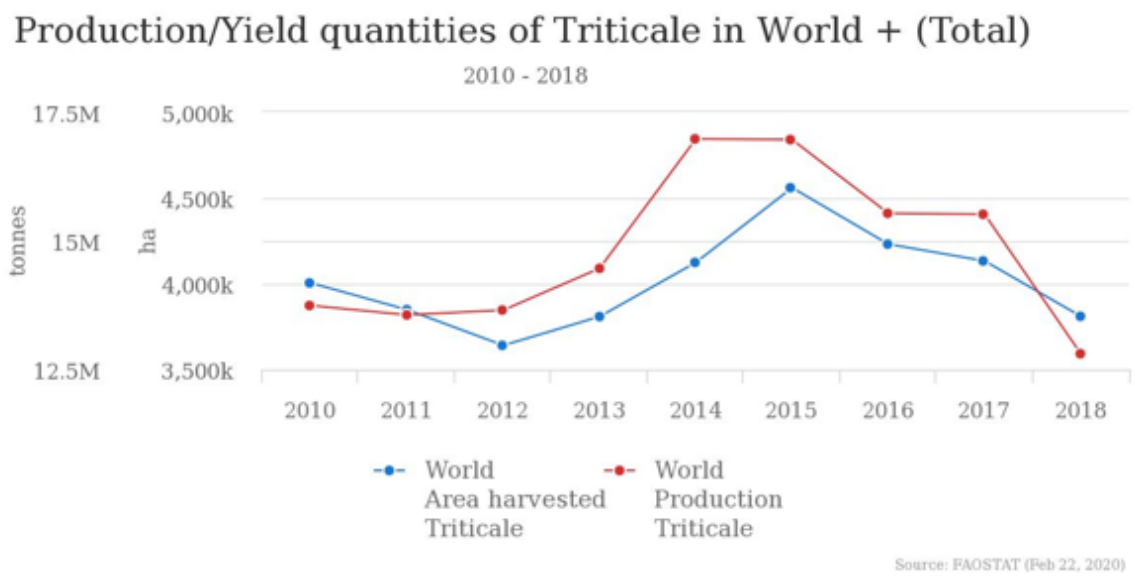
The risk with conventional spelt is significant.

Recommendation: Unless a flour miss offers a contract on spelt, this crop should take a backseat in the strategy for COPC

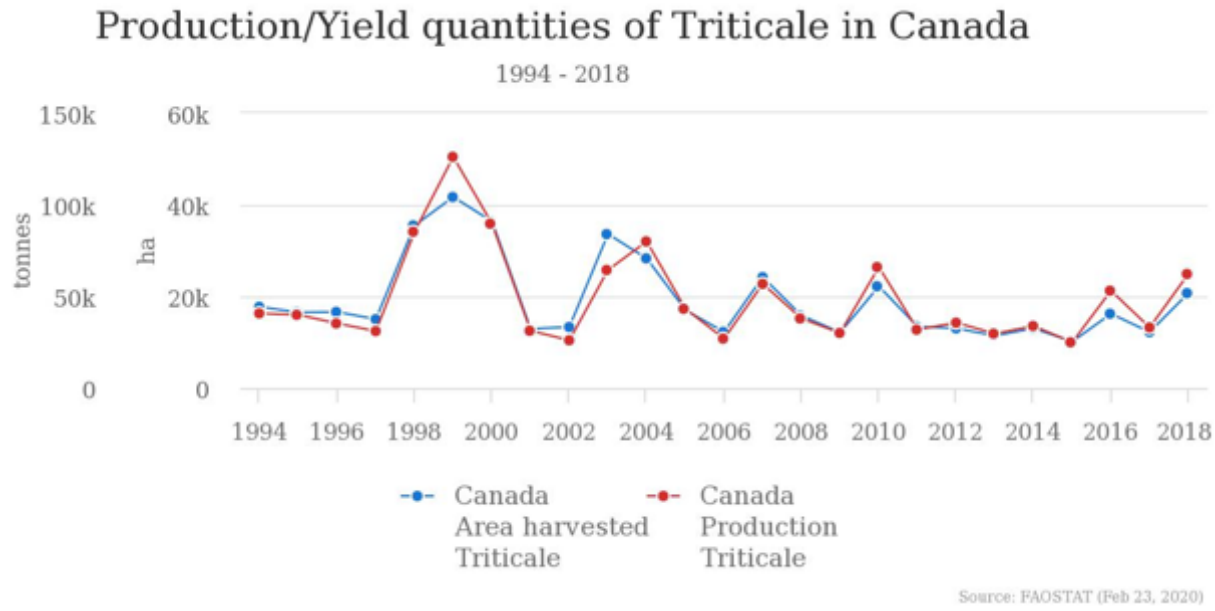
TRITICALE

Triticale is a crop species resulting from a plant breeder's cross between wheat (Triticum) and rye (Secale). Triticale was thought to have potential in the production of bread and other food products. The protein content is higher than that of wheat, although the glutenin fraction is less. As a feed grain, triticale is already well established and of high economic importance. It has received attention as a potential energy crop, and research is currently being conducted on the use of the crop's biomass in bioethanol production.

Initially touted as a super grain, it has yet to live up to it's promise: World production has slowed after seeing increases in 2014/15:



In Canada, Triticale has yet to see the commercial success of other crops because it is stuck in a 'chicken-and-egg' conundrum: producers will not grow large quantities of the grain because there is no one currently purchasing large quantities of it, and mills will not purchase large quantities of it because no one can assure them a large, continuous supply on a long-term basis."



Recommendations: Both Spelt and Triticale are specialty crops showing very little to no growth. Organic farmers grow them for human consumption and the markets will be regional flour mills. The demand for these flours will very much on demand on specialty bread. A conversation with regional organic mills is certainly worthwhile, but we recommend that before planting, farmers should have firm commitments from buyers first.

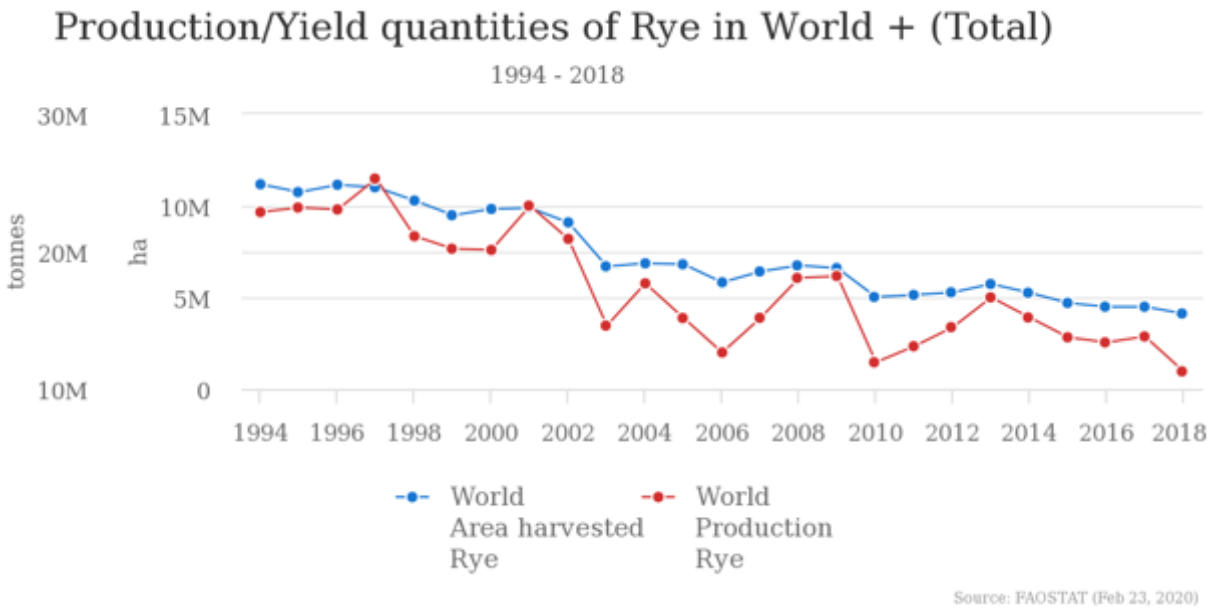
RYE

Rye flour is high in gliadin but low in glutenin. It therefore has a lower gluten content than wheat flour. It also contains a higher proportion of soluble fiber.

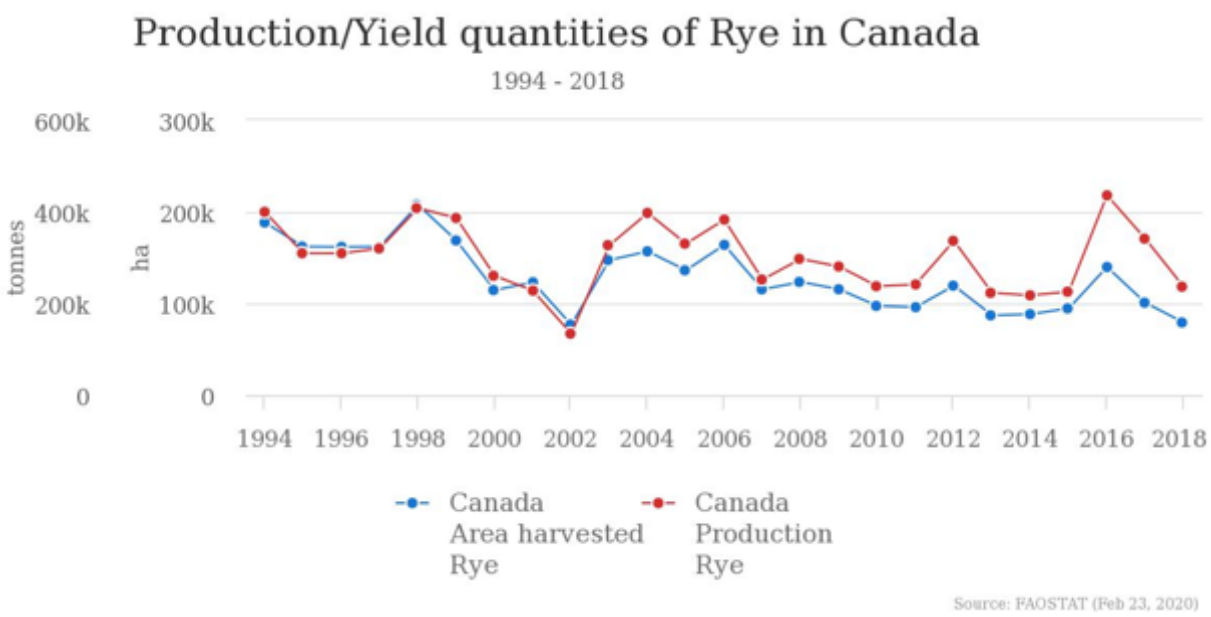
Rye bread, including pumpernickel, is made using rye flour and is a widely eaten food in Northern and Eastern Europe. Rye is also used to make crisp bread.

Rye grain is also used to make alcoholic drinks, like rye whiskey and rye beer. Other uses of rye grain include kvass and an herbal medicine known as rye extract. Rye straw is used as livestock bedding, as a cover crop and green manure for soil amendment, and to make crafts such as corn dollies.

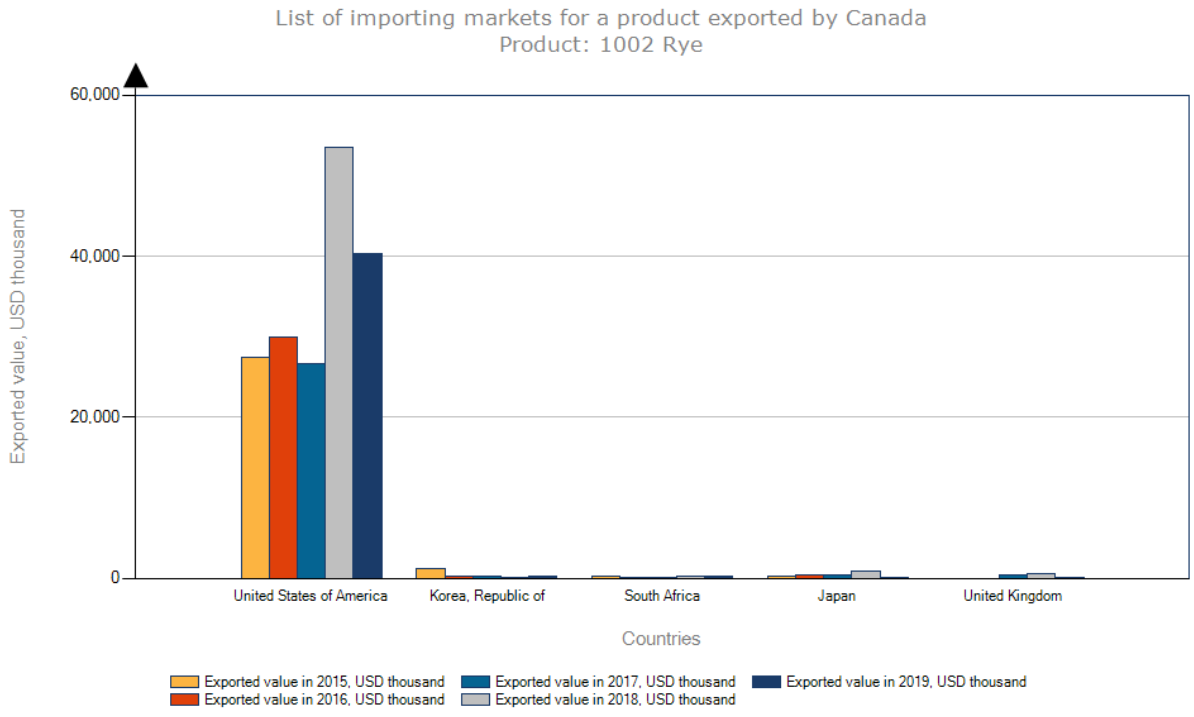
Rye grows well in much poorer soils than those necessary for most cereal grains. Thus, it is an especially valuable crop in regions where the soil has sand or peat. Rye plants withstand cold better than other small grains do. Rye will survive with snow cover that would otherwise result in winterkill for winter wheat. Most farmers grow winter ryes, which are planted and begin to grow in autumn. In spring, the plants develop and produce their crop. Despite these qualities, rye is being planted in ever decreasing numbers:



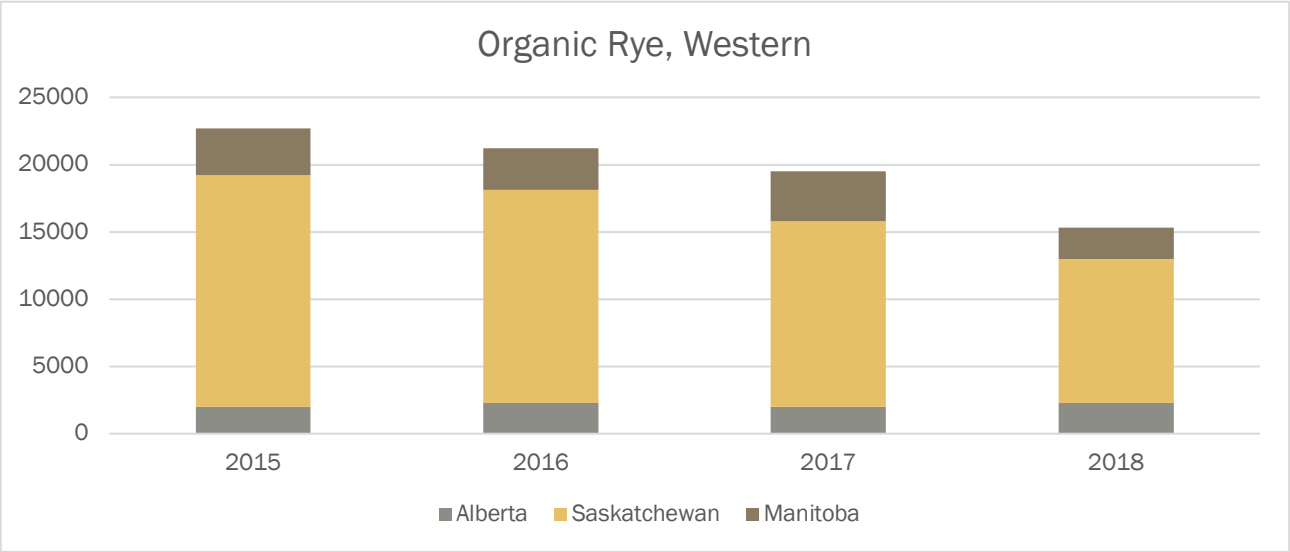
In Canada too, rye is not growing



Market leaders for rye production can all be found in Central to Eastern Europe: Germany, Poland, Russia, Belorussia and Ukraine. Canada may have stable production numbers for Rye. Exports, however, are up, with almost all product being shipped to the USA.



Organic: Despite the uptick in exports of conventional Rye to the United States, organic Rye is facing shrinking production numbers as well. The following graph shows the shrinking acreage in Western Canada which represented 89% of Rye production in Canada in 2018.



Here in the Maritimes, Speerville Mills confirms the situation with a comment on the demand for rye:

"Organic Rye: A winter grain, planted in the fall & harvested the following year. A great rotation crop for organic farmers, but to their disappointment, not enough consumers use rye".

Recommendation:

Rye seems to have an image problem. The dark colour of the products it makes seems to turn consumers away from this crop. At the moment, organic rye is caught in the general decline of its conventional cousin, waiting for a revival of its fortunes.

CHAPTER 2: PULSES

As the global population continues to grow rapidly and more consumers think about their health and the environment, the demand for animal-protein alternatives, meat replacements and other non-animal industrial ingredients has rapidly increased. Cultural, health and environmental changes have all combined to create favourable market conditions for the rise of plant-based protein. While the total protein demand is projected to double to 943.5 million metric tons in 2054, the market for alternative proteins, including plant-based proteins, is expected to grow at 14% annually by 2024 — up to a third of the protein market.

Plant-based protein applications reach well beyond dietary supplements, ranging from cosmetics and pharmaceuticals, to animal feed and pet food.

Annual global sales of plant-based meat alternatives have grown on average 8% a year since 2010, with projections forecasting that, in 25 years, 20% of meat will consist of plant-based and clean meat.

Global revenue for plant-based dairy is expected to reach USD 34 billion in 2024. The plant-based beverage market has grown approximately 33% annually over the past five years.

While North America takes the major share in the global plant-based protein market, Europe has a significant deficit in plant-based proteins, importing most of what its agricultural sector needs.

Plant proteins make high-quality animal feeds that can translate into more animal-based proteins needed to meet the increasing demand for animal protein in many developing countries. In countries where pulses are a traditional staple, the need for plant proteins for direct human consumption is also expected to grow at a rapid pace.

Although the plant-based protein market is currently dominated by soy protein products, demand for pulse ingredients is growing as manufacturers are adding them to various products from breakfast cereals to snacks. Only from 2010 to 2014, the number of new product launches containing pulse ingredients increased by 74%.

The United Nations Food and Agriculture Organization (FAO) recognizes 11 types of pulses grown worldwide. The four main types of pulses grown in Canada are

- Dry peas
- Lentils
- Beans and
- Chickpeas

Pulses are very high in protein and fibre and are low in fat. They provide important vitamins, complex carbohydrates and minerals, such as iron, antioxidants & folate, owing to which there has been an increase in the demand for pulses in the global market.

Pulses are also nitrogen-fixing crops that improve the environmental sustainability of annual cropping systems. Pulses are also ecologically sustainable agricultural solutions due to their tendency to reduce the emission of gases such as CO2.

Pulses come in a variety of shapes, sizes and colours and have many uses, ranging from traditional dry and canned to protein isolated used for extrusion:

- Bagged pulses – whole and split pulses
- Ground pulses – pulse flours. Products made with ground pulses – pappadums and rotis, specialty dough mixes
- Whole processed pulses – canned pulses, micronized pulses, toasted pulses. Products made with processed pulses – dried soup mixes, canned soups, canned refried beans, canned curries, canned chilies, retort pouch packaged entrees, frozen entrees, snack mixes
- Fractionated pulses – starches and proteins
- Extruded pulses – pastas, meat substitutes

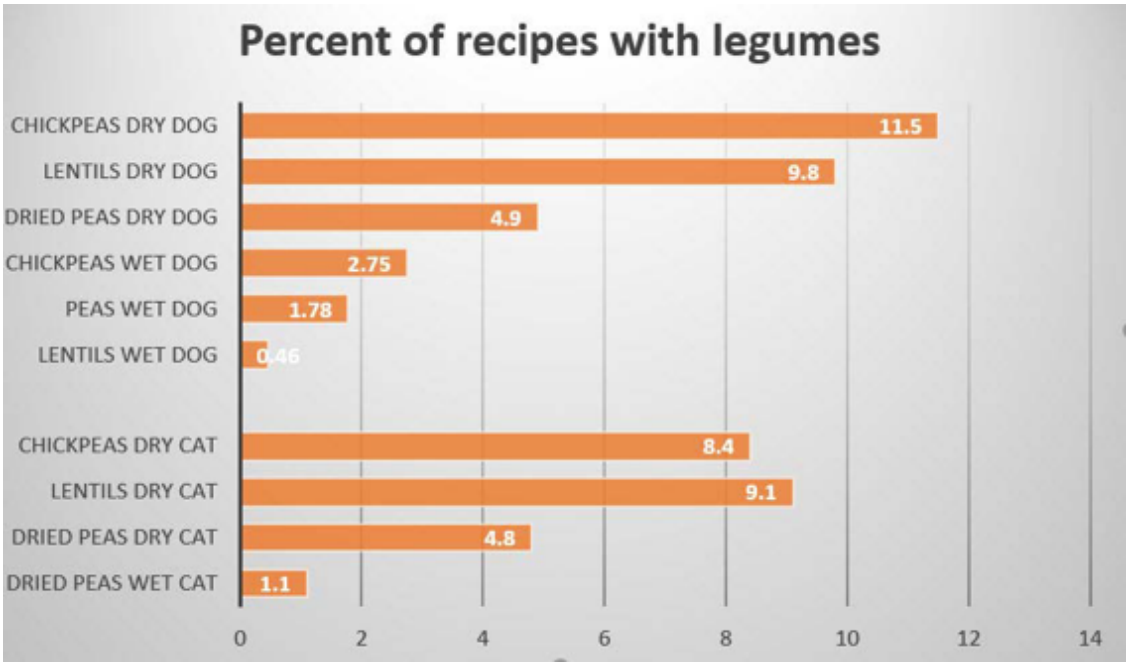
Pulse flours: The pulse flours market, by product type, comes as pea, lentil, chickpea flour and others. Based on application, the pulse flour market is used for human food for baking, extruded food and vegetable-based meat products.

Manufacturers are creating innovative food products using pulse flour to satisfy the consumer demand for natural and healthy products. Nutritional baked products made with pulse flour has a

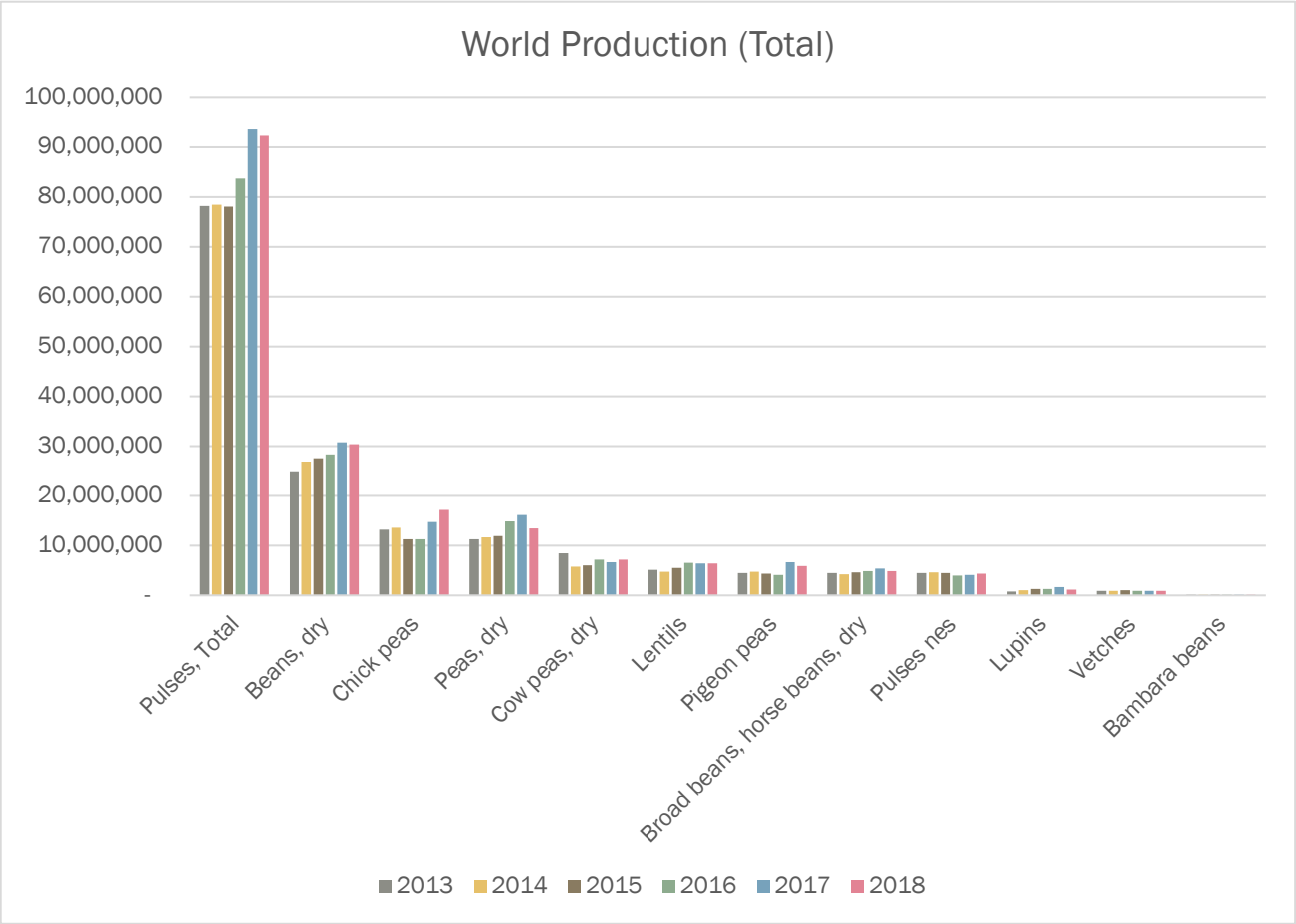
huge demand in developed regions such as North America and Europe is anticipated to bolster the growth of the global pulse flour market.

The pulse flours market is dominated by the European demand and is expected to maintain its dominance during the next ten years. Asia Pacific was another lucrative market growing with the fastest growth rate owing to increasing production of pulses with upgraded technology, and growing food industry is accelerated the demand for pulse flour market in the region.

Pulse flour is also used for beverages and animal feed. The following chart shows inclusion rates in dog and cat food:



All of these different uses and applications have led to a strong increase in global pulse production.

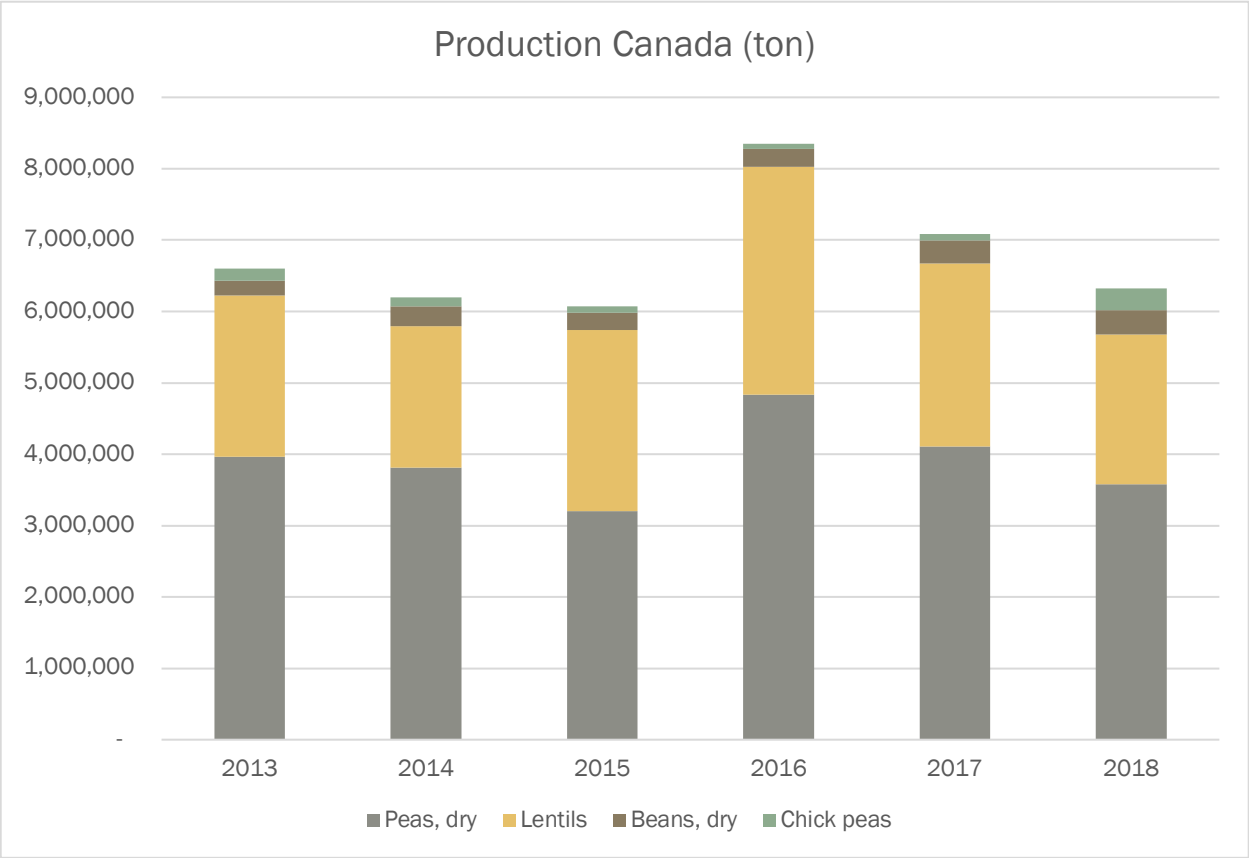


Canada is one of the powerhouses in pulse production. Production here has kept pace with global growth except for recent declines on production due to new tariffs imposed by India on imported pulses.

The recent decline in sales began in the first quarter of 2017/18 when traditionally high seasonal shipments to the India market did not materialize. At that time, abundant monsoon rains helped to greatly expand Indian production of many pulse crops. The large volume of domestic production weighed on prices received by Indian farmers and led the Indian Government to impose tariffs on imported chickpeas, lentils, and a variety of dry peas. In the spring of 2018, tariffs on imported pulses from the U.S. were raised once again, this time in response to U.S.-levied tariffs on imports of steel and aluminum from India.

Tariffs of 50 percent for lentils and dry peas and 70 percent for chickpeas remain in place today. Despite various tariffs and quotas, India still managed to import 1.1 million tonnes of pulses in the first half of 2019-20 including 400,000 tonnes of yellow peas and 350,000 tonnes of lentils. Many traders are circumventing the quota through favourable court orders.

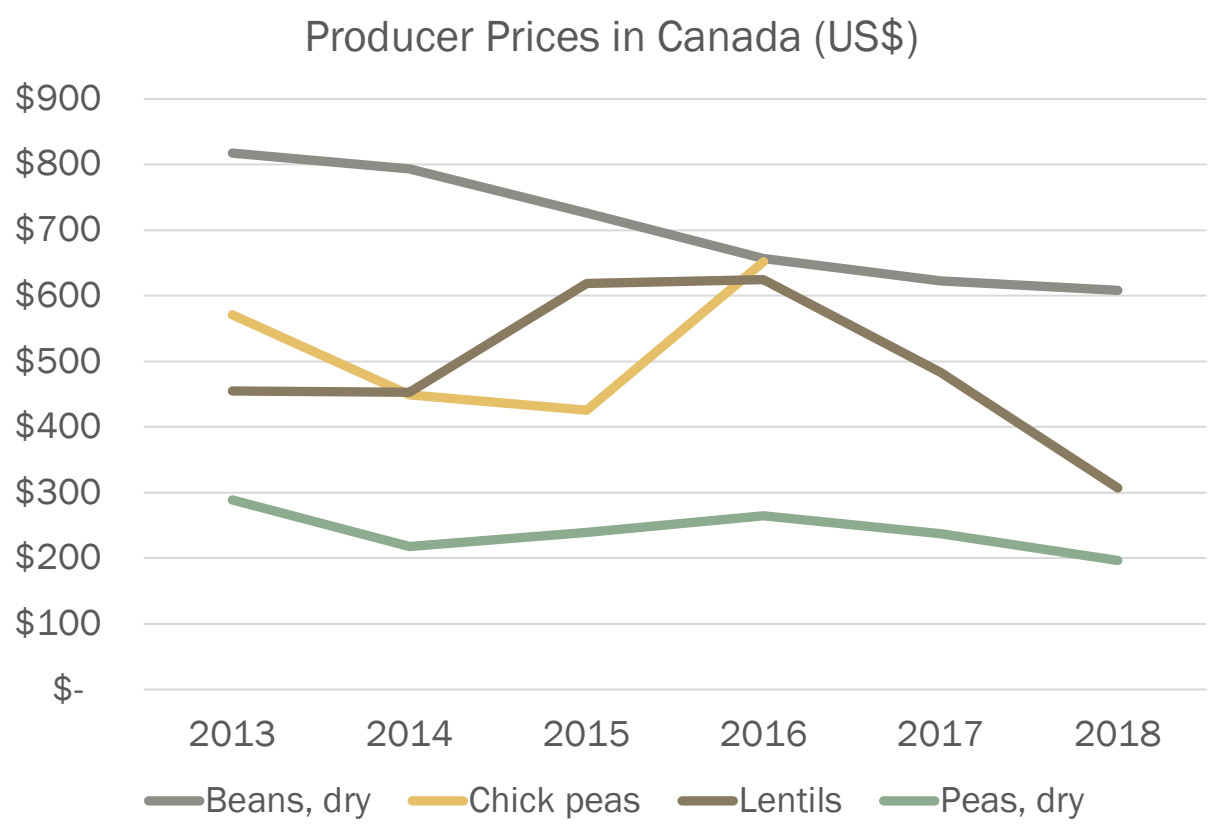
Lentils face a 30 percent tariff but there is no quota. Analysts say Canadian lentils are price competitive in India despite the tariff.



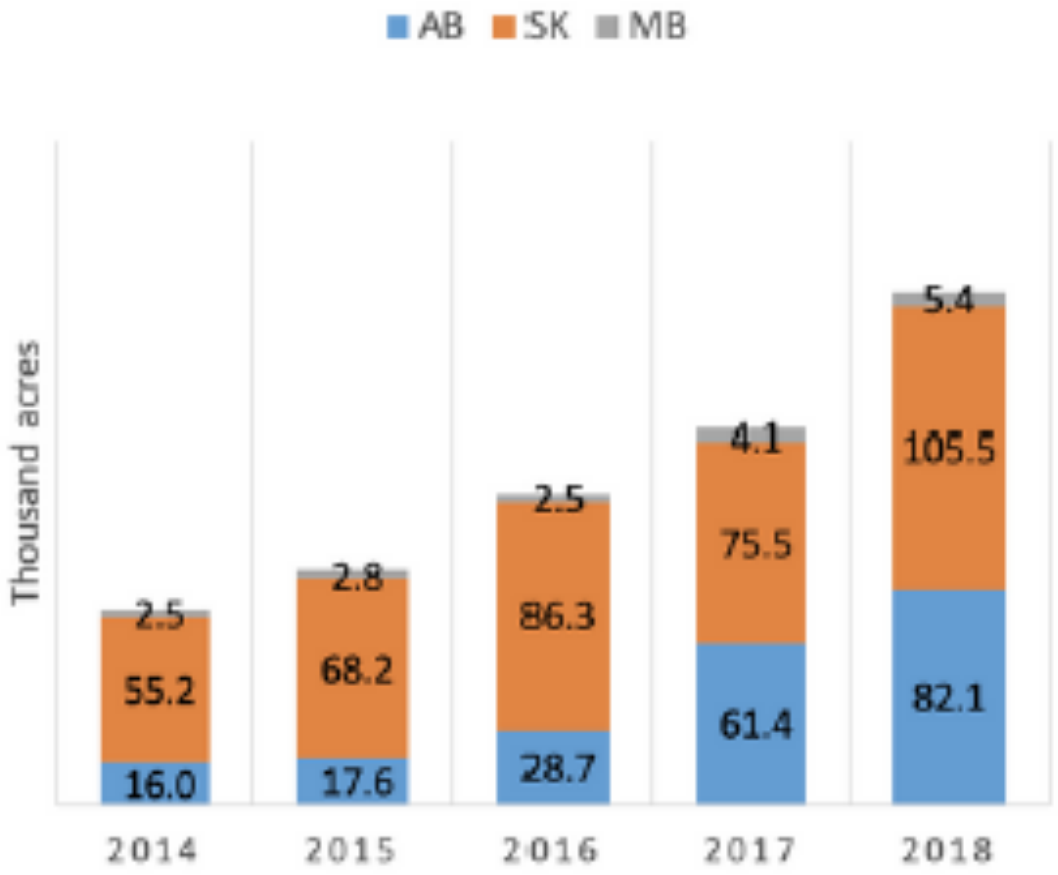
Canada's dominant position as a producer of lentils and peas also reflects in its exports. The tables below show export volume in its evolution for different pulses.

Code	Product label	2014	2015	2016	2017	2018
		Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons	Exported quantity, Tons
	Total Pulses	5,753,279	5,917,732	5,689,287	5,399,774	5,287,871
'071310	Dried, shelled peas "Pisum sativum", whether or not skinned or split	3,270,147	2,835,779	3,136,472	3,236,206	3,183,819
'071340	Dried, shelled lentils, whether or not skinned or split	2,114,790	2,630,043	2,053,705	1,641,371	1,643,911
'071339	Dried, shelled beans "Vigna and Phaseolus", whether or not skinned or split (excluding beans ...	147,128	155,494	179,666	205,444	191,339
'071333	Dried, shelled kidney beans "Phaseolus vulgaris", whether or not skinned or split	126,857	128,563	120,996	114,508	132,973
'071320	Dried, shelled chickpeas "garbanzos", whether or not skinned or split	57,872	113,746	137,053	154,564	85,159
'071350	Dried, shelled broad beans "Vicia faba var. major" and horse beans "Vicia faba var. equina ...	12,522	22,015	25,633	20,879	23,740
'071332	Dried, shelled small red "Adzuki" beans "Phaseolus or Vigna angularis", whether or not skinned ...	20,473	27,648	29,754	17,031	18,954
'071331	Dried, shelled beans of species "Vigna mungo [L.] Hepper or Vigna radiata [L.] Wilczek", whether ...	2,731	3,534	3,665	5,142	3,366
'071360	Dried, shelled pigeon peas "Cajanus cajan", whether or not skinned or split	43	23	588	2,459	2,967
'071390	Dried, shelled leguminous vegetables, whether or not skinned or split (excluding peas, chickpeas, ...	690	859	1,667	2,122	1,500
'071335	Dried, shelled cow peas "Vigna unguiculata", whether or not skinned or split	23	28	88	48	143

As a result, producer prices have declined in the last three years:



These declines have not affected the organic pulse market. Of all crops in Western Canada, organic pulses have seen the strongest growth in acreage from 88,500 acres grown in 2015 to more than double that with 192,635 acres grown in 2018. Western Canada represented 97% of all Canadian organic pulse acreage.



Source: Diana Zeidan, Canada Organic Trade Association

	AB	SK	MB	Prairie Total	Cdn Total	% Cdn Total
Beans	1,100	1,700	200	2,900	4,619	43%
Lentils	3,822	54,229	-	58,051	58,966	98%
Peas	75,325	46,193	3,178	124,696	130,017	96%
Other pulses*	600	1,500	2,500	4,600	9,002	87%
PULSE TOTAL	**61,415**	**75,526**	**4,072**	**192,635**	**199,188**	**97%**

As a result, pulses have become the biggest export among Canadian organic crops totalling 280 million Canadian dollars in 2017. To compare, exports of organic cereals had a total value of 53.3 million and oilseeds 24.4 million.

Canada Exports to the World Organic Pulses		
Calendar Year: 2017		
Description	CAD Dollars	Volume (Tons)
CAN Organic Pulses	**280,060,374**	**309,424**
CAN Organic green lentils	187,957,091	176,890
CAN Organic red lentils	54,139,143	69,818
CAN Organic NES lentils	1,129,344	947
CAN Organic yellow peas	33,545,933	57,990
CAN Organic peas other than yellow	3,288,863	3,779

This boom in pulses has also arrived on PEI. Last year, WA Grain & Pulse solutions opened its $8 million pulse processing plant in Summerside, P.E.I. – the first such facility in Atlantic Canada

The plant's establishment followed a four-year Agriculture and Agri-Food Canada research collaboration study to investigate basic agronomy for a variety of pulses on PEI.

CHICKPEAS

Chickpeas offer various health benefits and are increasingly being used to prepare a grain-free flour. Chickpea flour is gluten-free, dense, and a rich source of dietary fiber and protein. These factors will trigger the global chickpea market size to grow at a CAGR close to 4.8% during 2020-2025

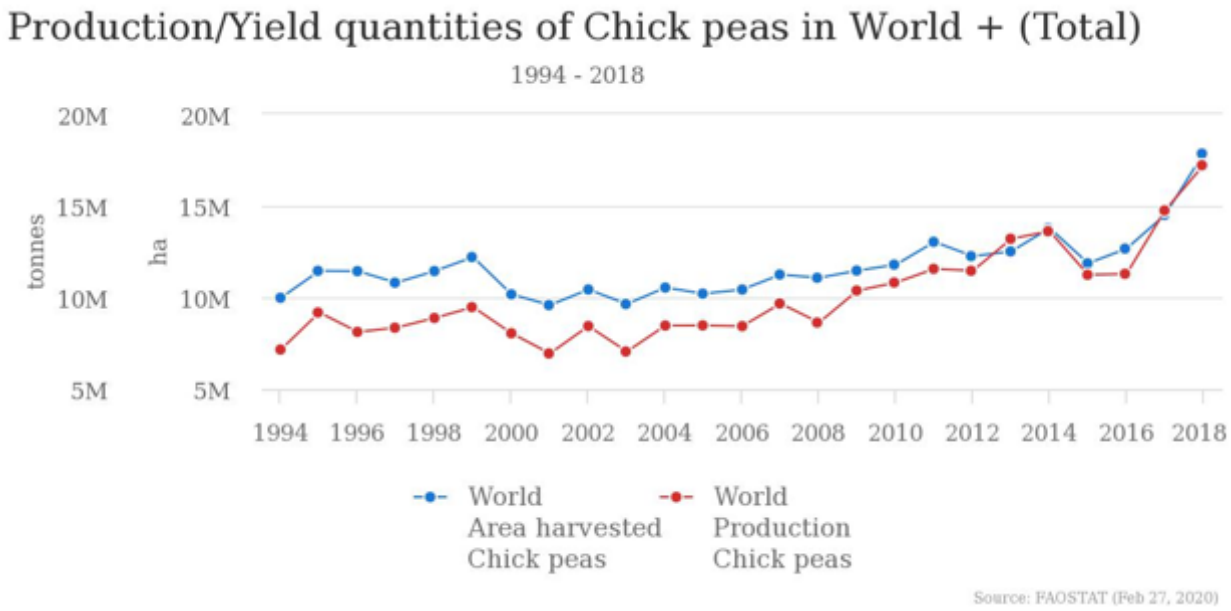
In particular in the US demand for food made with pulses like hummus, which has seen retail sales rise from less than $10 million in the late 1990s to industry estimates in the range of $700-800 million in more recent years, according to the U.S. Dry Pea and Lentil Council.

Trends toward more healthful and varied snacking, as well as growing demand for gluten-free products. Pulse crops are naturally gluten-free and are also high in fiber and a good source of protein.

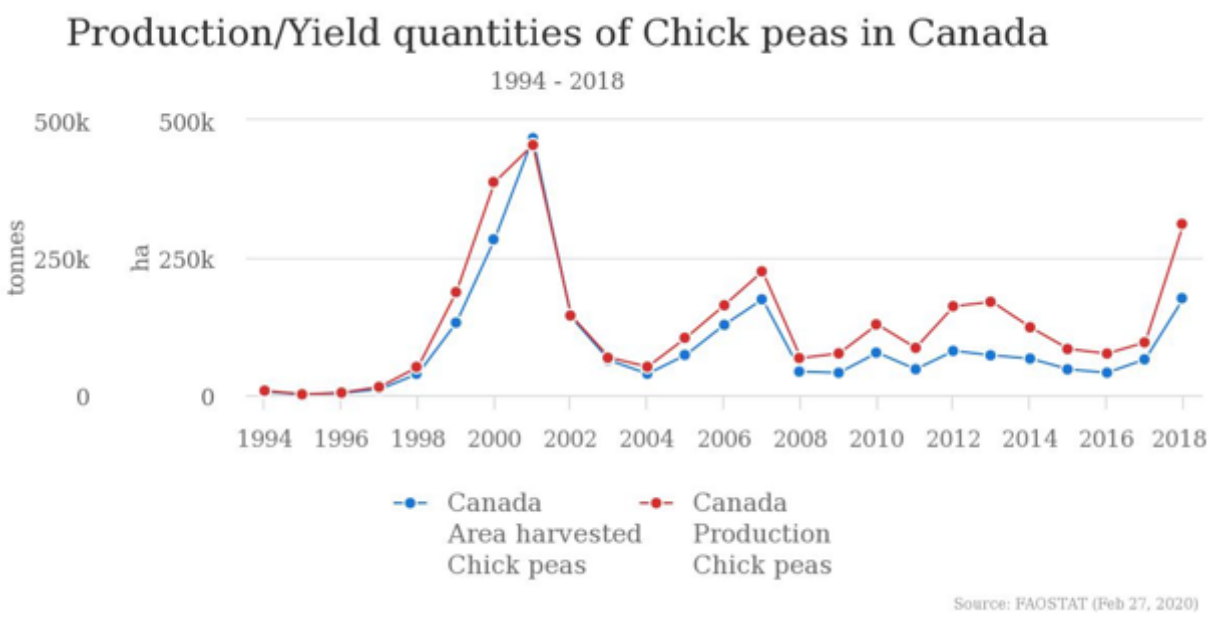
Chickpea flour possess various health benefits, which includes soothing blood and sugar level, improving breakdown, reduces the risk of heart attack, and helps in managing weight. It is commonly used for aroma and taste enhancement in sauces, soups, spreads, and dips.

In the past 10 years, domestic demand for chickpeas in the US has gone from less than 47,000 tonnes to nearly 200,000. The biggest jump was between 2015 and 2016 when demand doubled to nearly 184,000 metric tonnes.

The result has been a steady expansion on acreage worldwide.



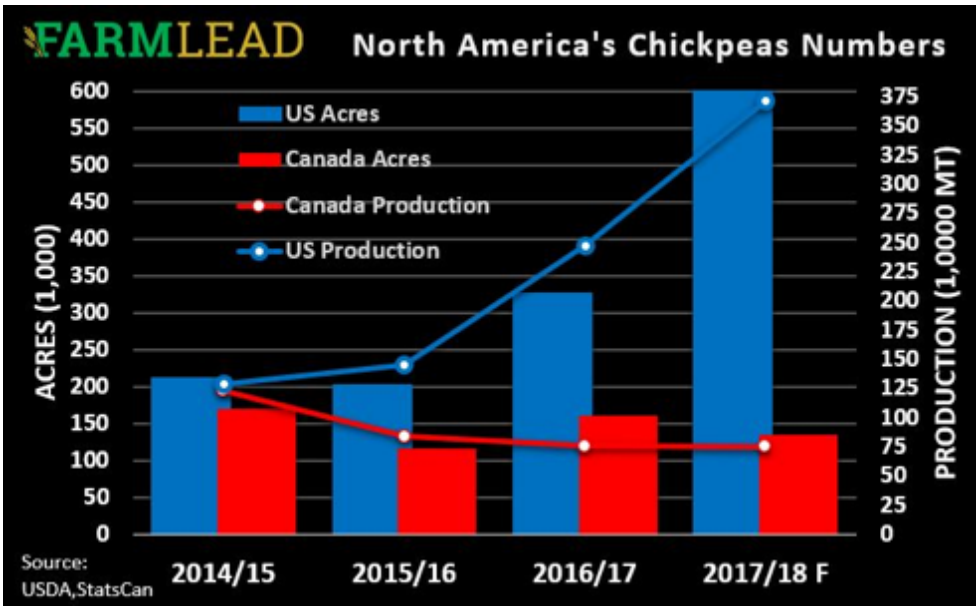
The leading producers of chickpeas by a large margin are India, followed Australia, Myanmar, Ethiopia, Turkey and Russia. Canada, as a producer comes in at number 10 in the rankings with 311,300 tonnes of production.



But the uptick from 100,000 to 0ver 300,000 tons means that production can be ramped up, especially in view of the decline in production of other pulses. The above graph however also contains a warning about "irrational exuberance" in the chickpea markets. In 2001, Canadian production peaked at just under 500,000 tons, but quickly fell back again.

The export markets for Canada have been somewhat volatile with the US, Pakistan, Turkey and India being the biggest Canadian customers. As seen in the summary of pulses in general, these markets can be volatile.

Markets in the US are stable, even though demand has been strong. A strong increase in US domestic production has mostly kept up with that demand



Organic:

On the organic side, chickpea production is harder to capture. In the statistics below, they are bundled together with Fava beans as “other pulses”, but the numbers are nonetheless a good indicator. It is also important to point out that when it comes to organic Chickpeas and Horse Beans, Western Canada only represent half of Canadian acreage.

	AB	SK	MB	Prairie Total	Cdn Total
Beans	1,100	1,700	200	2,900	4,619
Lentils	3,822	54,229	-	58,051	58,966
Peas	75,325	46,193	3,178	124,696	130,017
Other pulses*	600	1,500	2,500	4,600	9,002
PULSE TOTAL	**61,415**	**75,526**	**4,072**	**192,635**	**199,188**

Source: Diana Zeidan, Canada Organic Trade Association

Prices: The Saskachewan crop insurance program estimates prices for conventional chickpeas to be between $319 and $374 / ton. No prices were available for organic chickpeas.

CROP (COMMERCIAL)	BASE GRADE	2020 BASE ($/T)	2020 LOW PRICE ($/T)	2020 BASE ($/BU)	2020 LOW PRICE ($/BU)
CHICKPEA (DESI)	2 CW	440	374	0.20	0.17 #
CHICKPEA (LG SD KABULI)	AVERAGE	420	357	0.19	0.16 #
CHICKPEA (SM SD KABULI)	2 CW	375	319	0.17	0.14 #

Not much information was available regarding organic chickpea markets, but we can make an assumption that the increasing domestic consumption of chickpeas in the US, especially on the snacking side would lead to a market demand for an organic niche as well. There are indications for this already: Puff producer Hippeas last year closed an $8 million round of funding from investors. HIPPEAS organic chickpea puffs are vegan, low-calorie, certified organic, gluten-free, kosher, non-GMO AND committed to organic and sustainable farming.

On PEI, WA Grain & Pulse solutions states that 20-25% of their business is the result of selling chickpeas into the Indian market.

Recommendation: The organic chickpea market seems to be small, but the niche it occupies shows signs of growth. The future of growing organic chickpeas on PEI will certainly depend on good relationships with buyers and processors as well as the readiness to switch production to other pulses/crops should these markets become volatile – but then again, this is what farmers have always having to do.

FABA BEANS, HORSE BEANS

The latest report by IMARC Group, the global fava beans market reached a volume of 4.85 Million Tons in 2018, growing at a CAGR of 1.34% during 2011-2018. Fava beans, also known as viciafaba, faba beans, horse beans and bell beans, belong to the Fabaceae family. Fava beans are used as an essential ingredient in a wide array of traditional dishes across various regions: Egyptian, Italy and Luxembourg have specialty dishes featuring faba beans. Apart from this, fava bean flour provides volume and excellent texture to bread loaves and pasta, besides increasing their nutritional profile. Owing to this, the market is further expected to reach a volume of 5.2 Million Tons by 2024.

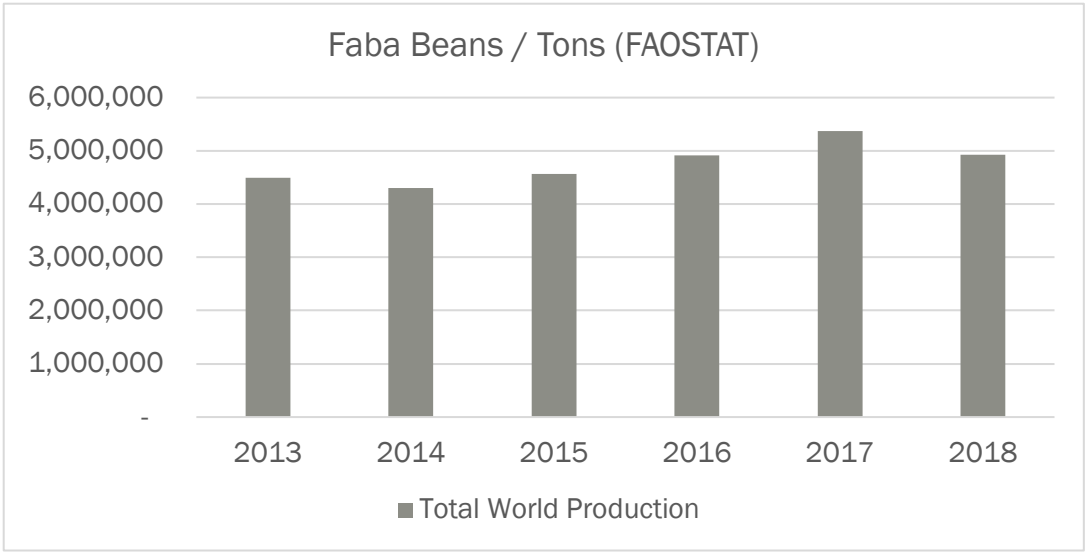
Faba beans are a great source of nutrients, such as magnesium, potassium, iron, copper, phosphorous, vitamin B1, thiamine, etc. As a result of this, fava beans offer several health benefits such as controlling blood pressure, lowering the risk of developing cardiovascular diseases, helping in the treatment of Parkinson's disease, and maintaining the balance of fluids in the body. Additionally, these legumes have high protein content which makes them popular among the increasing number of vegetarians.

Other uses are as animal feed, fodder, forage and soil improvement. It has the highest Nitrogen fixing capacity of any of the pulses. One advantage fababeans have over peas and lentils is their ability to withstand certain types of diseases.

For livestock feed, faba bean is used as a protein supplement as the seed has a crude protein content of approximately 28 per cent: Fava beans, blended with Canola have been used in feed for Chicken, Swine, Beef and Dairy cows. Newer, low tannin varieties promise higher levels of inclusion. Faba bean and grass-legume silage can slow be use with and without grain

Fababeans are generally graded for human consumption first. Whatever doesn’t make the grade is destined for animal fodder.

The following graph shows global production stats by FAO:



This growth is considered modest and the markets for it are certainly mature.

Top producers are China, Ethiopia, Australia, the UK and Germany. Canada does not figure among the top ten producing countries.

Production numbers for Canada are hard to obtain. FAO stopped reporting on Canadian production in 2007 at 5,000 acres. The last number that we were able to obtain was 20,000 acres in 2013 in Alberta alone, jumping to 79.000 acres in 2014. Estimates for 2016 were 130,000 to 135,000 acres across Canada.

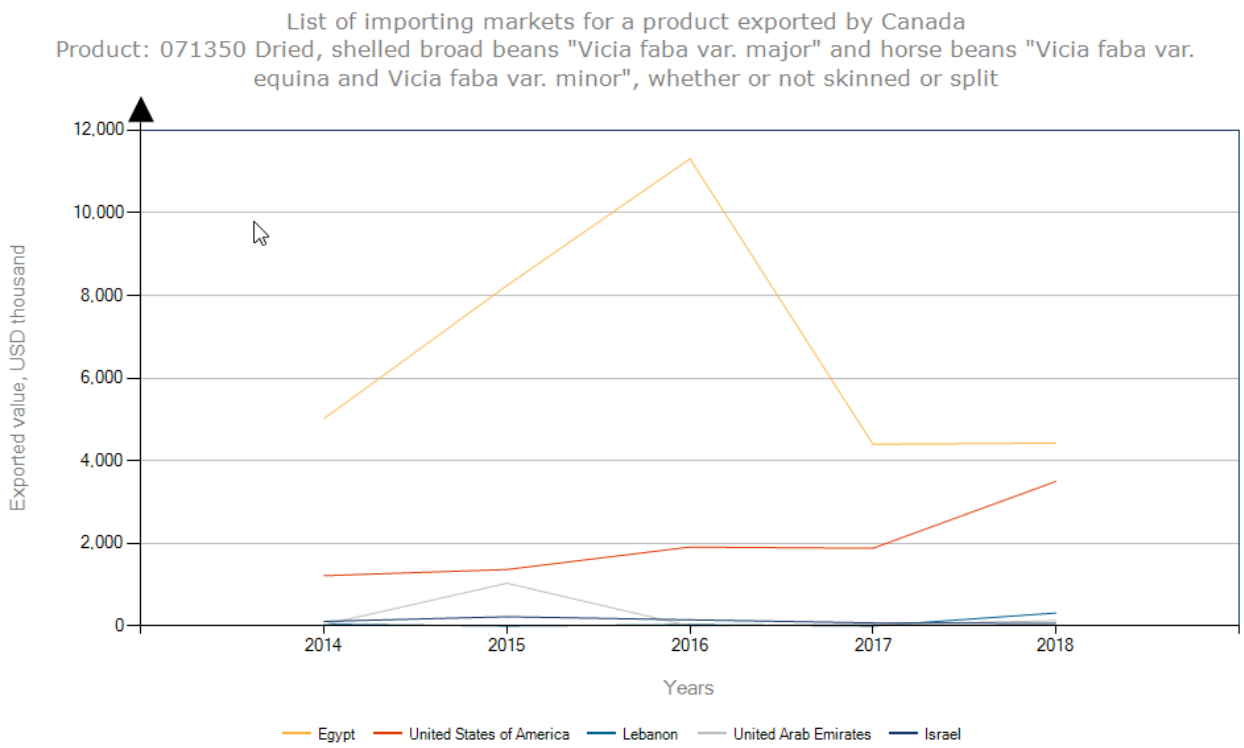
In 2016, expert opinion estimated the following:

“The marketplace is really being driven by lentils and peas. The indication for many growers is to put their acres into those type of crops; Fababeans are taking a bit of a back seat,” said Leanne Fischbuch, executive director for Alberta Pulse Growers.

The situation is similar in Saskatchewan, the other main growing province for the crop. “We expect the growth we’ve seen in Fababean acres in recent years to be muted a bit,” said Carl Potts, executive director for Saskatchewan Pulse Growers.

Most of the crop will be headed for Egypt, Fischbuch and Potts added, but the country’s not in a deficit situation for pulse supplies like India.

The trade statistics back this up:



Organic:

Very little is known about organic Fababean production in Canada. The 2018 number of 9,000 organic acres in Canada are split between Chickpeas and Fababeans.

In production literature, however, the nitrogen fixing abilities of Fababeans are mentioned frequently.

CROP (COMMERCIAL)	BASE GRADE	2020 BASE ($/T)	2020 LOW PRICE ($/T)	2020 BASE ($/BU)	2020 LOW PRICE ($/BU)
FABABEANS	2 CANADA	260	221	0.12	0.10 #

Organic

FABABEANS	390	332	0.18	0.15 #

Crop insurance suggest conventional prices to fall into the range of $221 to $260/ton
Organic prices are being insured in the range of $332-$390/ton
The organic premium is thus calculated to be 150%

Recommendation:

Fababeans are not a heavily traded crop and there does not seem to be a strong increase in the organic niche either. The crop holds promise though as a good rotational crop because of its nitrogen fixing capacity. Fababeans can be used effectively in animal production, the economics however of growing Fababean purely for animal feed without the higher prices that can be obtained for food grade remains questionable.

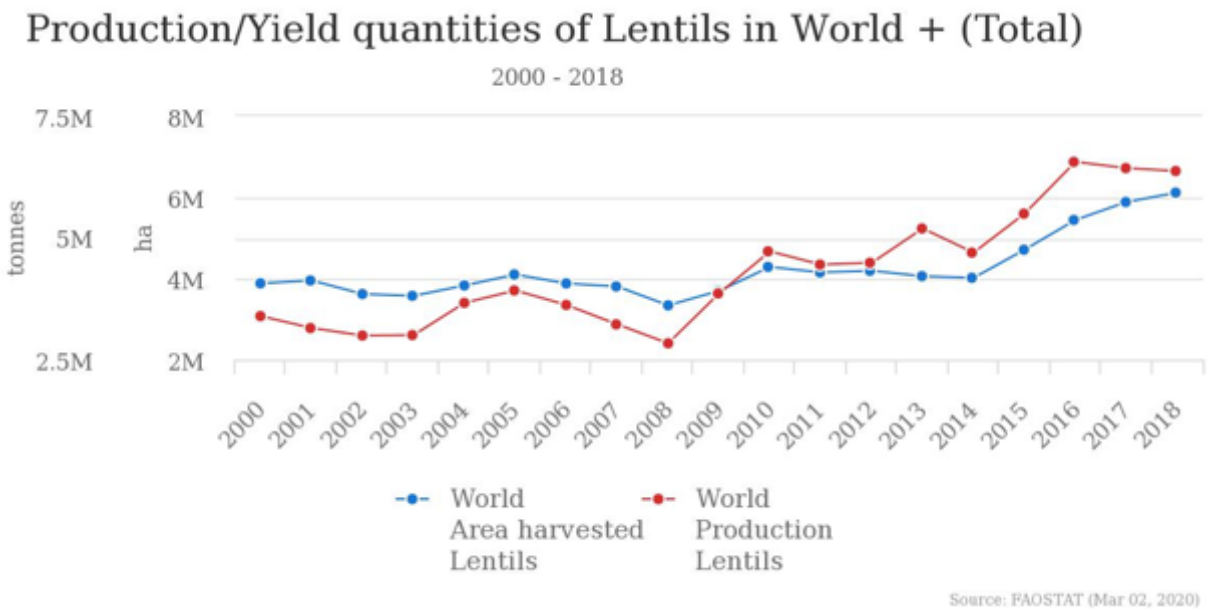
LENTILS

The global lentil market reached a volume of 6.3 Million Tons in 2018. The market volume is further projected to reach a volume of 8.4 Million Tons by 2024, gowing at a CAGR of 4.8% during 2019-2024.

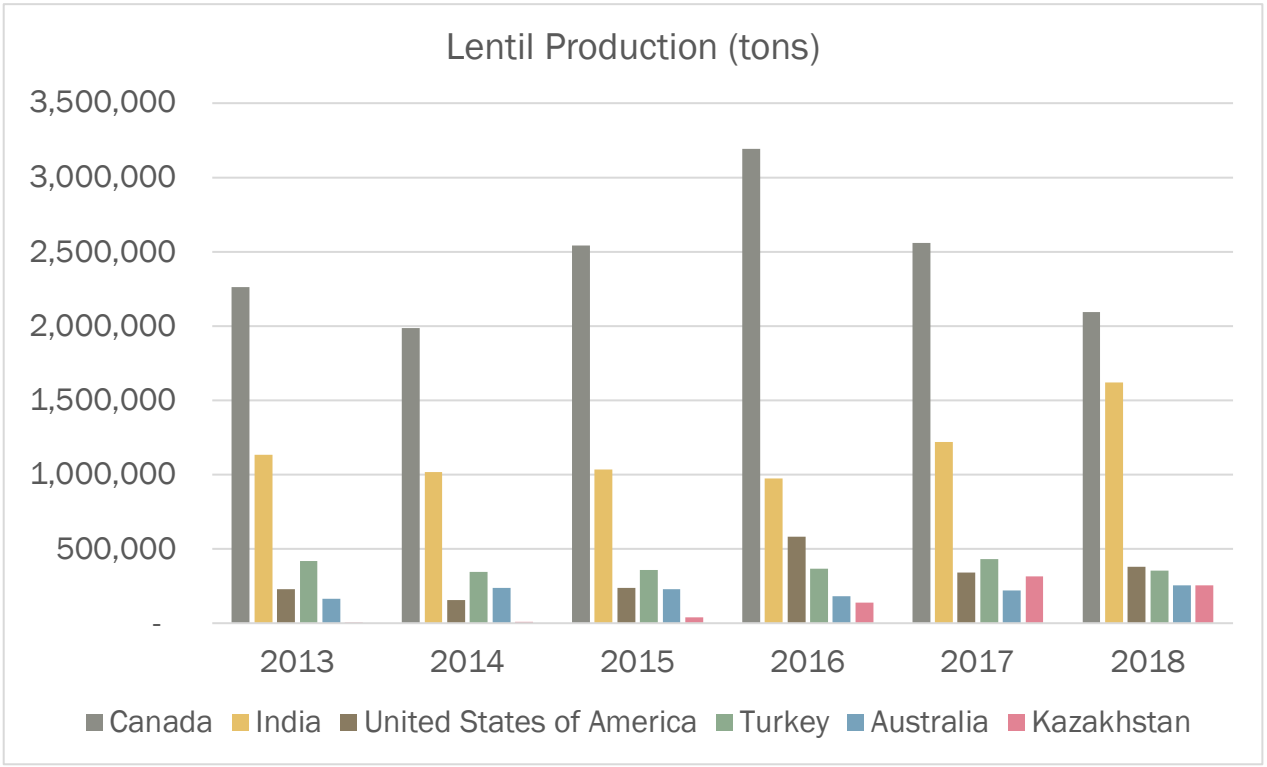
Lentils are high-protein and high-fibre legume which grow in pods and their colours can range from red and brown to black. Additionally, lentils are an excellent source of fibres, vitamin A & B, potassium, iron, minerals, nutrients and complex carbohydrates. Owing to the presence of these nutrients, lentils can be used across various industries like batter and breading, bakery, beverages, meat, snack food industry, etc. Currently, lentil is largely consumed as a staple food of various South Asian regions such as India, Pakistan, Nepal, Sri Lanka and Bangladesh. In addition to this, lentils are gaining popularity across the globe as they offer numerous health benefits such as lowering the risk of cardiovascular diseases, controlling diabetes, preventing cancer, boosting metabolism and improving digestion.

Lentils are also an excellent source of vitamin and provide fibre, potassium, vitamins, and iron. Lentil contains no cholesterol and is virtually devoid of fat making it a perfect choice for a healthy diet and due to its health benefits a consumer driver demand for Lentil Flour is well observed in the regions of Europe.

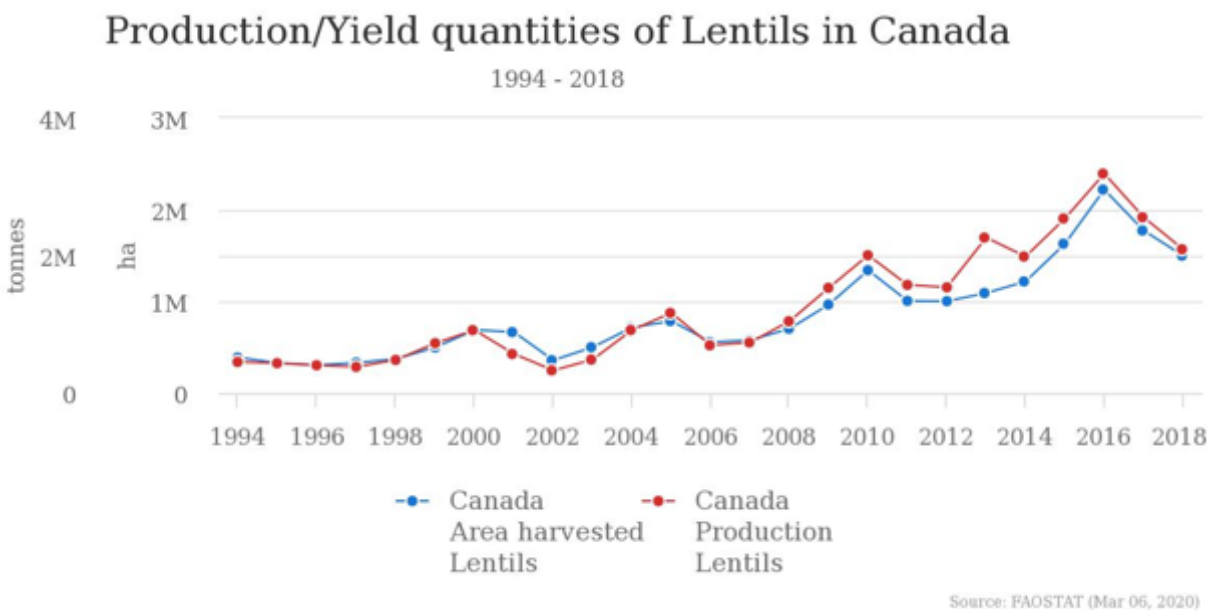
Lentils (Lens culinary) become occasionally available to the animal feed industry, especially when they suffer from quality problems (such as frost damage, discoloration, or seed damage).



As a flour, many staple preparations which use Lentil Flour as a mixture for bread and snack preparation can be commonly found in the same areas. Global Pulse flour Market is projected to cross USD 60 billion by 2025; according to a new research report by Global Market Insights, Inc. The market must witness significant gains from 2019 to 2025 as it persuades more demand in the food application to enhance the taste and aroma. Food products that offers therapeutic benefits related to consumption of these ingredients such as weight management, improved digestion, and maintaining blood sugar levels may support pulse flour market growth.

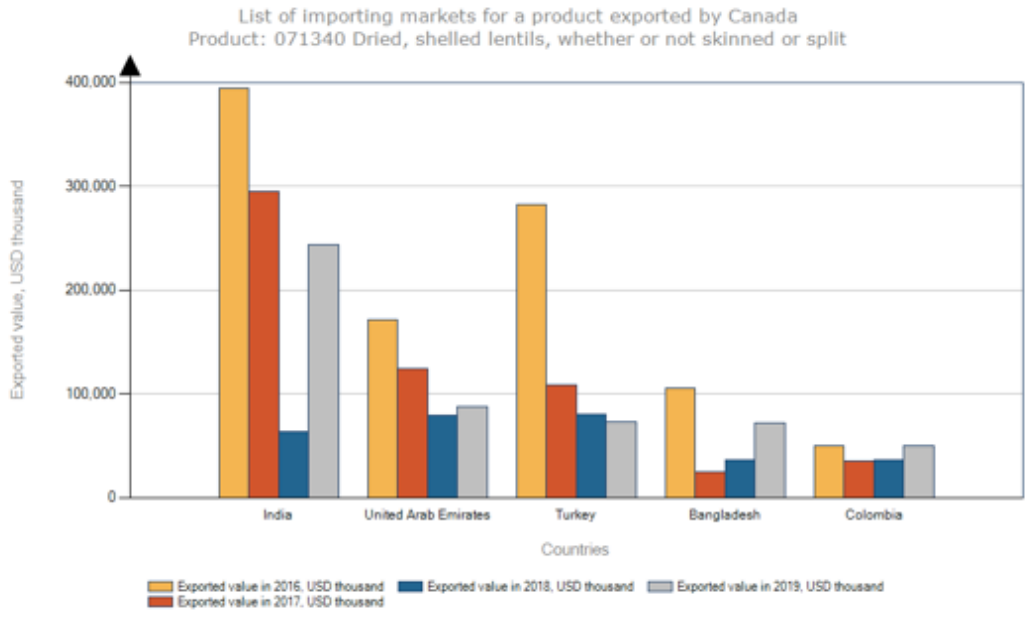


Canada has for the past ten years enjoyed a leadership position as the top lentil producer. By 2018, India has become a formidable producer of lentils as well.



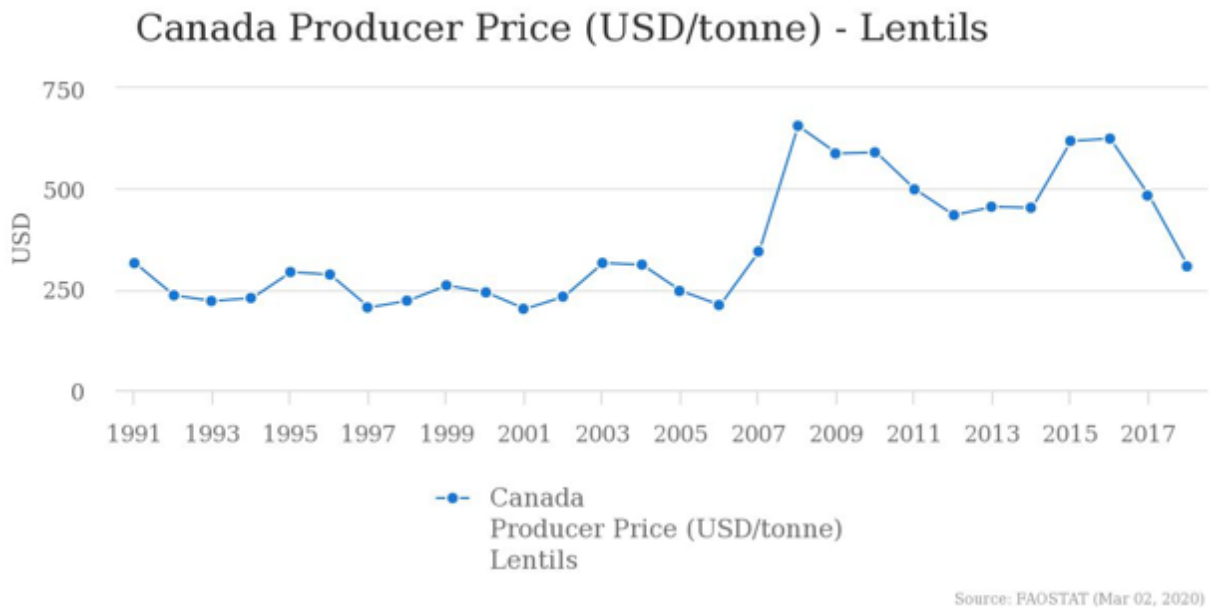
With the imposition of India's tariffs on lentil imports, Canada experienced severe retrenchment in overall trade volumes in the 2017/18 season over the prior two seasons. After its export flow peaked above 2.5 MMT, Canada's export volumes have fallen to approximately 1.5 MMT in the 2017/18 season.

Export have since picked up, but other trends may undermine Canada's leadership position in the long term:



The amount of arable land in the steppes of Ukraine, Russia and Kazakhstan are more than triple the acreage of Western Canada. For now, exports from the region explode in years with favourable weather and plummet in dry or wet years. If their farmers figure out the agronomy and the management to get decent yields in years with adverse weather, Canada could struggle to compete

As a result, prices for conventional lentils have fallen from $.44 CAD/ LBS in 2015/16 to $.18 CAD/ LBS in 2019/20.

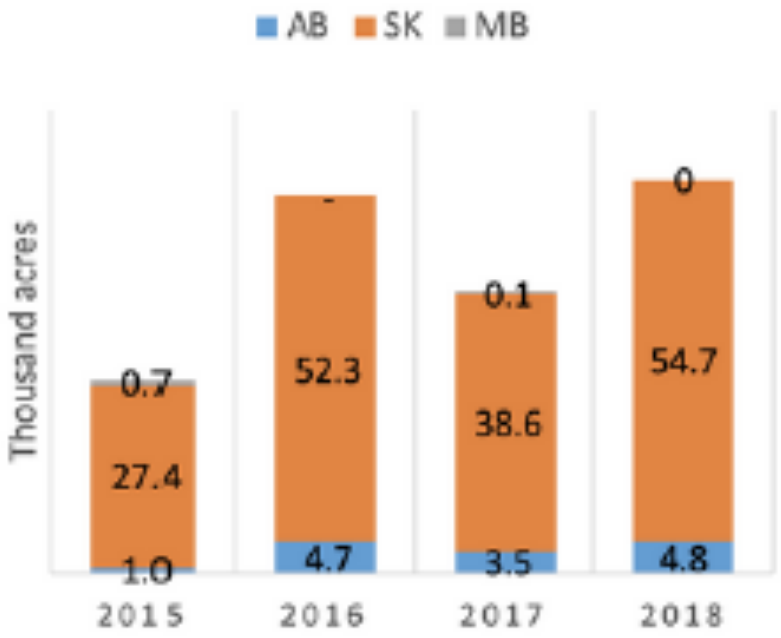


Organic:

Organic Lentil acreage has not seen the same fluctuations, showing instead strong increases, just as their conventional cousins were experiencing severe disruptions.

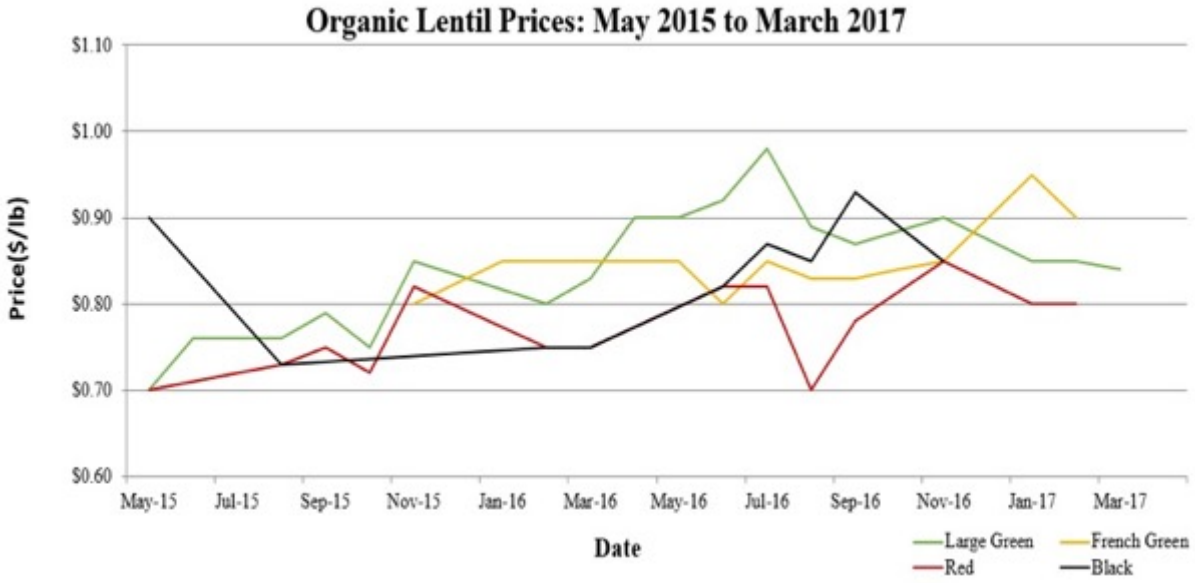
The two trends may be related, in that frustrated conventional lentil farmers are transitioning their farms to organic in order to be in a more stable market environment, but that in itself doesn't undermine the fundamental market opportunities connected to farming organic pulses.

Acreage in Canada for lentils (Western Canada grows 98%) has almost doubled in the last four years.



Source: Diana Zeidan, Canada Organic Trade Association

This growth has also been accompanied by a growth in organic lentil prices. This is a sign of strong demand.



Currently, crop insurance in Saskatchewan indicates the following prices for conventional lentils:

CROP (COMMERCIAL)	BASE GRADE	2020 BASE ($/T)	2020 LOW PRICE ($/T)	2020 BASE ($/BU)	2020 LOW PRICE ($/BU)
LENTILS (LG GREEN)	2 CANADA	530	451	0.24	0.20 #
LENTILS (OTHER)	2 CANADA	440	374	0.20	0.17 #
LENTILS (RED)	1 CANADA	420	357	0.19	0.16 #

On the organic side, prices are generally 260% to 300% of conventional lentils.

LENTILS (LG GREEN)	1,378	1,171	0.63	0.53 #
LENTILS (OTHER)	1,320	1,122	0.60	0.51 #
LENTILS (RED)	1,176	1,000	0.53	0.45 #

Organic lentils have found lucrative export markets

Canada Exports to the World Organic Green Lentils Calendar Year: 2017		
Partner Country	**CAD Dollars**	**Shares**
World	187,957,091	100.00
Algeria	29,579,376	15.74
India	21,023,913	11.19
Morocco	20,230,217	10.76
Colombia	18,675,768	9.94
United Arab Emirates	14,536,335	7.73

Canada Exports to the World Organic Green Lentils Calendar Year: 2017		
Partner Country	**Quantity (Tonnes)**	**Shares**
World	176,890	100.00
India	28,962	16.37
Algeria	25,217	14.26
Morocco	17,268	9.76
Turkey	16,549	9.36
Colombia	15,575	8.80

Canada Exports to the World Organic Red Lentils Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	54,139,143	100.00
India	28,521,024	52.68
Pakistan	7,812,635	14.43
Turkey	5,660,367	10.46
United Arab Emirates	2,870,682	5.30
Bangladesh	1,669,766	3.08

Canada Exports to the World Organic Red Lentils Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	69,818	100.00
India	37,685	53.98
Pakistan	9,378	13.43
Turkey	8,147	11.67
United Arab Emirates	4,183	5.99
Bangladesh	1,844	2.64

Canada Export to World Organic Lentils (all other) Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	1,129,344	100.00
Germany	577,178	51.11
Netherlands	215,444	19.08
Australia	170,701	15.12
Iran	120,000	10.63
Spain	35,239	3.12
New Zealand	10,782	0.95

Canada Export to World Organic Lentils (all other) Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	947	100.00
Germany	511	53.95
Netherlands	191	20.16
Australia	108	11.36
Iran	104	10.95
Spain	24	2.59
New Zealand	9	0.99

Organic trends for lentil flour have widely picked up and have shown very strong growth with more and more consumers demanding organic food and bakery and baby food manufacturers have introduced prduct catering to this demand.

Lentil acres in Kazakhstan and the Ukraine have been ramping up in recent years in response to high prices and promotion of pulse crops globally.

According to COTA, organic lentils have been imported into Canada at a discount to domestic prices (it's impossible to know when and how much because that data doesn't exist publicly). There are parcels of organic lentils being offered into Western Europe out of Eastern Europe at a steep discount to current equivalent Canadian values. It's also possible that they could end up in North American food markets, displacing demand for local organic lentils in the same manner as imports of organic hemp recently have affected domestic prices.

The spreads here for organic over conventional are wider for lentils than for other crops, and (except for French greens) organic lentil prices stopped rising last fall. The premiums for organic over conventional at the retail level are far narrower than farm gate organic premiums and we expect a correction to happen in the near future.

If this market gets oversupplied, it could be tough to find new demand. In that event, the market would most likely dry up for a period of time, similar to what has happened in the organic spelt and hempseed markets recently.

Food companies aren't in the habit of milling lentils for pulse flour as they do with organic peas, which are finding their way into more food and feed products. Nor do lentils have the potential to find new demand from organic consumers in China, as has been happening with organic peas this year.

Projections for organic lentils are very cautious. People only eat so much of them and animals almost none. They are consumed in their raw form only, limiting demand into new food applications. In the parts of the world where eating lentils is most common, not very many can afford to buy organic.

Recommendations:

At over $1,300/ton and with an organic markup of up to 300%, lentils must be part of the top considerations for the organic farmers on PEI. We also found the geographic mix of importing nations for organic lentils intriguing. There is a lot of diversity in the market.

We are aware of the potential bubble and farmers should make provisions for a price correction of the organic premium to 200%, but the opportunity remains.

The challenge will be to examine the infrastructure needs necessary to take advantage of these market opportunities.

PEAS

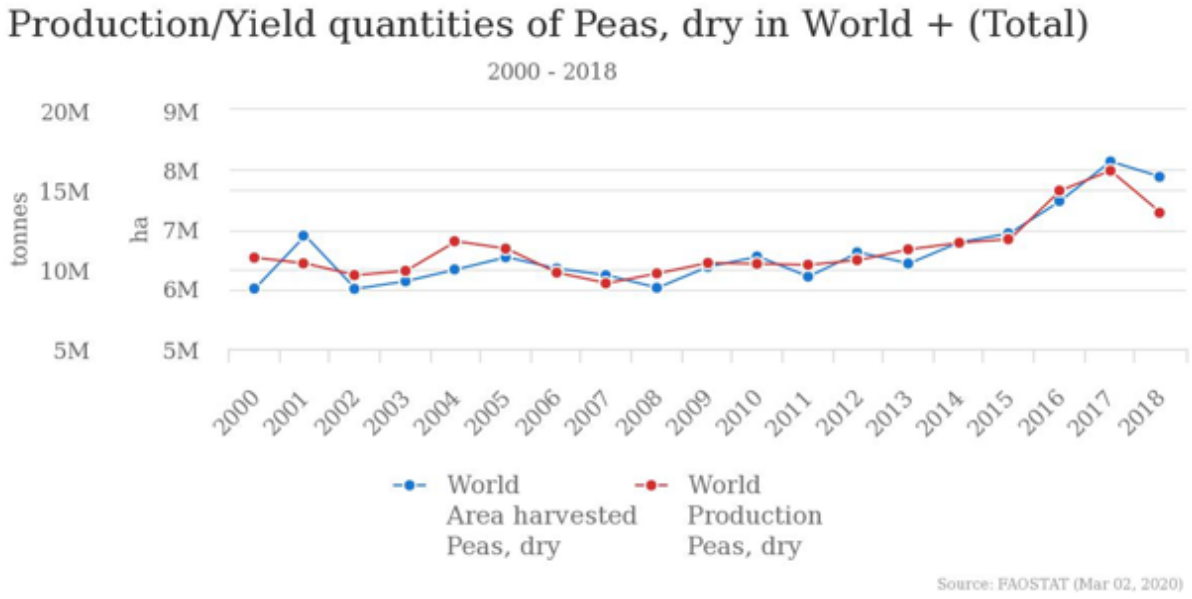
Dry peas can be hydrated by soaking and either canned or frozen, then served as a vegetable. Applications for canned or frozen peas include stir-fry dishes, pot pies, salads, and casseroles. Dry peas may be put through a splitting process and the split peas are then used in the popular North American dish, split pea soup.

In many Asian countries, whole peas are roasted, salted, and consumed as snacks. In parts of the Mediterranean, they are added to meat and potatoes to make a hearty stew. Dry yellow split peas are used in the UK to make the traditional Pease pudding or porridge, while dried, rehydrated, and mashed marrowfat peas, known in England as "mushy peas," are a common accompaniment to fish and chips and meat pie.

In keeping with the increasingly popular use of vegetable proteins as functional ingredients in the food industry, dry peas have been proven especially useful due to their wide acceptance as part of the human diet. Starch and fiber fractionated from peas are also gaining its popularity for the same reason. Fractionation has been employed traditionally in many Asian countries to produce noodles using starch; however, utilization of protein which has been sold as a feed, has been implemented.

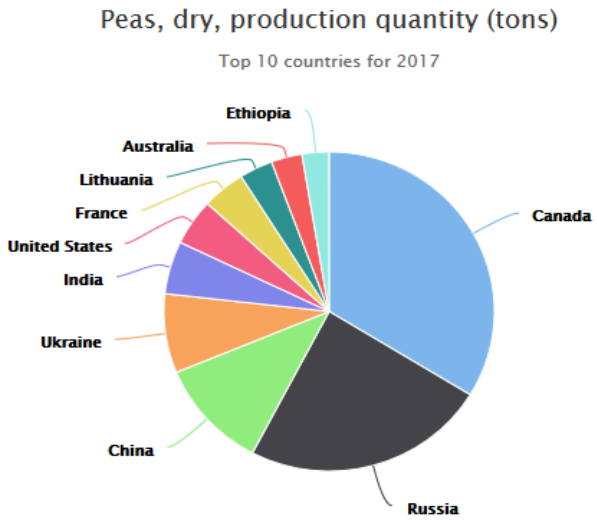
The global pea production is projected to register a CAGR of 5.9%, during the forecast period of 2019-2024. Pea cultivation is suitable to the cold climatic regions, such as North America and Europe where various commercial varieties of peas such as dry peas, yellow, green, maple, green marrowfat, and Austrian winter peas are grown. Dry peas are ranked fourth in terms of world

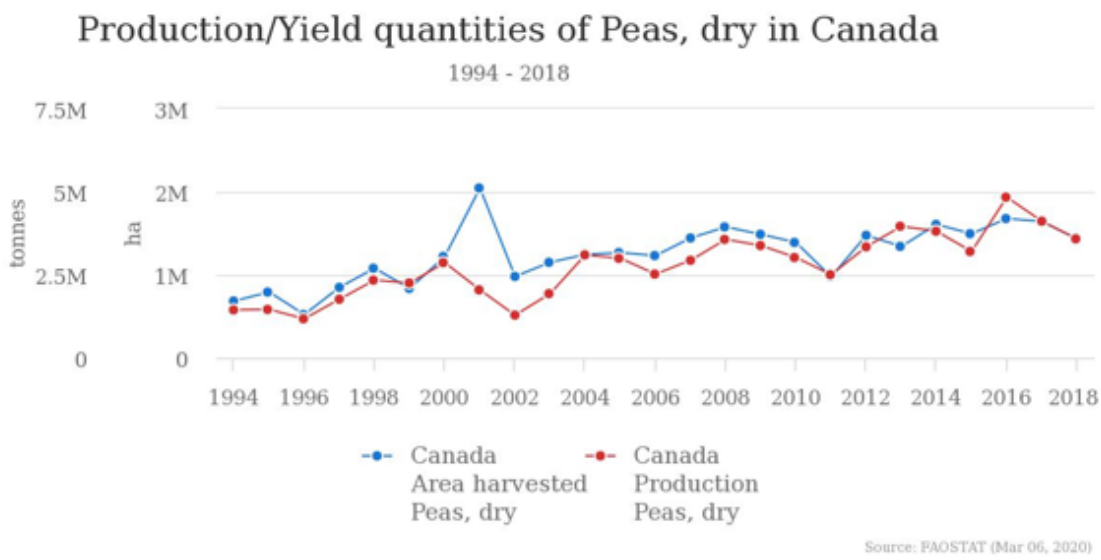
production of legumes below soybeans, peanuts, and dry beans. Yellow peas and green peas are the commercially grown varieties, with yellow peas dominating the global production. The increasing world population, mainly in the developing regions, is continuously driving the consumption demand for dry peas which also acts as a major driving force behind the growth of the peas market.



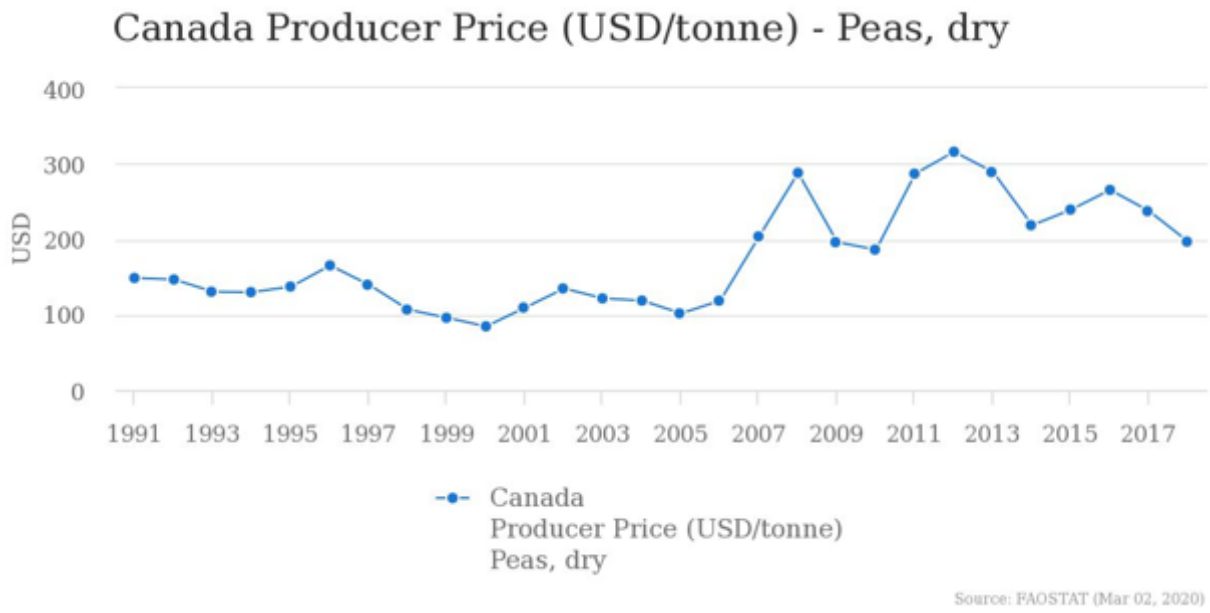
Historically most of Alberta's field pea crop were marketed as livestock feed. Feed pea prices and Alberta's cooler, shorter growing season have dictated this market over the past 15 years. Both yellow and green cotyledon types are grown for feed. Farmers who grow for the feed market will choose a variety based on its yield potential. Over the last number of years however, more than 95% of the acres planted are intended for human edible food markets. Most registered varieties available to Alberta producers produce grain that can be sold for food if it meets a grading standard of No. 2 Canada or better.

As with lentils, Canada is the largest global producer of peas, having taken full advantage of – and leading the global growth:

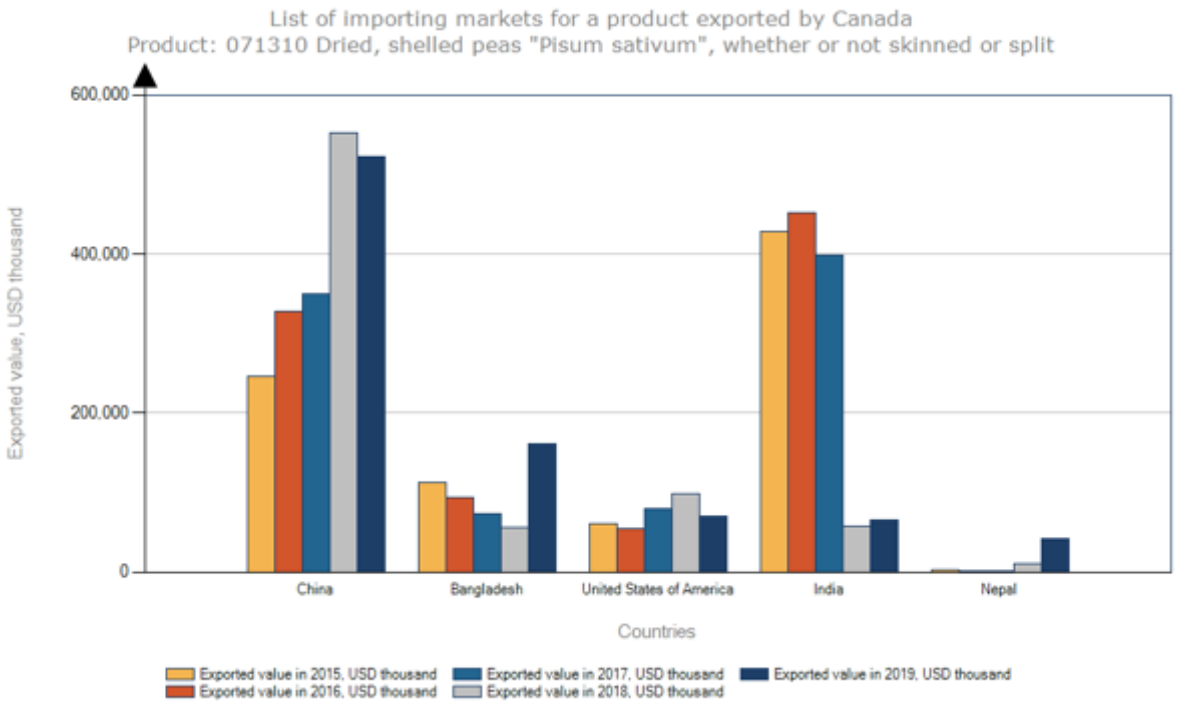




Prices have kept pace due to global demand:



Two countries have set the pace for Canadian production: India and China. Canadian producers have been adept at reacting to a collapse of the market in India in the face of high domestic pulse production and the imposition of import tariffs by New Delhi and switching their exports to China, reversing the number one and number two import customers.



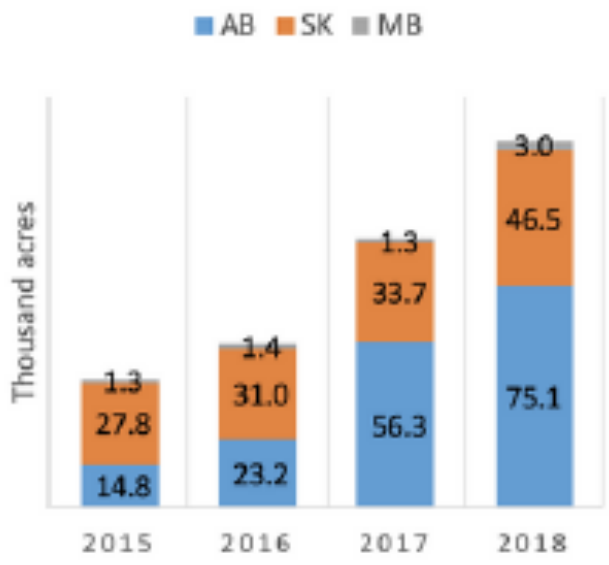
Organic:

Organic pea production in Canada stands at 130,017 acres, by far the largest acreage of organic pulses.

	AB	SK	MB	Prairie Total	Cdn Total	% Cdn Total
Beans	1,100	1,700	200	2,900	4,619	43%
Lentils	3,822	54,229	-	58,051	58,966	98%
Peas	75,325	46,193	3,178	124,696	130,017	96%
Other pulses*	600	1,500	2,500	4,600	9,002	87%
PULSE TOTAL	**61,415**	**75,526**	**4,072**	**192,635**	**199,188**	**97%**

Source: Diana Zeidan, Canada Organic Trade Association

Acreage has grown more than threefold on the last four years.



Source: Diana Zeidan, Canada Organic Trade Associatio

Such acreage also means enough critical mass to pursue export markets

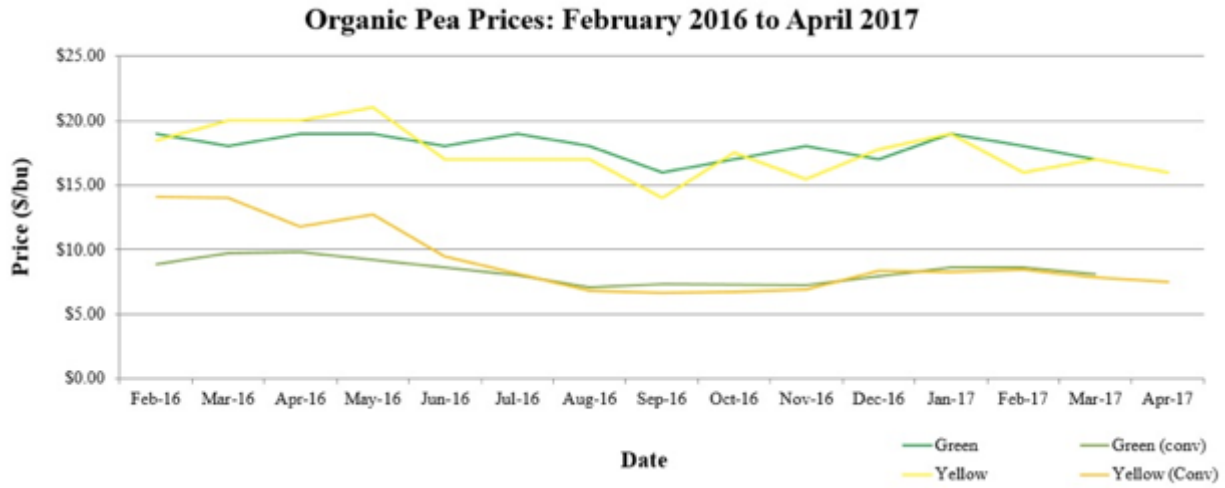
Canada Exports to the World Organic Yellow Peas Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	33,545,933	100.00
China	19,469,201	58.04
India	3,718,266	11.08
United States	3,112,199	9.28
Pakistan	1,639,767	4.89

Canada Exports to the World Organic Yellow Peas Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	57,990	100.00
China	30,850	53.20
India	8,168	14.08
Pakistan	3,944	6.80
United States	3,560	6.14

Canada Exports to the World Organic Peas (Other Than Yellow) Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	3,288,863	100.00
China	2,935,967	89.27
Sweden	108,069	3.29
Panama	76,520	2.33
Pakistan	54,152	1.65
Mexico	41,541	1.26

Canada Exports to the World Organic Peas (Other Than Yellow) Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	3,779	100.00
China	3,245	85.87
Pakistan	137	3.61
Panama	131	3.48
Mexico	75	1.98
Sweden	74	1.96

The only indicator pointing down would be the long-term development of organic prices:



Crop insurance suggest conventional prices to fall into the range of $205 to $241/ton

Organic prices are being insured in the range of $389-$457/ton

The organic premium is thus calculated to be 190%

FIELD PEAS	2 CAN (70%) + 3 CAN (30%)	241	205	6.56	5.58

Organic Crops

CROP (ORGANIC)	2019 BASE ($/T)	2019 LOW PRICE ($/T)	2019 BASE ($/BU)	2019 LOW PRICE ($/BU)
FIELD PEAS	457	389	12.44	10.58

Organic trends:

The organic pea protein market (isolates, concentrates & textured) was valued at USD 45 million in 2019 and is projected to grow at a CAGR of 8.0% from 2019, to reach a value of 96 million by 2029. The market is majorly driven by the wellness trends such as weight management, protein fortification in food & beverages, cost-competitiveness of plant proteins, regulations for sourcing, processing, packaging, and labeling of food & beverages, genetically modified strains for soy protein, and growing vegetarian and vegan population. Organic pea proteins are being used in many applications such as meat extenders & analogs, snacks & bakery products, nutritional supplements, beverages and many other applications.

The market for organic peas feels like organic wheat — highly liquid, with lots of buyers and different uses. Offering big volumes seems to open up new demand channels rather than overwhelm the

supply-demand balance. As a result, there's likely less market downside risk next year for these two crops, if any.

Recommendations:

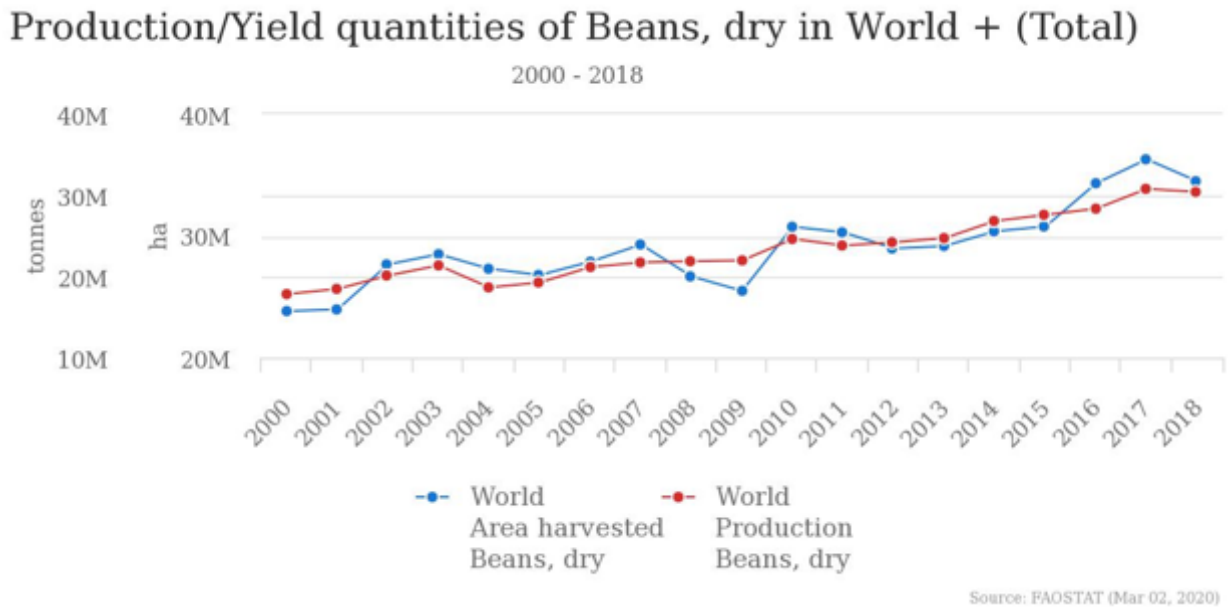
Similar to the recommendation about lentils, organic dry peas are a potentially lucrative crop for growers on PEI. One difficulty would be the low price / weight ratio. This fact makes transportation a more important part of the profitability equation.

Market demand for organic Peas is not likely to diminish. Finding out the potential supply chain to get their product to market will be the next step in this study.

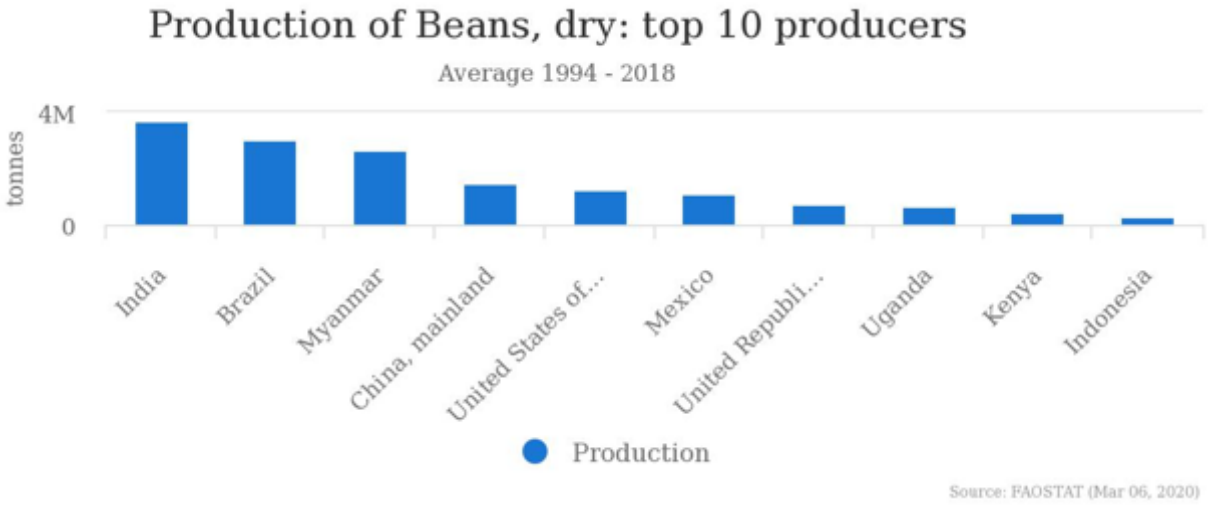
DRY BEANS

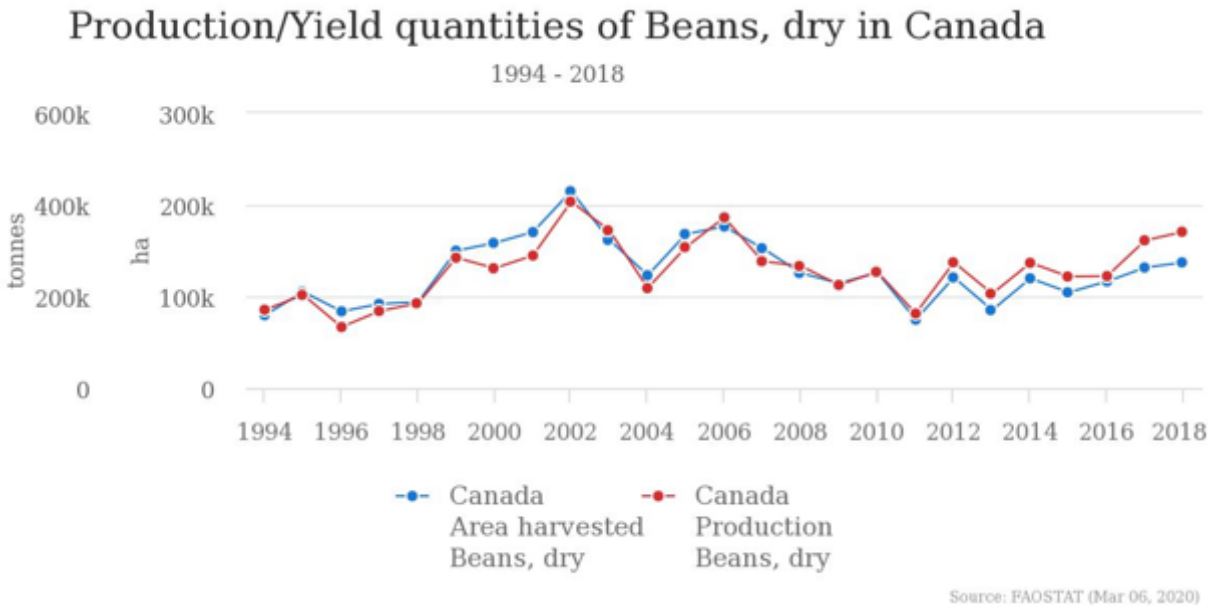
Dried beans have high content of fibers and proteins, which makes it ideal for people with diabetes as well as for people who would want to reduce their meat consumption. There is an increasing trend of veganism in Europe and the United States, which is spreading across the world. Moreover, people are focused toward plant-based diets, which has also been the reason for higher consumption of dry beans.

The global production of dry beans was 32.7 million metric ton in 2018 and is expected to register a CAGR of 4.2% during the forecast period. Myanmar is the world's leading producer of dry beans, accounting for nearly 19.3 % of the total output. Dry beans production declined in the year 2017, because of unfavorable weather conditions and uneven rainfall in the producing countries. Major importers of dry beans are India, Pakistan, China, and Turkey



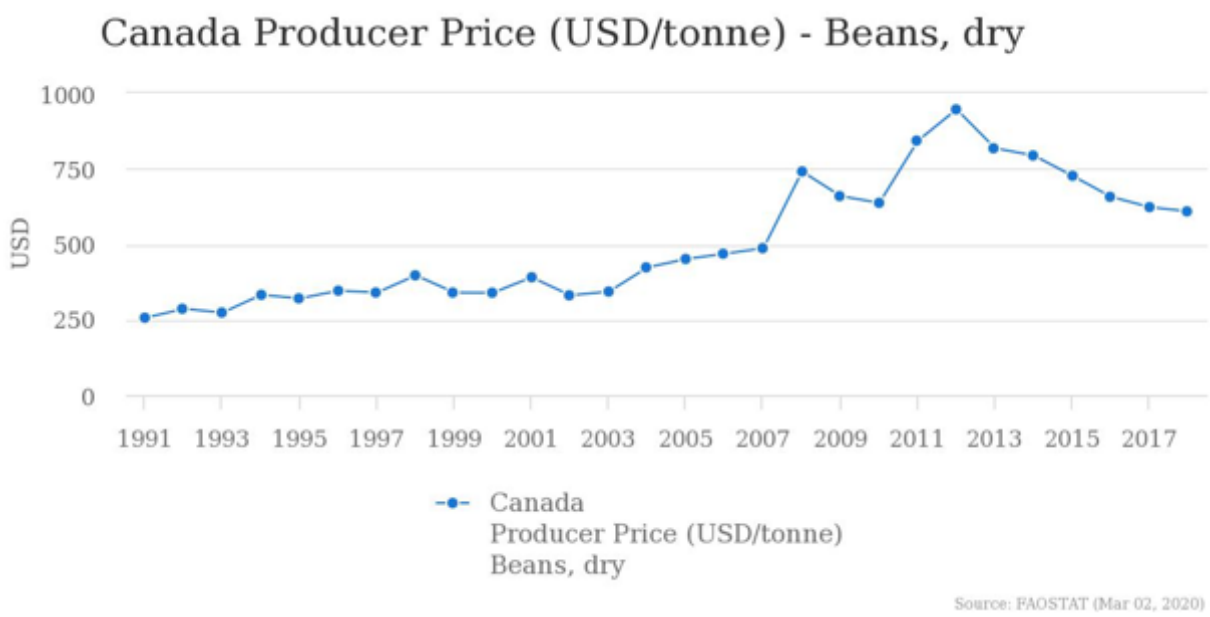
Canada has not kept pace with global output. It is not part of the top 10 producers either.



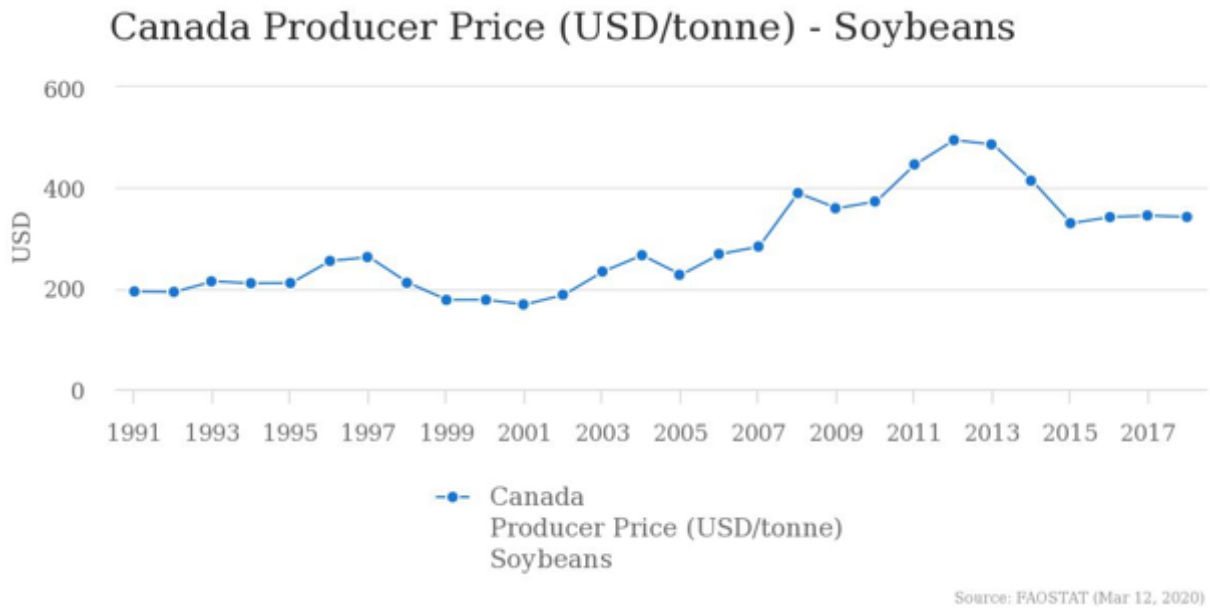


For 2019-20, Canadian exports are forecast to be marginally lower than last year. The EU and the US are forecast to remain the main markets for Canadian dry beans, with smaller volumes exported to Japan and Mexico.

For 2020-21, the area seeded is forecast to be lower than 2019-20, but remain historically high, because of favorable potential returns compared to other crops, particularly soybeans and corn. Production is expected to increase to 0.33Mtdue to lower expected abandonment and higher expected yields. Supply is expected to rise to a record 0.5Mt due to the higher carry-in stocks. Exports are forecast to be marginally higher than 2019-20. Carry-out stocks are expected to rise. The average Canadian dry bean price is forecast to fall sharply due to an expected increase in North American supply.



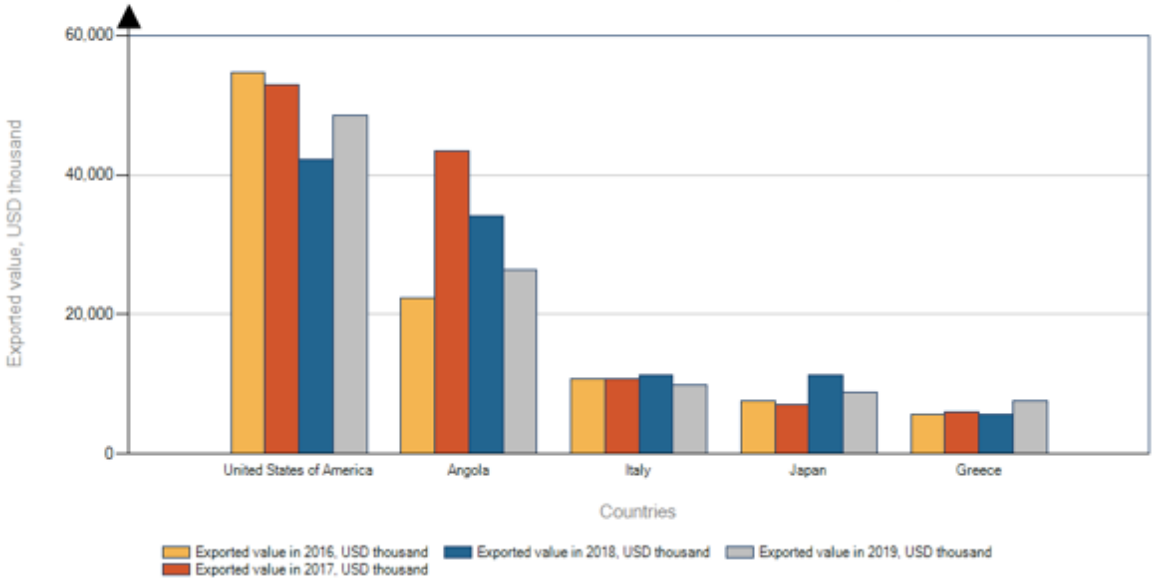
Regarding the supply chain, pulse processors, specifically edible bean processors, are influenced by soybean prices as a result of insufficient instant data for various bean types, meaning soybeans can affect the prices of edible beans and other pulses to some extent.



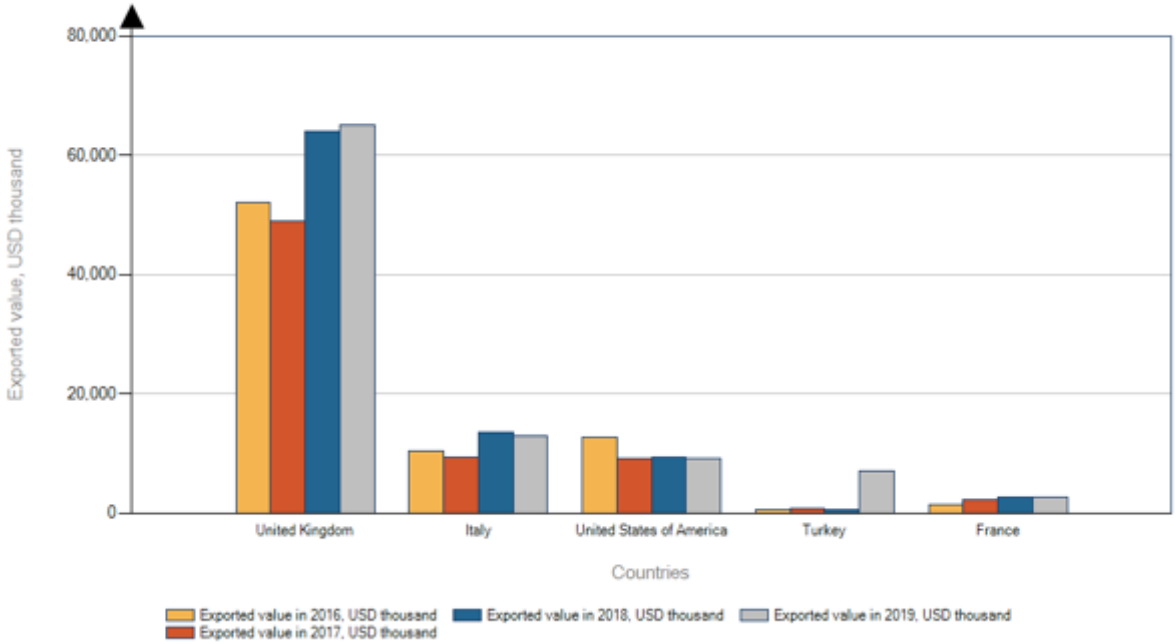
As for export markets, they depend on the kind of beans. Most beans, excluding Adzuki beans and kidney beans find markets in the US, and Angola, while Adzuki beans get exported to Japan and kidney beans to the UK.

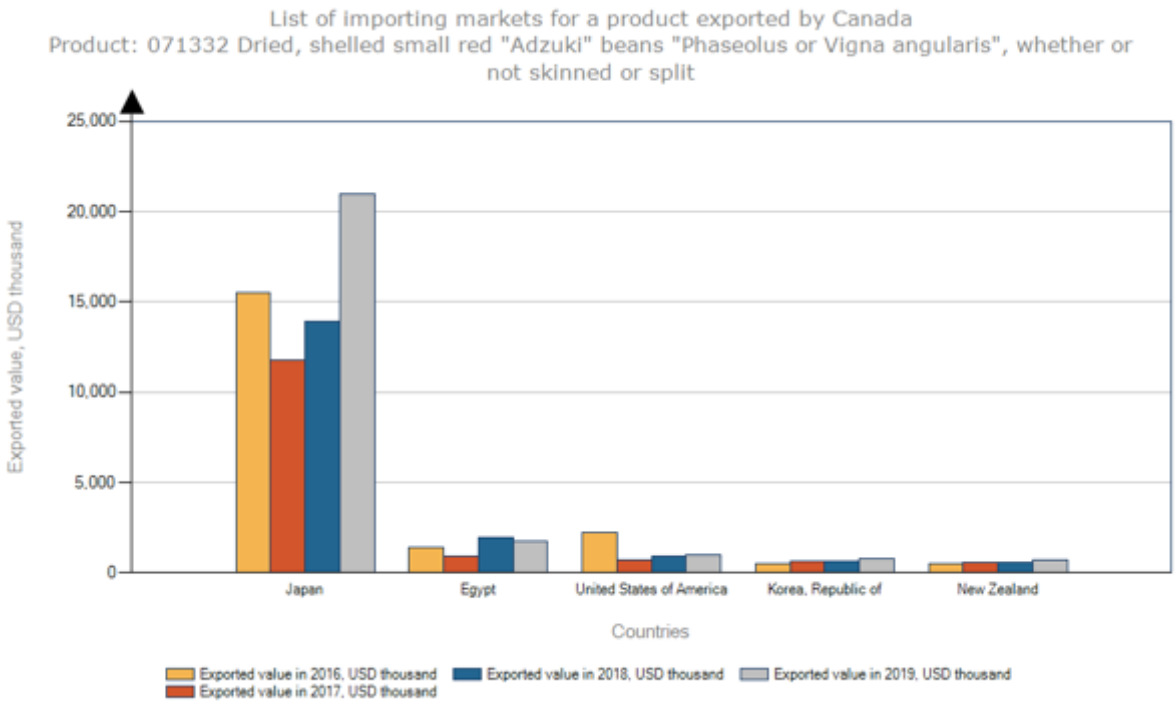
This shows a diversified portfolio of markets.

List of importing markets for a product exported by Canada
Product: 071339 Dried, shelled beans "Vigna and Phaseolus", whether or not skinned or split (excluding beans of species "Vigna mungo [L.] Hepper or Vigna radiata [L.] Wilczek", small red "Adzuki" beans, kidney beans, Bambara beans and cow peas)



List of importing markets for a product exported by Canada
Product: 071333 Dried, shelled kidney beans "Phaseolus vulgaris", whether or not skinned or split





Organic:

Consumer demand for organic heirloom dry beans is on the rise. According to the authors of a new study, the number of acres of land used for certified organic dry bean production has increased significantly in recent years, and a similar trend is occurring across the United States. In a study published in the January 2016 issue of HortScience, researchers Hannah Swegarden, Craig Sheaffer, and Thomas Michaels offer essential recommendations to small-scale vegetable growers about heirloom dry bean cultivar choices for distribution to local markets in Minnesota and the Midwest.

Canadian acreage in 2018 was 4,619 organic acres, up from 1,100 acres in 2015. This is a low number.

	AB	SK	MB	Prairie Total	Cdn Total	% Cdn Total
Beans	1,100	1,700	200	2,900	4,619	43%
Lentils	3,822	54,229	-	58,051	58,966	98%
Peas	75,325	46,193	3,178	124,696	130,017	96%
Other pulses*	600	1,500	2,500	4,600	9,002	87%
PULSE TOTAL	**61,415**	**75,526**	**4,072**	**192,635**	**199,188**	**97%**

Source: Diana Zeidan, Canada Organic Trade Association

Research staff at the Regional Sustainable Development Partnerships and the U of MN Agronomy Department examined the potential market channels for local, organic edible legumes in 2014. According to that study, only two out of nine distributors reported working with organic dry beans. One distributor said that organic dry beans accounted for 1-3% of their total volume. The second said that the company sold organic dry beans, but not through their Minnesota facility, and organic dry beans accounted for less than 3% of their total dry bean sales. This distributor mentioned that some Minnesota farmers sell organic beans to their organic facilities in Idaho and Colorado, but only a few truckloads.

One of the two distributors who processes organic beans does not purchase organic product. They work with growers so that the growers can do their own marketing.

The other distributor, who only distributes organic beans grown in Idaho and Colorado, sells the majority of their organic beans to canners and food services. This distributor mentioned that the Chipotle restaurant chain was one of their biggest customers.

Many distributors were unsure whether or not there was unmet demand for organic dry beans. Out of the seven distributors who answered the question, three said they were unsure, two said there was a significant demand, one said that there was a very small demand, and one said that there was not a significant demand.

The distributor who indicated that there was a very small demand, indicated that organic farmers struggle to supply a quality product and quality is the most important factor for consumers.

One distributor who said that there was a demand elaborated to say that it is a growing segment of the bean market that is getting harder to source, and he believes that buyers will pay double for organic beans. However, he sees organic production declining because farmers can also get a good price for conventional beans that are significantly less expensive to produce. He sees production of organic beans not keeping up with production of organic corn and soy and does not know if the market will bear the price farmers need to make a living producing organic dried beans."

In Canada too most organic bean production seems to be sold to traditional processors:

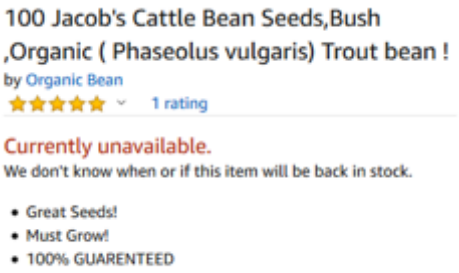
Many of the canned beans and pulses sold at Canadian retail are processed in Canada, although company ownership may not necessarily be Canadian. French owned company, Bonduelle, has facilities in ON and QC that process organic kidney beans and chick peas.

Bonduelle's manufacturing facilities process only in season, which means they run only 5 months per year. Other Canadian players include Sprague Foods and KD Canners, both Ontario-based companies. Private label also has a presence in this category with Loblaw's PC Organics canned pulses. In 2017, Eden Foods had a 0.5% share of the total organic packaged food market.

PEI

There seems to be a PEI link to an heirloom variety. Listed on Amazon, as seed, this bean is described as follows: "Jacob's Cattle bean is also called a Trout bean or an Appaloosa bean, but Jacob's Cattle bean is the oldest name for the variety. This bean is a Prince Edward Island heirloom. Legend has it that it was a gift from Maine's Passamaquoddy Indians to Joseph Clark, the first white child born in Lubec, Maine.It is a plump, white and red speckled, kidney-shaped bean. It is full-

flavored, holds its shape under long cooking, and stands up well to plenty of seasoning. The bean has a rich aroma and has a rich and nutty aftertaste”



Wayne MacLean, general manager of W.A. Grain and Pulse Solutions, one of Canada's biggest exporters of pulses mentioned beans as part of their product mix: “The operation has a cleaning line which handles many kinds of pulses including green and yellow peas, black beans, pinto beans, cranberry beans as well other products such as rye and barley.

Recommendation:

Beans are a small part of the Canadian crop mix and the market is quite fragmented. He biggest customers for organic beans in Canada are traditional processors and that would mean quite a bit of pressure on prices.

There are opportunities connected to growing heirloom varieties, but this market would be very niche.

CHAPTER 3: OILSEEDS

The annual FIBL survey on organic acreage worldwide (last numbers to be reported are 2017 numbers) shows Oilseeds in third position after Cereals and Pulses when it comes to ranking in acreage. This is a listing of acreage alone. Harvest yield and economic return are not part of the statistics. It shows however that Canada is mainly a producer of these three families of crops.

Canada Organic Acerage								
Source of data: FiBL survey								
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Berries, total	**1,141**	**1,141**	**3,529**	**2,889**	**3,398**	**4,298**	**6,633**	**4,999**
Cereals, total	**207,191**	**207,191**	**208,108**	**296,175**	**228,855**	**244,421**	**260,756**	**264,491**
Dry pulses and protein crops, total	**23,801**	**23,801**	**32,129**	**28,917**	**30,413**	**38,343**	**56,658**	**61,088**
Fruit, temperate, total	890	890	1,130	1,174	906	1,290	908	900
Grapes, total	129	129	262	347	447	1,001	1,000	598
Nuts, total	101	101	94	67	64	56	49	
Oilseeds, total	**42,269**	**42,269**	**48,253**	**32,020**	**52,265**	**44,309**	**40,911**	**56,875**
Root crops, total	594	594	614	2,549	1,641	1,307	1,736	1,426
Strawberries, total			33	38	39	179	174	60
Textile crops, total	**1,170**	**1,170**	**3,817**	**3,811**	**2,509**	**2,264**	**3,051**	**9,681**
Tobacco, total				124				
Vegetables, total	1,884	1,884	2,854	3,545	4,678	14,488	13,230	5,539
Total	**279,171**	**279,171**	**300,822**	**371,657**	**325,217**	**351,957**	**385,106**	**405,657**

Analysts forecast the global organic edible oil market to grow at a CAGR of over 11 percent during the forecast period of 2019-2023, according to their latest market research report (as opposed to a CAGR of 4.7% for conventional oils). One of the key factors contributing to the growth of the global organic edible oil market is the increasing demand for unrefined, unprocessed, healthy, and organic oil. In the coming years, vegetable oils with low cholesterol, fat, and calories are likely to gain high response due to growing health awareness among people across the world.

Concern about healthy food choices increases the demand for organic edible oils that have a different fat makeup than normal edible oils. The purchase and sales of clean-label, organic, and non-GMO products are growing faster than traditional products.

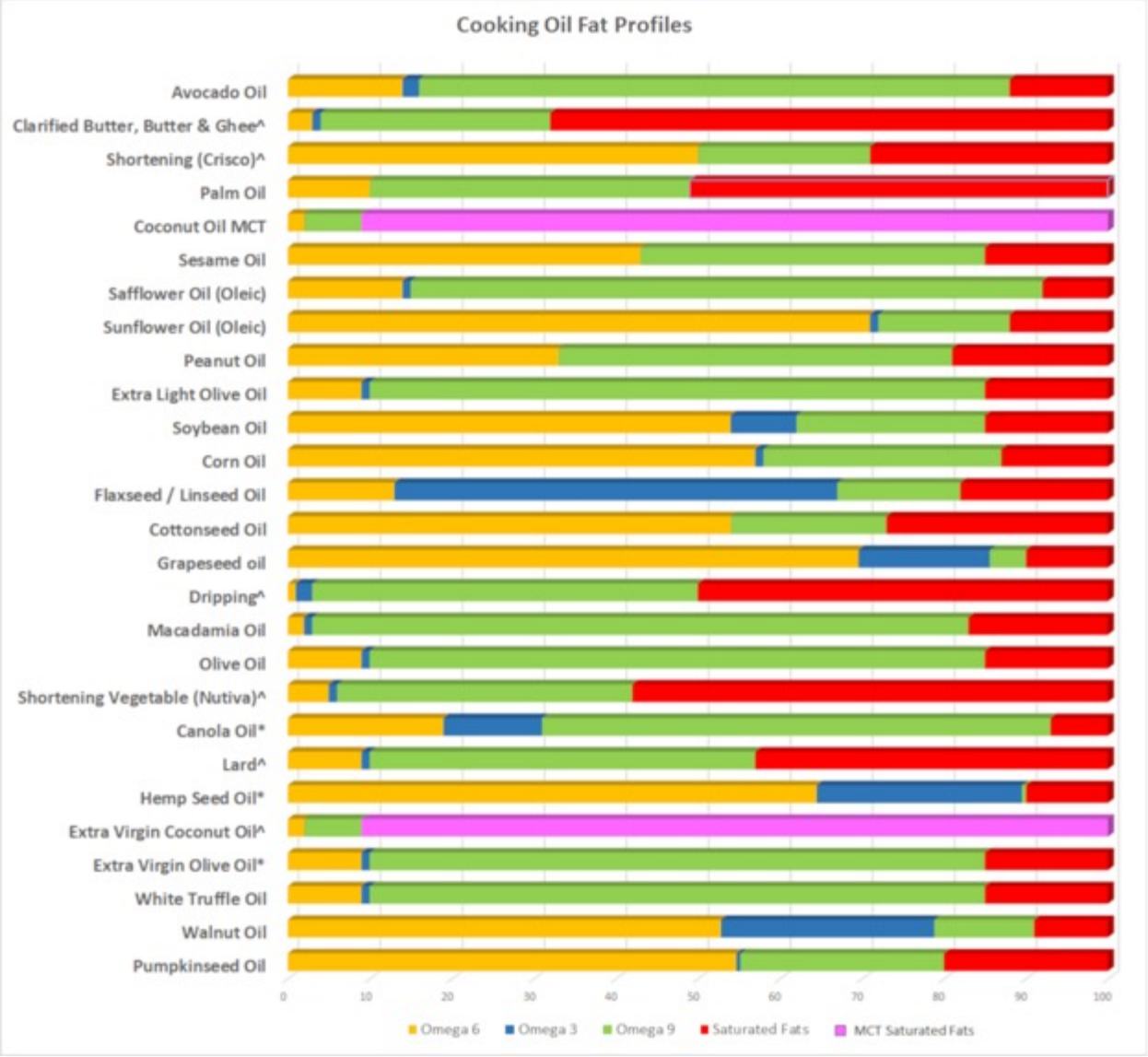
Organic labels guarantee that not only organic ingredients have been used for oil manufacturing but that the manufacturing process itself is more natural. Small-scale pressing using expeller presses results in more oil being left in the meal than results from chemical processing. Typically, the oil in the meal from small-scale pressing is in the range of 8–15%. Commercial processing leaves less than 1% oil in the meal. While extracting the most oil as possible from the seed is one goal, often producing oil at a temperature less than 49°C (120°F) is also an important objective.

The global cold-pressed oil market size (Organic and conventional) was valued at $24.62 billion in 2018 and is expected to grow at a CAGR of 5.3% to reach $36.40 billion by 2026. Oils obtained through cold pressed are expeller extracted in a controlled temperature setting. The controlled temperature lies below 49°C (120°F). Cold pressed oils retain most of their subtle color, flavor, and

nutritional value. In addition, cold pressed oil has zero trans fatty acids and is cholesterol free. As a result, cold pressed oil has gained huge traction in the last few years.

The adoption by the food industry contributed greatly to the growth in the edible oil market, owing to its massive usage in cooking, in marinating salads and via dietary supplement. Also, in developed nations such as North America, people increasingly prefer virgin or cold-pressed oil in their diet as it has clinically proven health benefits.

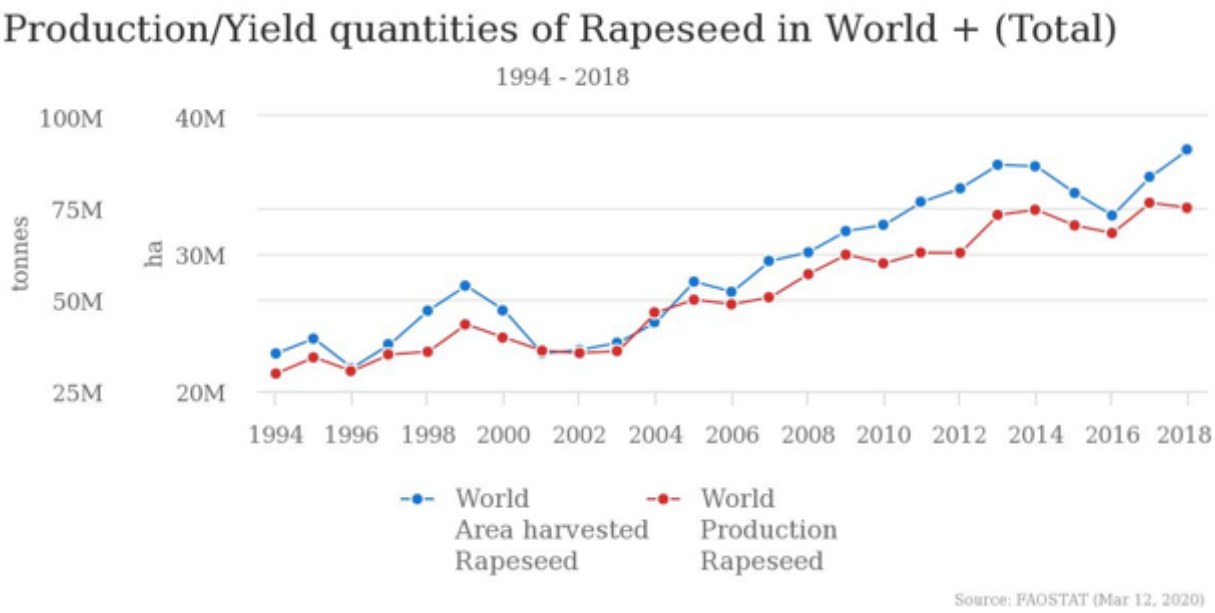
Critical to understanding the importance of oilseeds in human and animal nutrition is the absence of saturated fats and the presence of Omega 3 fatty acids and their benefits.



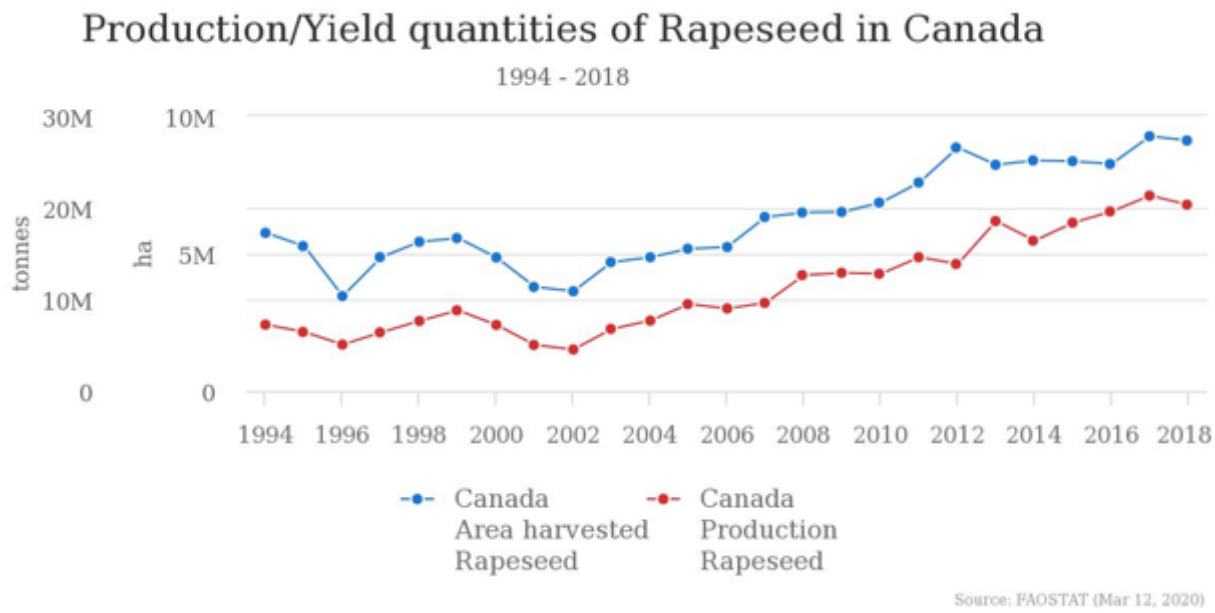
CANOLA

World production of Canola (in most FAO reports referred to as rapeseed) has seen tremendous growth. Traditionally a crop planted for animal feed, the creation of Canola, a variety of rapeseed with low levels of euricic acid changed the marketability of rapeseed in a fundamental way.

Currently, canola offers uses from human edible oils to animal feed to bio diesel usage.



Canada is the market leader for global canola production. Strong domestic and export demands for canola oil coupled with continued market access for canola meal have been supportive of continuous growth for this crop.



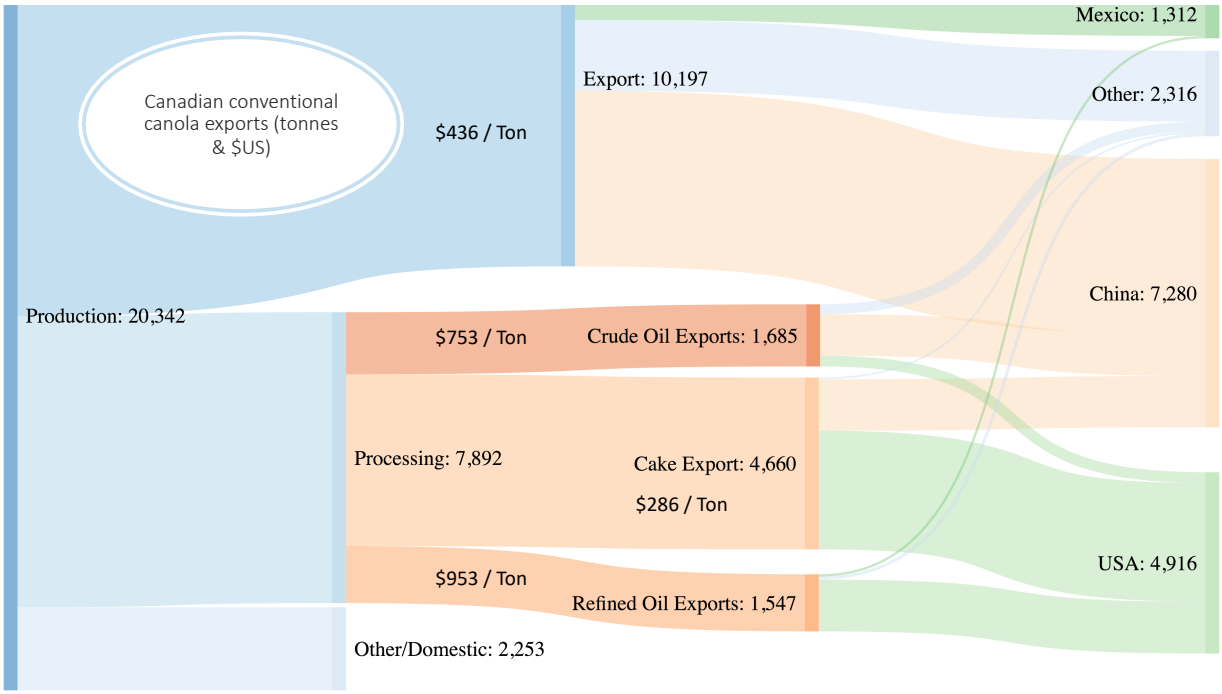
Through the first three months of 2019, canola oil prices have averaged $1,000/ton, 2.0% higher than 2018. Meal prices have averaged $356/ton, a 3.5% decline.

The recent de-certification by China of two Canadian companies affects Canola seed, not oil or meal. The EU is rumored to pick up the slack in the export markets.

The November 2019 futures contract price for canola is currently $470/ton, roughly 8% lower than the 2018 average producer price and 2% lower than November 2018 assuming a $35 basis.

Over the past 10 years, Canadian canola crushers have on average processed 43% of domestic production as crusher capacity has expanded at a similar pace than production. Canola demand from crushers has more than doubled from 4.14 Million Metric Tons (MMT) in 2009 to 9.27 MMT in 2018, a 124% increase.

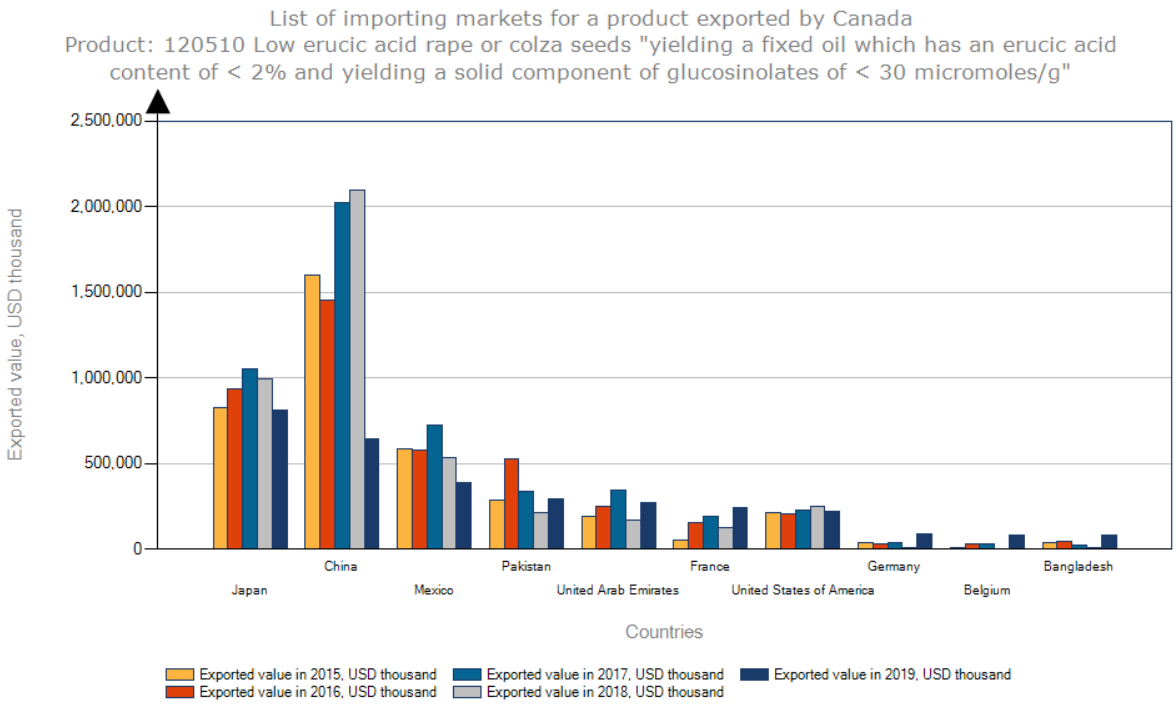
The multiple uses and markets for canola seed and processed oil and meal (or cake) are shown on this graph (expressed in thousand metric tons)



Average export prices per ton range from $US 286/ton for cake or meal to $1,547/tom for refined oil.

As mentioned before, the de-certification (another word for trade sanction) by China of the two largest Canola companies has had an effect. Sales to China have dropped rapidly, but sales to other countries (notably Europe) have increased.

The other measure was to process more domestically. Exports of oil and oilcake to China (not targeted by the trade sanctions) have increased substantially.



Organic: In stark contrast to conventional canola, Canada is not a player at all when it comes to organic canola. This certainly has to do with the 3-kilometer GMO contamination buffer:

In 2018, there were 77,870 acres of organic oilseeds overall on the Prairies comprising:

60,645 acres of flax
14,058 acres of mustard
3,168 acres of other oilseeds

Assuming some farmers grew organic camelina, organic canola acres were likely 2,000 to 2,500.

Organic canola is processed using expeller presses that literally squeeze the oil out of the seed. No solvents or hexane are used. The oil can be refined using a vacuum, heat and clay as a filter. Unrefined oil is also available. Refined oil has had many of the taste, colour and odour molecules removed while unrefined oil is a golden yellow colour and tastes like its brassica brethren (turnip or radish).

Some Canadian processors such as Highwood Crossing in Alberta, cold press organic canola oil. Seeds are kept cool - under 4 C and pressing is done in an oxygen and light-free environment to avoid damaging the oil.

Oil presses are run slowly to avoid generating excess heat. The resulting oil has a lower smoke point than industrially processed oil. The company sources canola from hundreds of miles away in the Peace Country of northern Alberta. To assure that the raw product is not contaminated by pollen drift from GE plants, random samples are sent for DNA testing.

“It’s one of those things: if you grow it, it (the market) will come,” she said. “The market isn’t there right now because nobody thinks it’s possible to (produce organic canola).”

As organic farms get larger, producers could adapt to the three km buffer zone. It might be possible to grow canola in the middle of a 5,000-acre organic farm, away from neighbouring canola fields.

Or they could grow it on patch of land that's surrounded by trees, reducing the risk of wind drift.

Having canola as an option would be helpful because organic growers rely heavily on cereal crops. In 2018, there were 622,000 acres of organic cereals grown on the Prairies and only 78,000 acres of oilseeds.

"We are cereals dominant," McMillan said. "We are not growing the one oilseed with the greatest competitive ability, from a weed standpoint.... We are missing a good rotational crop."

Processors frequently blend organic canola oil with another oil such as sunflower. This may be because it is difficult to source sufficient canola oil.

According to the Saskatchewan crop insurance rates, the organic premium is 150%

Data tables for organic area data for selected crops					
04/01/20					
Source of data: FiBL survey					
Element	Organic area [ha]				
Item	Rape and turnip rape				
Year	2012	2014	2015	2016	2017
All conventional		36,307,188	34,377,957	32,508,353	34,740,402
All organic	71,763	90,497	92,679	136,200	94,971
		0.25%	0.27%	0.42%	0.27%
Kazakhstan	29,353	29,353	29,353	29,353	26,316
Romania		16,065	10,589	12,811	18,909
Sweden	3,275	3,709	4,985	6,458	8,881
France	2,198	2,169	6,287	7,548	5,864
Germany	2,500	2,200	2,600	4,800	5,100
Estonia	2,933	4,110	3,521	6,973	4,835
Lithuania	2,885	1,083	4,129	36,537	4,587
Croatia	304	1,293	1,034	2,421	3,699
Russian Federation		4	4	11,937	3,453
Denmark		722	1,310	1,535	2,065
Italy	607	783	1,606	613	2,045
Finland	2,191	2,271	2,589	1,676	1,541
Bulgaria	974	833	2,263	2,720	1,281
Hungary	1,071	2,729	861	1,073	1,076
Latvia	876	379	433	1,311	969
Poland	1,482	511	792	461	943
Canada	4,112	600	190	5,531	593

Recommendation: In the case of organic canola, the reason for the underwhelming Canadian performance lies within the success of its conventional cousin. Because of the necessary buffer zone, control over the GMO-free purity is hard to obtain, especially in areas where conventional canola is grown.

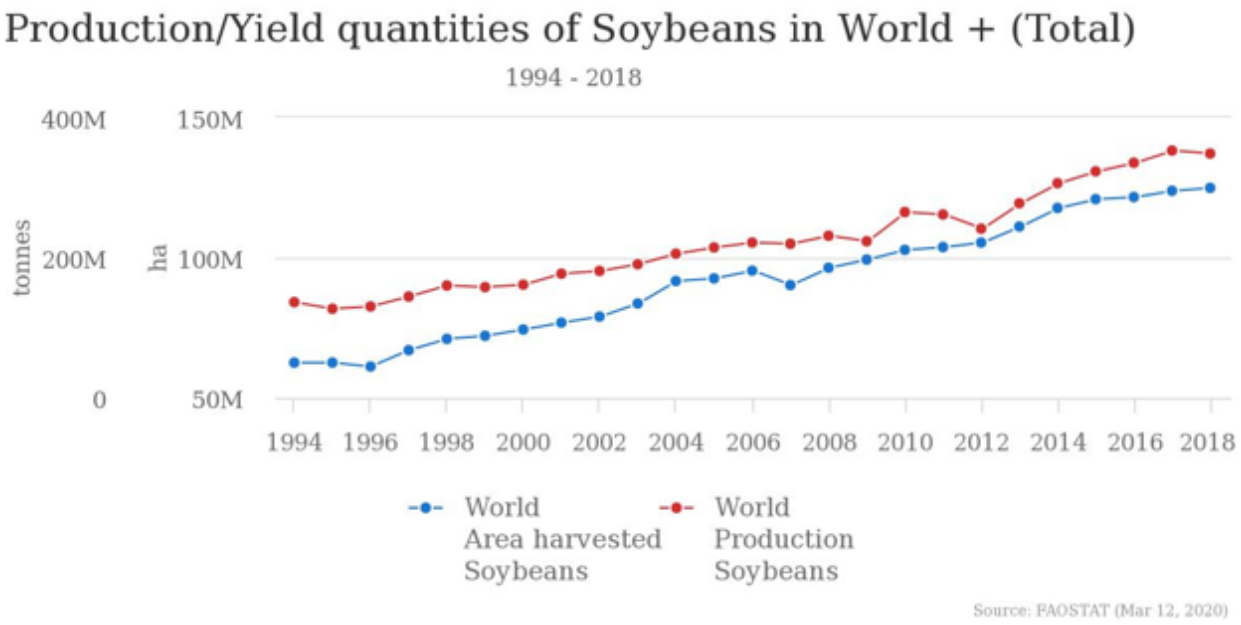
We seem to be in a situation where the market is willing to absorb as much product as could be produced, if only it could be produced.

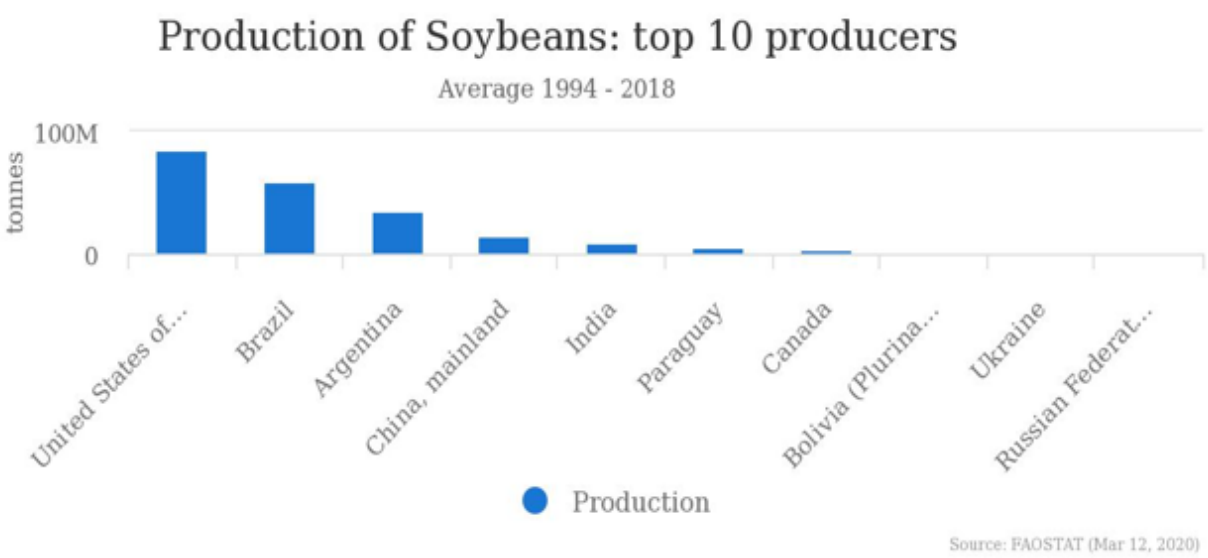
This presents an opportunity for PEI famers. The Island has a natural buffer zone in form of water. If there was a mechanism to guarantee the absence of GMO canola, the Island would have a unique competitive advantage for farming organic canola.

SOY

Soybean is an important source of food, protein, and oil, and hence more research is essential to increase its yield under different conditions, including stress. The most important countries of the world with the highest rate of soybean production include the USA, Brazil, Argentina, China, and India.

Soybean has been grown as a commercial crop primarily in temperate ecologies for thousands of years, first in northern Asia and in more recent years in North America and countries of the Southern Cone of Latin America. The remarkable success of this crop in temperate zones is well known to all, but there is also a very important potential role for soybean in many cropping systems of the tropics and subtropics, where often the farms are mostly small and with little mechanization.



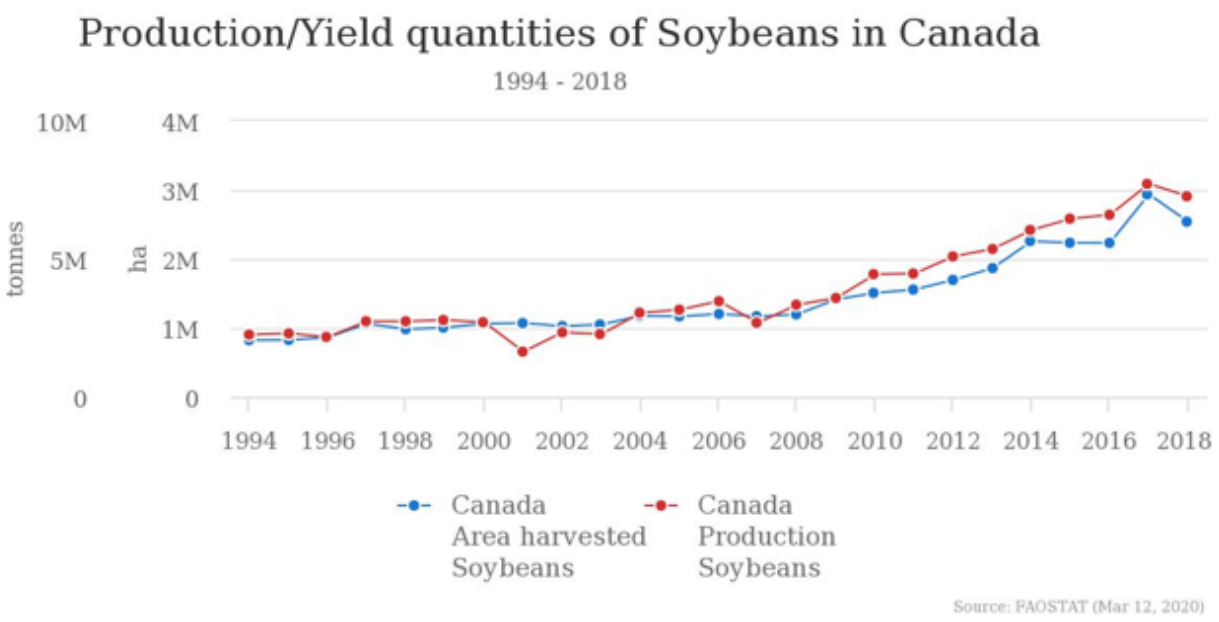


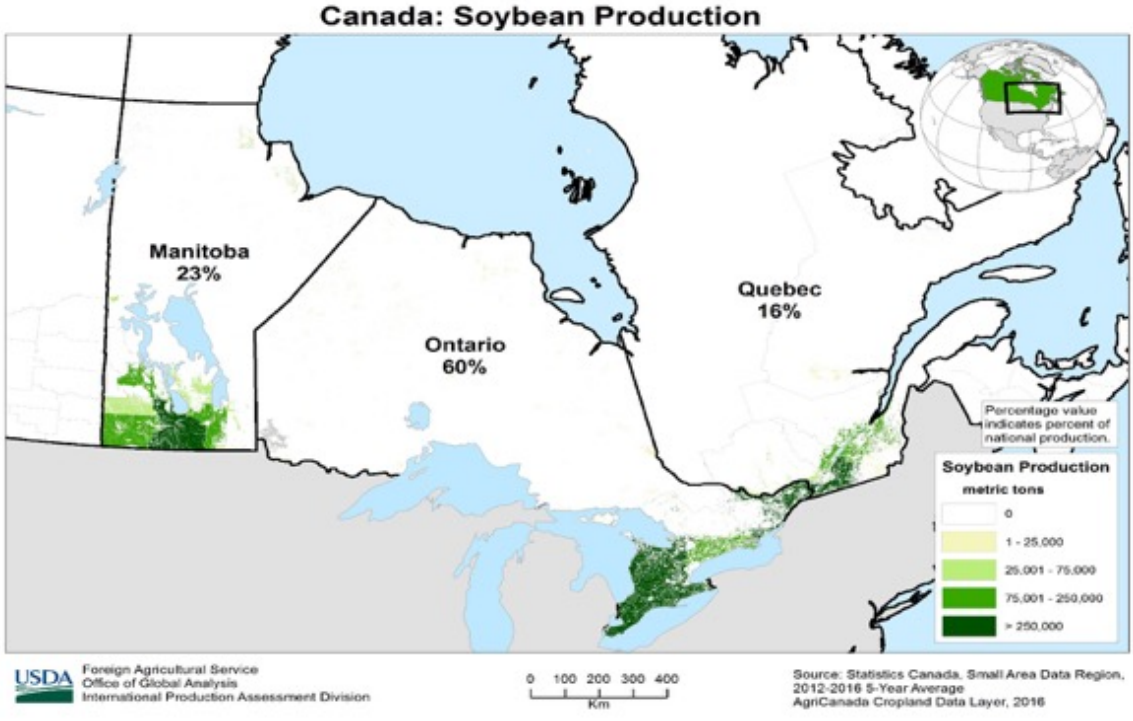
Trade of soybeans is dominated by three large soybean producing countries: Brazil, the US and Canada.

Exporters	Exported value in 2015	Exported value in 2016	Exported value in 2017	Exported value in 2018	Exported value in 2019
World	87,580,304	89,568,867	98,130,256	100,674,711	
Brazil	21,207,738	19,557,938	26,008,460	33,517,529	26,455,603
United States of America	23,619,246	27,718,131	26,393,625	22,421,640	23,892,195
Canada	6,801,094	7,163,332	7,863,988	7,526,626	5,613,387

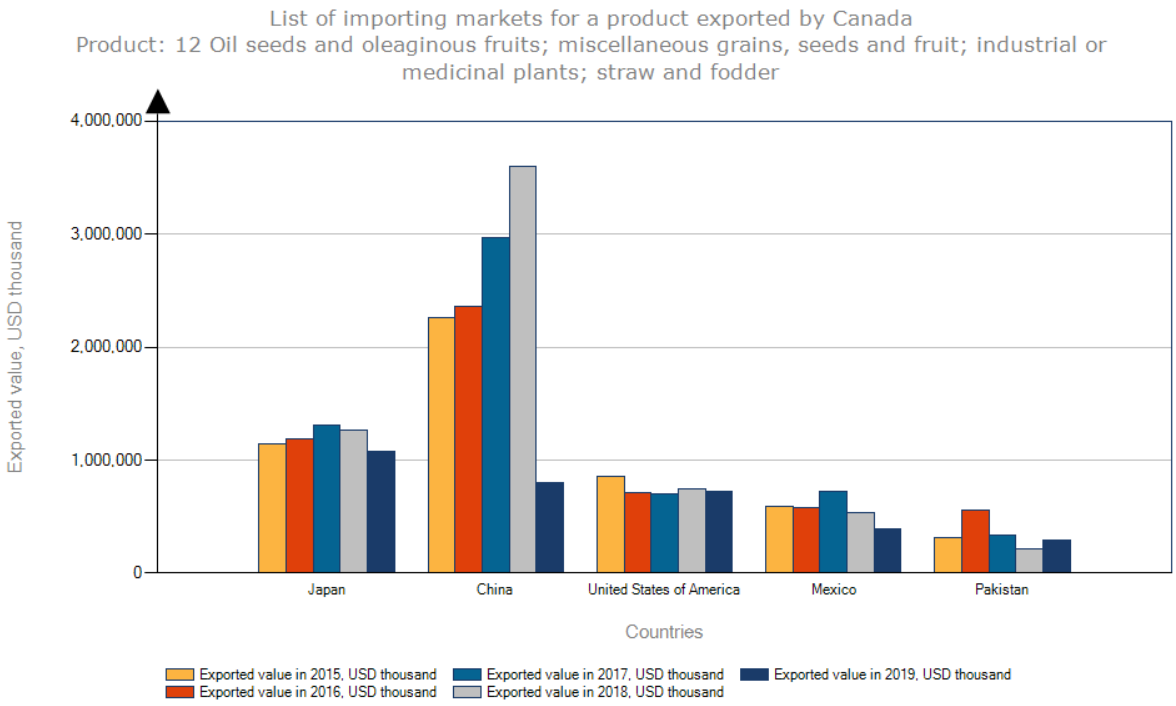
Though a small producer of Soy, Canada is a big exporter of it. Canadian farmers have grown soybeans for more than 70 years, and recent advances in plant breeding are spurring on a new surge in production. Soybeans now rank fourth among Canada's principal crops in terms of acreage.

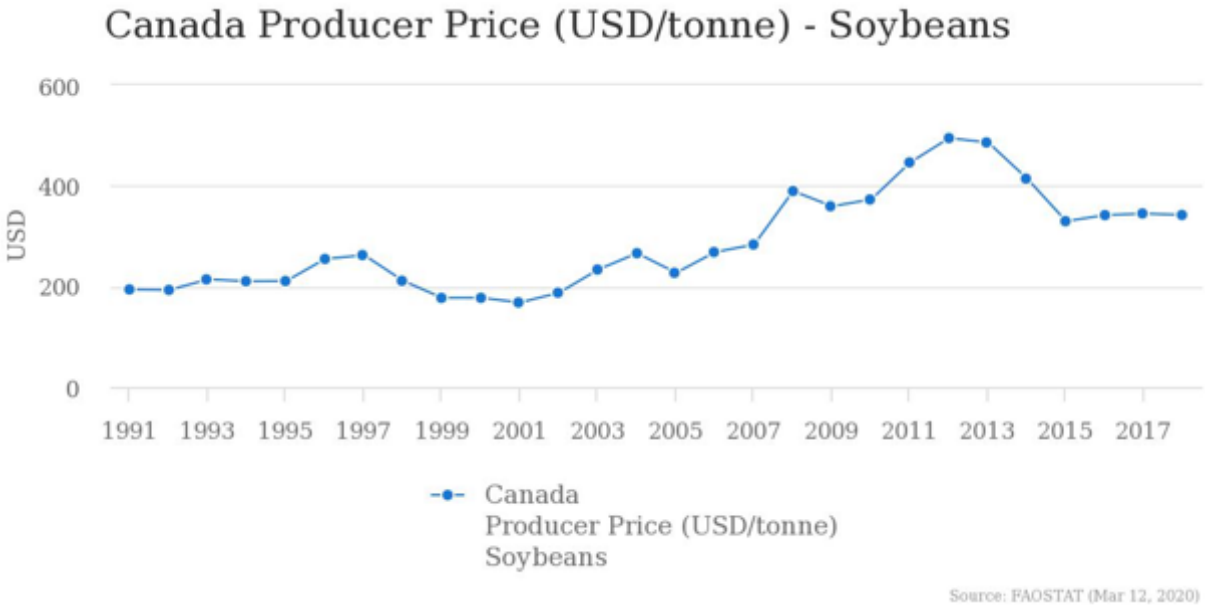
This growth has been driven by the development of new early-maturing soybean varieties that are expanding the boundaries of where the crop can thrive. Until the 1970s, almost all of Canada's soybeans were grown in southern Ontario. Today soybeans have become an important crop in Quebec and Manitoba, as well as parts of the Maritimes, southeast Saskatchewan and southern Alberta.





Canadian trade of soybeans with china has suffered the same fate as the US. Japan is now Canada's number one customer for soybeans.


List of importing markets for a product exported by Canada
Product: 12 Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder
Exported value, USD thousand
4,000,000
3,000,000
2,000,000
1,000,000
0
Japan
China
United States of America
Mexico
Pakistan
Countries
Exported value in 2015, USD thousand
Exported value in 2016, USD thousand
Exported value in 2017, USD thousand
Exported value in 2018, USD thousand
Exported value in 2019, USD thousand


Canada Producer Price (USD/tonne) - Soybeans
USD
600
400
200
0
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
Canada
Producer Price (USD/tonne)
Soybeans
Source: FAOSTAT (Mar 12, 2020)

Organic Soybeans:

Year	2010	2011	2012	2013	2014	2015	2016	2017
India					130,000	130,000	130,000	130,000
Russian Federation			512	41	41	7,085	49,336	70,399
United States of America	50,837	53,585	53,585	53,585	40,854	56,796	50,420	50,420
Togo	36,571		2,483	3,225	12,503	12,506	18,754	36,448
France	7,644	8,186	42,981	10,360	12,994	20,191	24,615	24,814
Canada	14,186	14,186	17,947	17,802	18,134	16,881	8,979	19,669
Austria	5,883	7,878	6,848	7,655	8,723	13,225	14,674	17,872
Romania	6,041	6,638			10,571	15,707	14,241	14,670
Benin			316	99	278	278	186	12,563
Argentina	10,692	9,541	9,377	7,499	9,471	11,418	10,256	10,526
Kazakhstan	6,528	6,528	9,394	9,394	9,394	9,394	9,394	9,762
Italy	4,854	5,057	4,493	3,887	5,727	7,426	8,354	9,207
Burkina Faso			189	189	1,137	1,137	1,137	8,112
Germany	1,000	1,200	1,400	2,000	2,400	2,500	3,500	4,100

In Canada, organic soybeans are not keeping pace with their conventional cousins. Thy are predominantly grown in ON and QC with small acreages in MB and SK. There are only a few organic seed crushers in Canada.

Export of organic soybeans are destined mostly for the US market, but there are enough shipments going to Japan and Taiwan to take notice.

The US import data matches the export data generate by the more detailed export data as reported by the western organic oilseed alliance. It suggests declining imports of organic soybeans to the United States.

Canada Exports to the World Organic Soybeans Calendar Year: 2017		
Partner Country	**CAD Dollars**	**Shares**
World	21,067,528	100.00
United States	16,116,683	76.50
Japan	3,001,842	14.25
Taiwan	771,740	3.66
Malaysia	432,106	2.05
Belgium	295,493	1.40

Canada Exports to the World Organic Soybeans Calendar Year: 2017		
Partner Country	**Quantity (Tonnes)**	**Shares**
World	21,966	100.00
United States	14,389	65.51
Japan	4,180	19.03
Taiwan	1,443	6.57
Malaysia	757	3.45
Belgium	491	2.24

1201900010	ORG SOYBEANS OTH						
Cumulative To Date Values in Thousands of dollars							
	2014	2015	2016	2017	2018	Jan - Nov 2018	Jan - Nov 2019
World Total	184,168	240,176	250,170	268,122	202,932	187,671	146,138
India	74,365	77,818	55,522	87,962	71,906	61,688	49,372
Argentina	14,183	26,055	34,122	54,932	26,341	22,863	38,249
Ukraine	16,608	71,856	19,961	3,514	27,677	27,677	22,216
Russia	254	2,903	4,057	796	2,552	2,353	11,759
Canada	16,996	19,027	15,296	12,229	8,696	7,381	9,803
Kazakhstan	7,522	0	0	14,441	44,654	44,654	7,408
Moldova	0	0	0	0	0	0	3,418

This does not however mean a decline in the demand for soy related products. There are no statistics of organic crush capacity in Canada or organic soybean oil or meal exports to the US, but anecdotal evidence is the following:

The rapid growth of U.S. organic livestock production has resulted in massive imports of soymeal, according to John Greig at Glacier Farm Media.

American organic soybean imports, especially as meal, continue to dwarf import of other organic crops.

In fact, if American farmers tried to grow that many soybeans to make into meal, it could disrupt the whole organic system, says Ryan Koory, senior analyst with Mercaris, an American organic market intelligence company.

Rapid growth in organic livestock production is driving the increase in soybean meal being imported into the United States. About 70 per cent of all soybean product imports to the U.S. is soymeal.

Organic livestock production is easier for large integrated farms to get into than crop production, so some of the largest producers of poultry in the U.S. are now raising organic chickens. They are buying most of their feed, and much of the protein in the ration, supplied by soybean meal, is coming from places like India.

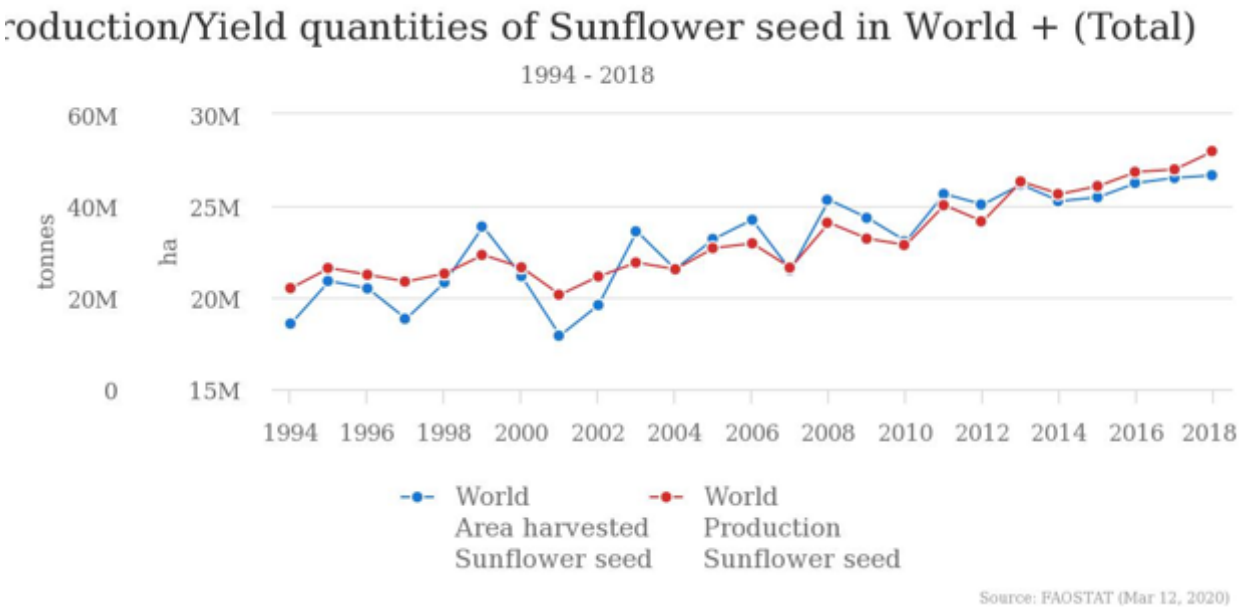
Organic premium:

Beans: 191% (feed), $ 25-$26 / bushel
Expeller pressed Oil: 209% [$.96 / pound ($2,116 / Metric ton)]
Meal: 230% [$1,000 - $1,100 / metric ton]

Recommendation: The growth and interested in organic soy is the growing need for soy, especially crush, as animal feed. This places soybeans firmly on the priority list for Island Organic Farmers. More understanding has to be had about the value chain and infrastructure necessary for Island crush operations to access this market.

SUNFLOWER

The sunflower market was valued at USD 7,020.5 million in 2018 and is estimated to reach a value of USD 9,971.3 million by 2024, registering a CAGR of 6.37% over the forecast period 2019-2024.



Top producers are Russia, the Ukraine and Argentina. Growth is mostly driven by consumers, in particular in India are increasingly turning toward sunflower oil, which has witnessed an increase in the consumption by about five-fold rise, over the past 15 years. Solvent Extractors' Association of India (SEA) noted a steady rise in sunflower oil imports, from 973,000 metric ton, in 2015-2016, to 1,516,000 metric ton, in 2017-2018. Their import needs are met by exports from the Ukraine and Russia.

	2010	2011	2012	2013	2014	2015	2016	2017
Ukraine [230]	6,771,500	8,670,500	8,387,100	11,050,480	10,133,750	11,181,120	13,626,890	12,235,520
Russian Federation [185]	5,344,821	9,062,022	7,494,657	9,842,356	8,475,346	9,280,296	11,010,197	10,481,188
Argentina [9]	2,232,034	3,671,748	3,340,520	3,104,420	2,063,410	3,158,290	3,000,367	3,546,707
Romania [183]	1,262,926	1,789,326	1,398,203	2,142,087	2,189,309	1,785,771	2,032,340	2,912,740
China [351]	2,298,000	2,313,000	2,322,655	2,423,241	2,492,000	2,698,113	2,609,669	2,579,636
Bulgaria [27]	1,536,321	1,439,702	1,387,780	1,974,425	2,010,668	1,699,228	1,873,677	2,056,987
Turkey [223]	1,320,000	1,335,000	1,370,000	1,523,000	1,637,900	1,680,700	1,670,716	1,964,385
Hungary [97]	969,718	1,374,784	1,316,545	1,484,370	1,597,250	1,556,976	1,875,412	1,892,509
France [68]	1,640,837	1,880,705	1,572,952	1,577,693	1,584,190	1,186,913	1,189,832	1,620,000
USA [231]	1,240,830	924,550	1,241,060	917,060	1,006,540	1,326,180	1,202,760	983,720
Canada [33]	**67,600**	**19,800**	**86,900**	**51,900**	**55,000**	**72,600**	**50,600**	**57,600**

Sunflower oil is gaining popularity in both conventional and organic markets because of its adaptability and the fact that it is not genetically engineered. It is used both as a culinary oil and by food processors. Large companies like Frito Lay, Kettle brand chips and Chipotle restaurants have made the switch to sunflower oil.

Sun-flower is lower in saturated fats than most vegetable oils. The development of NuSun varieties that are mid-level in oleic acid has spurred further interest in using sunflower oil in food preparation. NuSun oil has the primary advantage of being more stable than most vegetable oils and not needing to be hydrogenated to improve shelf life.

After the oil is extracted from the sunflower seed (the oil is about 40 to 45% of the seed by weight), the remaining seed material (meal) is fed to livestock. The nutrient value of sunflower meal depends primarily on the type of processing it has gone through: (1) whether the oil was mechanically pressed (expelled) from the seed, or solvent extracted (which removes more of the oil), and (2) the degree to which the hulls were removed prior to oil processing.

If part or all of the hulls remained on the seed prior to oil extraction, then the meal will have higher fiber content but lower protein and fat. Solvent extracted sunflower meal will have a protein percentage around 41% if dehulled, and around 28% if hulls are left on the seed.

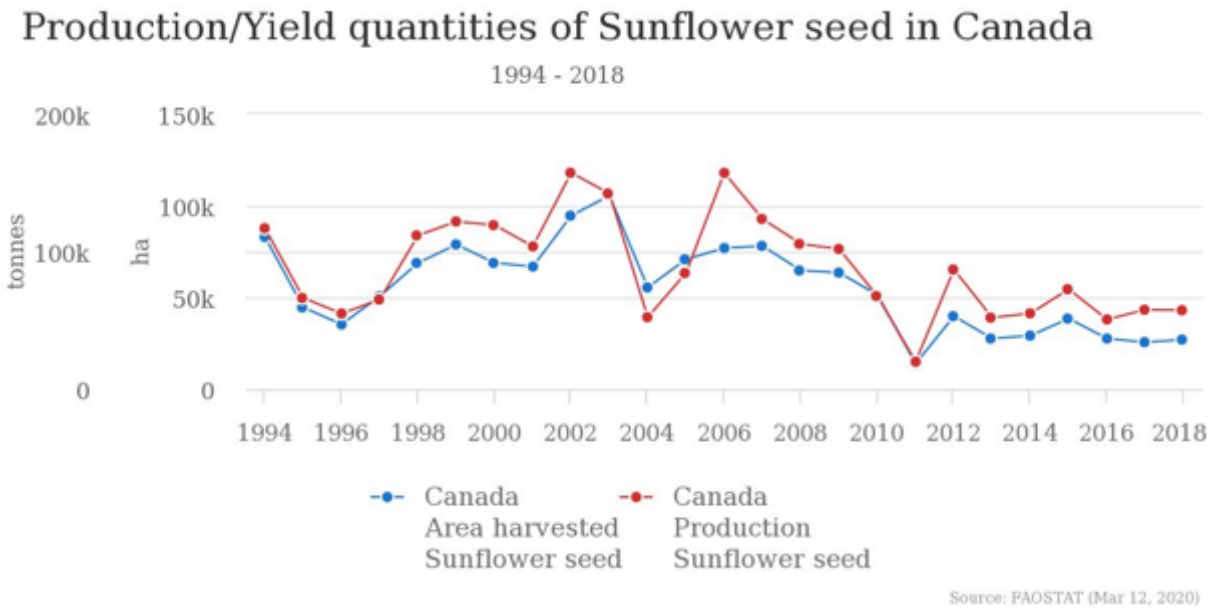
Fat content of solvent extracted meal is roughly 1%, and roughly 9% in mechanically pressed seed meal. Sunflower oilseed prices, including birdseed, follow soybean prices

Sunflower in Canada

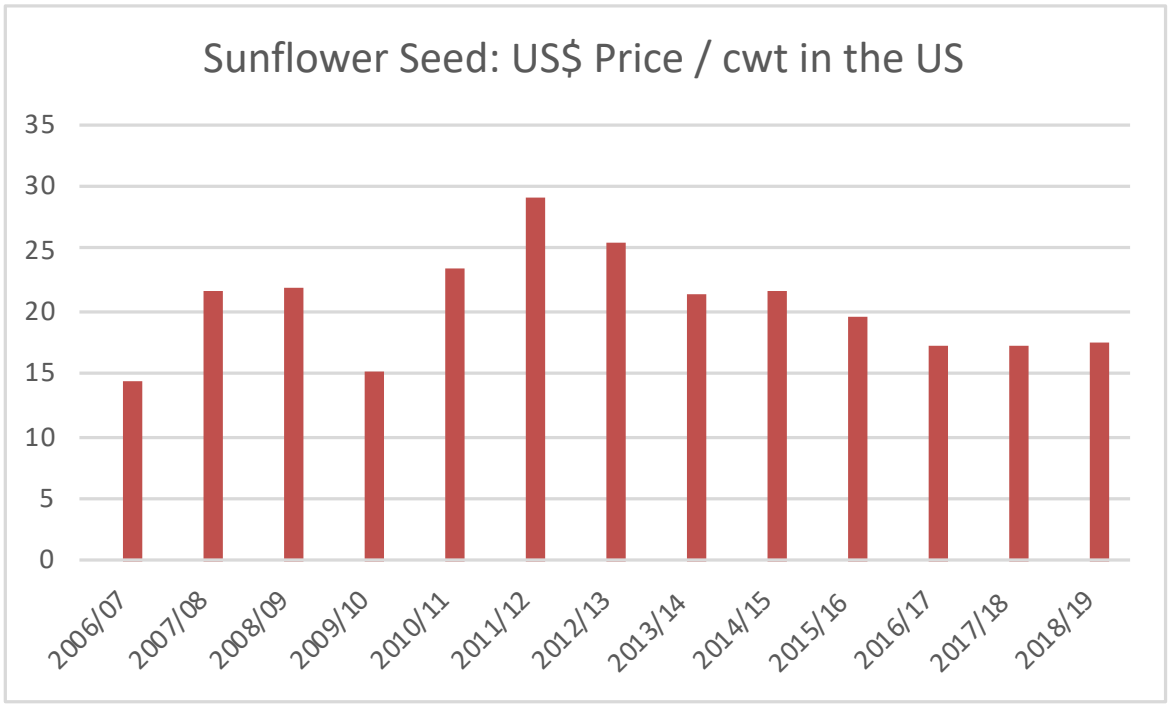
Approximately 90 percent grown in Manitoba with Increasing production in SE Saskatchewan, S. Alberta and S. Ontario. 65 % of Canadian production is for confection types.

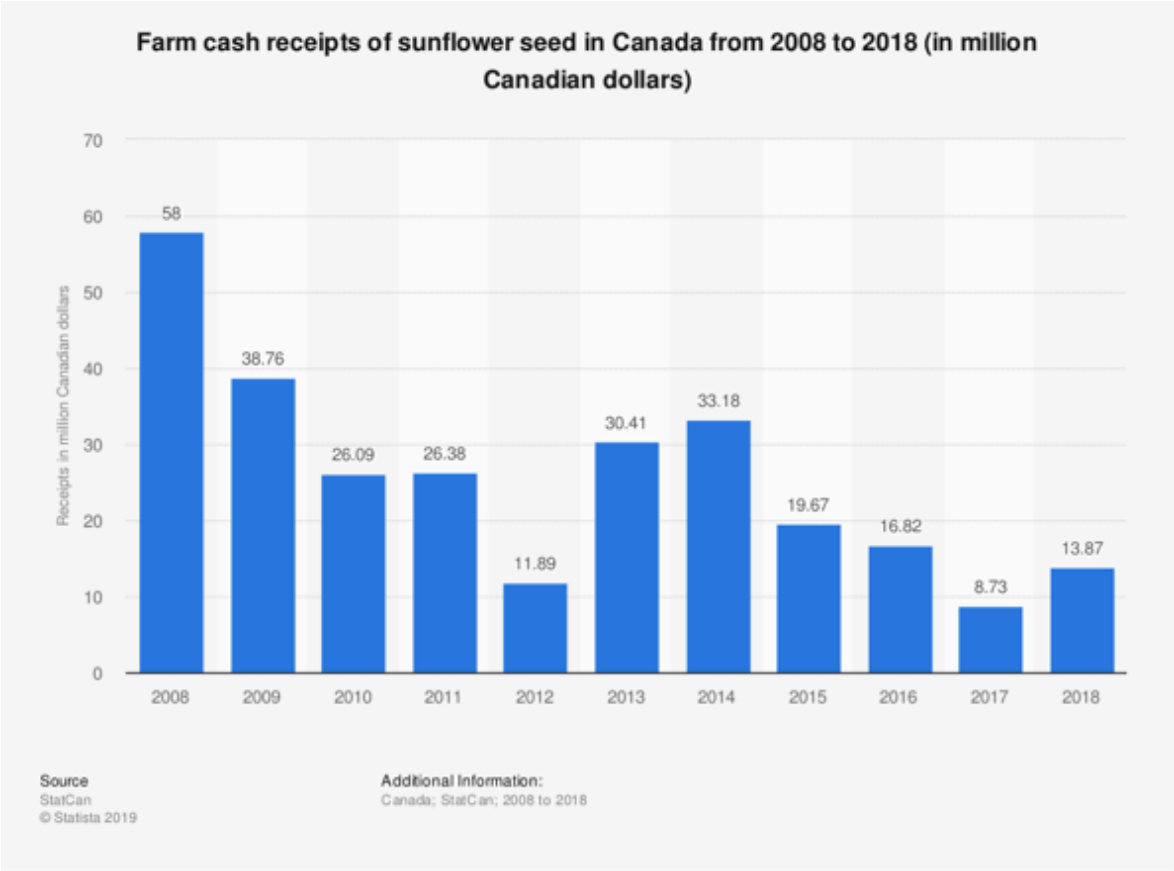
These are marketed primarily as roasted snack food in the shell or as dehulled seeds for the baking industry. Although significant percentage of market is domestic (North America), Canadian processors are increasingly accessing markets in Europe, the Middle East and Asia.

Oil sunflowers are used in both the bird food and the crushing industry for high quality oil. Although the bird food market is mostly the oilseed type, some of the smaller confection seeds are also used for bird seed.



This relative decline in production can be seen reflected in the price for sunflower seed.





Organic:

The sunflower segment in the oilseeds market is projected to be the fastest-growing segment as it is a rich source of oil, protein, calcium, carbohydrate, and ash. The seeds of sunflower are being used widely in the feed industry in the form of sunflower meal, which is increasingly used as a substitute to soybean meal as it is offered at higher prices.

There are 9 organic sunflower processors in Canada, of which all but two are based in Quebec. We do not know the value of this industry but it is guessed to be considerably lower than that of flax because organic sunflower oil is not seeing the same success that flaxseed oil has in export markets.

Leading organic chip processor, Neal Brothers Foods uses sunflower oil because of its clean light taste and the fact that it is stable at the high temperatures needed to process chips and popcorn.

Prices and premium:

Prices for confectionery sunflower run significantly higher than oilseed sunflower. Most of the confectionery sunflower is sold for snack food

Sunflower oil seed: Premium 150% ($713 / ton)

Sunflower oil US$ 776 / ton conventional

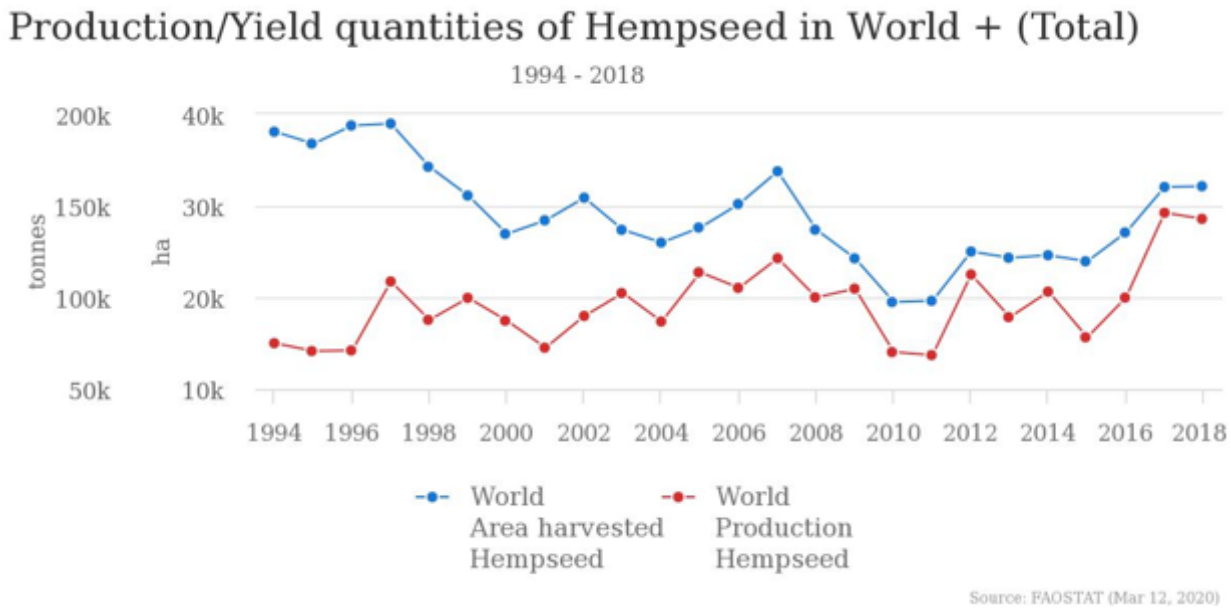
Sunflower is the only oilseed that pays premiums for oil content above 40%. Considering oil premiums that are offered at the crush plants on oil content above 40% at a rate of 2% price premium for each 1% of oil above 40%; this pushes a contract with 45% oil content gross return 10% higher per cwt. The AOG $18.50 contract increases to $20.35 and the cash $19.50 contract moves up to $21.45

Recommendation:

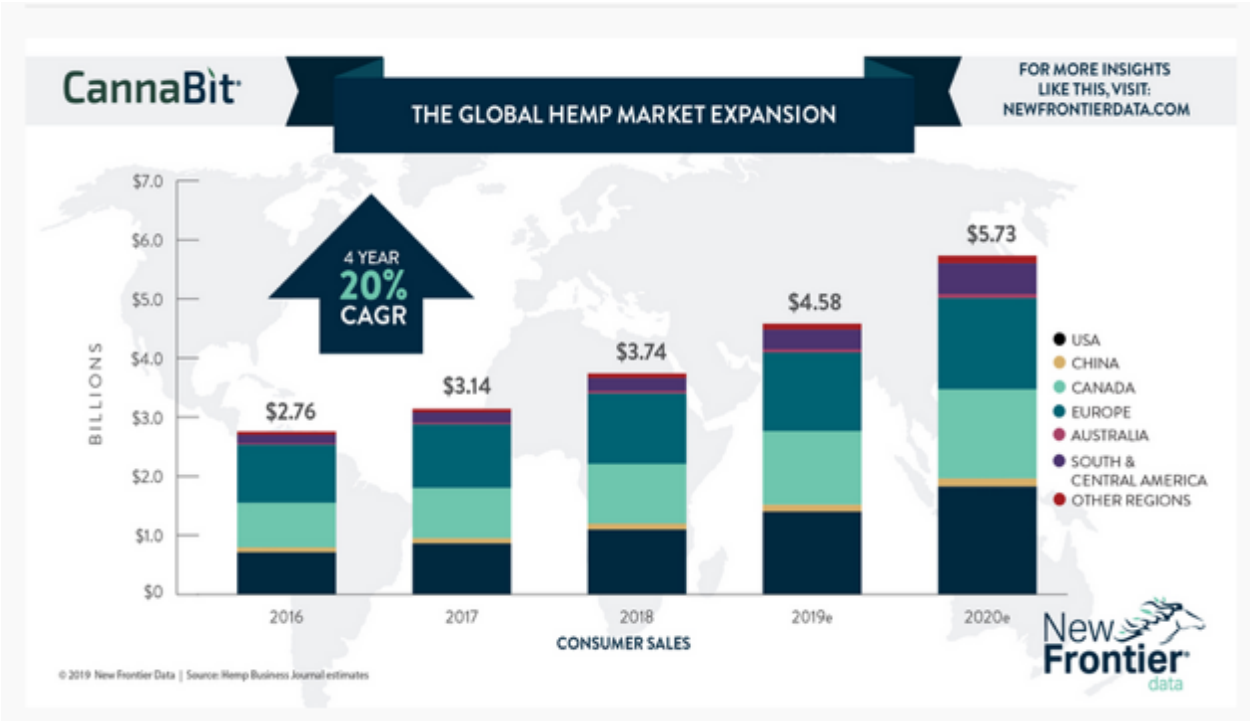
There are specialty markets to be had for organic sunflower seed, but markets are not as open and flexible than those for canola or soy. Aside from the challenges connected to finding the right variety to grow on PEI, obvious buyers did not emerge from our research.

HEMPSEED

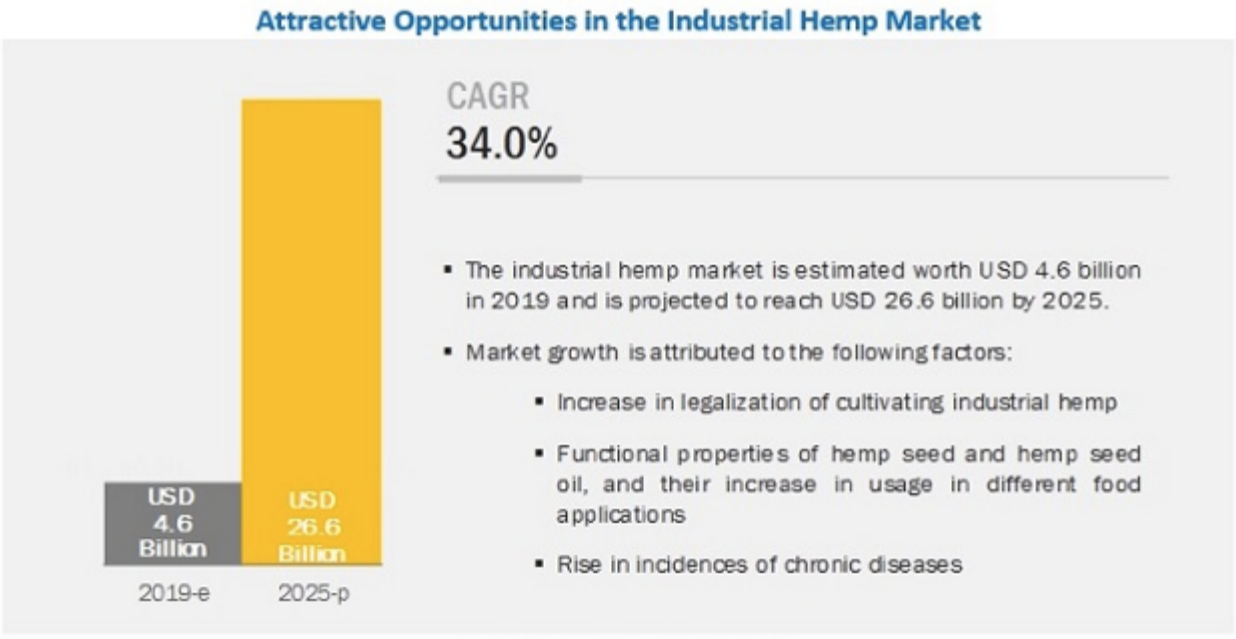
Hemp has always been touted as a plant with great potential. Since the 90's the crop has seen steady growth, but this growth has now accelerated dramatically.



Growth in the last 5 years has been 20% annually and this is projected to continue in the near future.



The global industrial hemp market size is expected to reach USD 15.26 billion by 2027, exhibiting a revenue based CAGR of 15.8% over the forecast period, according to a new report published by Grand View Research, Inc. Other estimates are more aggressive.



e - Estimated; p - Projected

Source: Secondary Research, Primary Interviews, Industry Journals, Related Research Publications, Press Releases, and MarketsandMarkets Analysis

Factors, such as rising awareness regarding the dietary advantages of hempseed and oil, coupled with growing demand from the cosmetics and personal care industries for production of soaps, shampoo, bath gels, and other such products is expected to drive the growth. In addition, use of hemp oil in hand and body lotions and UV skin protectors owing to the high and well-balanced fatty acid content of hemp, is expected to surge the demand.

On the fiber side, growing preference for eco-friendly products in thermal insulation, coupled with rising use of the product as fiberglass alternative is expected to drive the growth.

Rising consumer preference for green buildings owing to increasing environment pollution is expected to drive the demand for hemp-based construction materials in the forthcoming years. In addition, rising consumption of hempcretes-a concrete made from shives and lime-in Europe is expected to further propel the demand for industrial hemp over the forecast period.

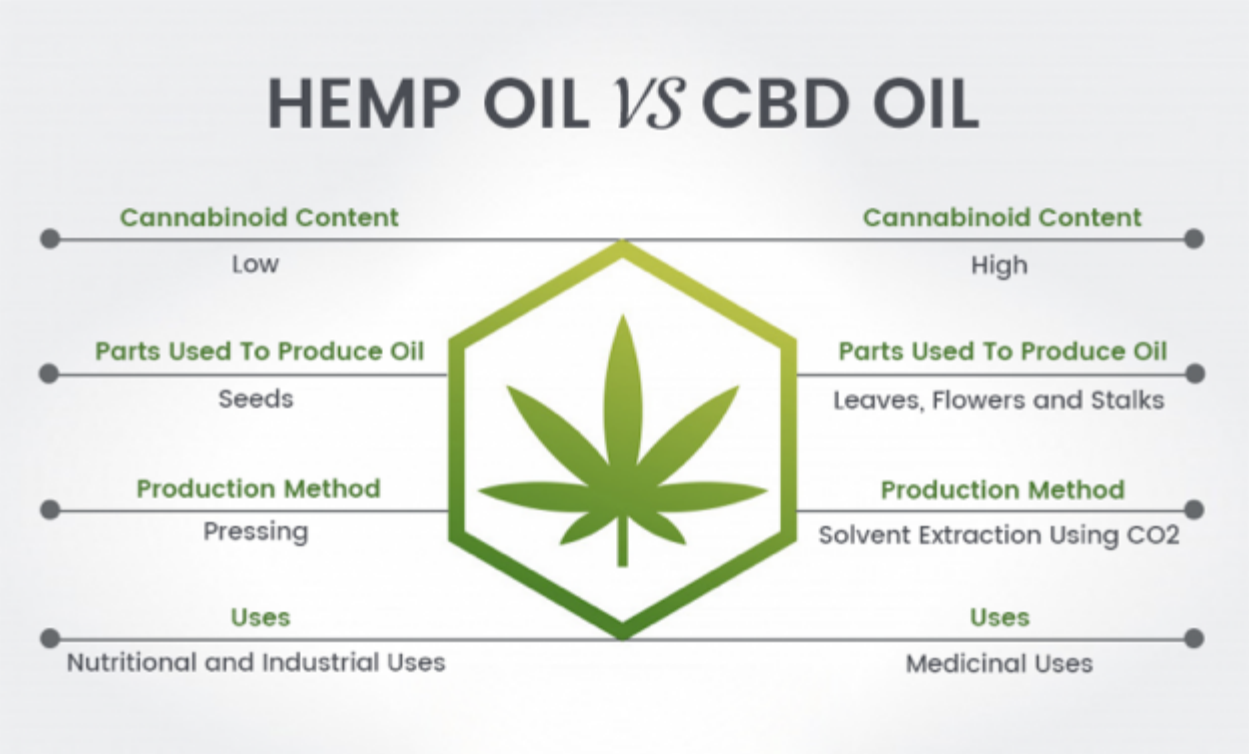
The market growth is expected to be driven by the factors, such as population growth, coupled with rising per capita disposable income leading to an increased demand for high-quality cosmetics and personal care products. In addition, rise in application scope for hemp in automotive industry is expected to drive the growth of the industrial hemp market.

The great versatility of the plant, including its relation to the Marihuana plant explains some of the confusion around what markets we are actually talking about:

The hemp fiber of industrial hemp accounted for approximately 24% of the share in the global industrial hemp market in 2018 owing to expansion in use of industrial hemp across various industries such as construction, animal bedding, agriculture, furniture, and automobile. Hemp fibre markets are limited in North America, primarily due to the lack of supply. There is an established market for hemp hurds or pellets as bedding materials for pets and horses.

Rise in the awareness about the benefits of hemp fibers as a renewable source for the production of biofuels and bioplastics, which expected to enhance the demand and sales in the global market.

The hemp seed market is more mature and here the growth rates are closer to those of other oil seeds. CBD hemp oil on the other hand has seen some wild fluctuations lately. Studies suggest that cannabidiol (CBD), a compound found in the leaves and flowers of industrial hemp plants, can provide pain relief, has anti-inflammatory properties and may help combat anxiety.

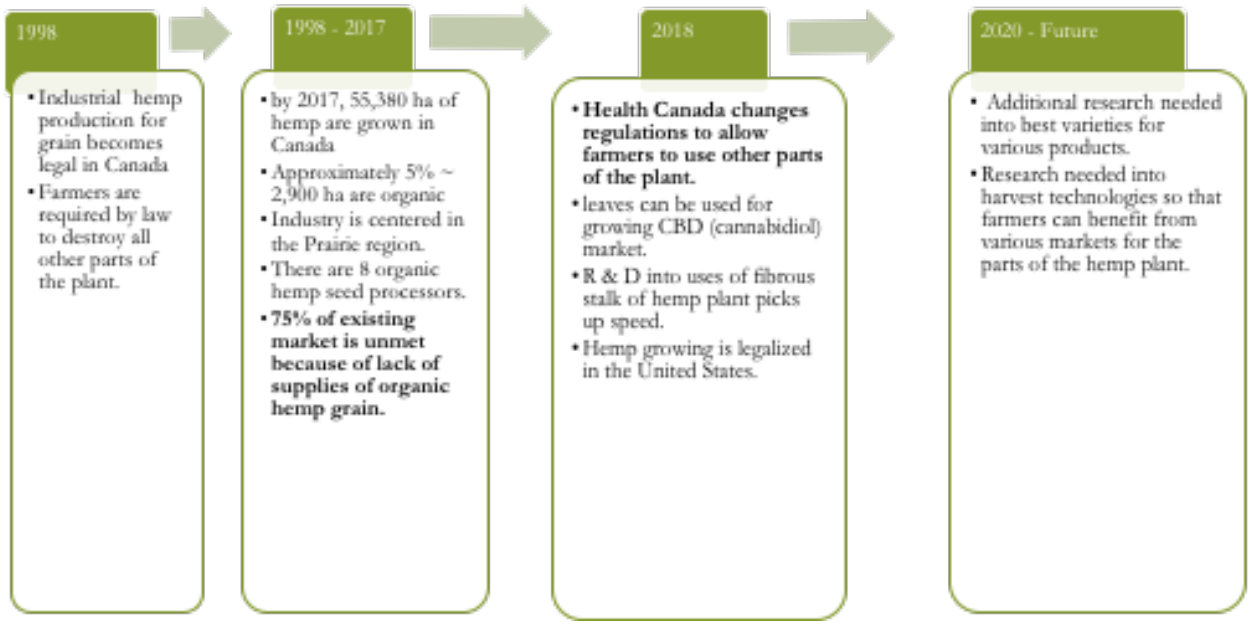


Hemp grain and hemp oil processing are dominated by Canadian enterprises, although the industry is young and evolving rapidly with new players getting in the game.

The largest organic hemp processor in Canada is Fresh Hemp Foods which is an amalgamation of two companies: Manitoba Harvest and Hemp Oil Canada. The company was acquired from U.S.-based Compass Foods for $419 M in 2019 by BC cannabis company Tilray Inc. In the Spring of 2019, Fresh Hemp Foods introduced a new line of CBD products in the U.S. market.

Hemp Production Services based in SK (hemp processing is in MB) and North American Hemp & Grain Co. based in BC provide hemp oil only for the wholesale market.

The market in Canada has evolved rapidly in the last few years as the regulatory framework regarding cannabis has evolved.



Industrial hemp commercial licences and registries by province

Province	Total licences and registries [1]	Licences and registries for cultivation
Alberta	335	184 (55%)
British Columbia	61	31 (51%)
Manitoba	202	99 (49%)
New Brunswick	41	33 (80%)
Newfoundland and Labrador	1	0 (0%)
Nova Scotia	10	5 (50%)
Ontario	111	75 (68%)
Prince Edward Island	21	16 (76%)
Quebec	150	106 (71%)
Saskatchewan	294	162 (55%)
Total	**1,226**	**711 (58%)**

Organic:

Hemp is well-suited to the organic market in the fact that it is a very fast, aggressive-growing plant that can outcompete weeds. But at the same time, it is a high nutrient user, which can make it a challenge to grow it in a tight rotation.

Organic Insider, an influential industry newsletter, said this about CBD in November, 2018: Organic Brands Need to be Prepared for a Massive Emerging Trend: CBD is set to become an ubiquitous ingredient. Cannabidiol, also known as CBD, is poised to hit the organic market in a very serious

way, and brands do not want to be left behind. It is expected to become a $2.1 billion market by 2020.

Farmers in Kentucky have organized themselves in an Organic Hemp Cooperative. In Kentucky, Many of the farmers once made their living growing tobacco.

Even of the traditional side, markets look promising. Unprocessed hempseed is priced between $0.60 and $0.75 per pound for conventional seed or between $1.20 and $1.80 per pound for organic seed. (circa 2017 in Manitoba)

Organic Hulled and packaged hempseed sells for around $12.00 per pound (e.g., hemp hearts). (Man. 2017)

Organic Hemp in Canada: There are 8 organic hemp seed processors. According to the regulator, Health Canada, there were 55,380 ha of hemp grain grown in Canada in 2017, primarily in the Prairie region. In 2016, organic hemp was licenced on 2,844 ha, 5% of total acreage. According to industry players, the market for organic represents about 80% of the total hemp grain market, yet production is only about 5%. This means that the existing organic market is 75% unmet due to challenges in procuring the supply of organic hemp grain."

August 2019: Canada's hemp industry has changed. Not overnight, but close. For years, hemp farmers have grown the crop for grain and partly for hemp fibres. This summer the majority of Canadian farmers are growing hemp to produce CBD.

The shift from hemp grain to hemp for CBD is mostly because of economics. A 30 ml bottle of CBD oil, the size of a bottle of eye drops, can retail for $40 to $200.

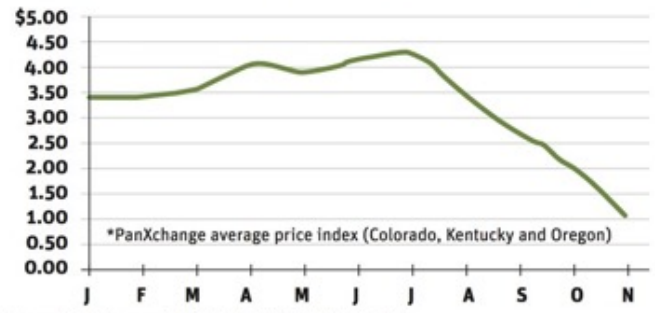
In North America's hemp industry, 2019 may be remembered as the year that the CBD craze hit its peak. After producing hemp mostly for grain, for two decades, Canadian farmers leapt into the hemp CBD business. There is no official acreage data yet, but hemp for CBD acres likely exceeded hemp for grain and fibre in 2019. Too many producers grew hemp for CBD on speculation, or signed production contracts with unreliable buyers.

The result was predictable:

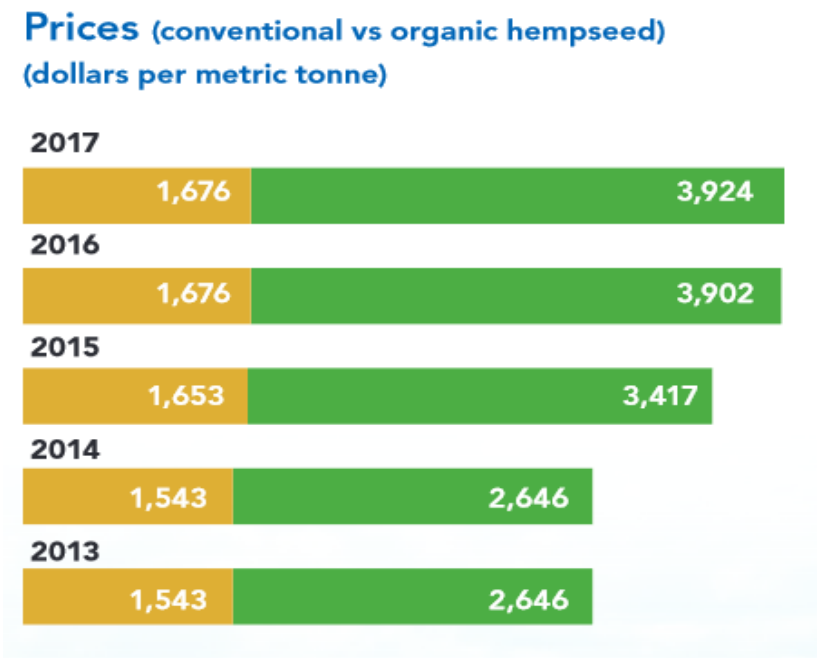
HEMP PRICES TUMBLE

The price of biomass from hemp flowers crashed in 2019. In July, the average price of biomass was about US$4 per % CBD content/lb. By November, the price had plummeted to $1. The price drop is in part from an increase in hemp production and the decline in retail prices for CBD products.

2019 midpoint* biomass price, $US per % CBD content/lb.



Source: PanXchange | MICHELLE HOULDEN GRAPHIC



In 2018, conventional hemp prices have dropped about 20 cents this year, to around 55 cents/lb. While conventional prices have dropped, organic hemp prices are still higher, at around $1.80-$1.85/lb.

In Quebec, organic Hempseed was traded at the following prices: 2017/18: $3,010; 2018/19: $3,015; 2019/20: $2,939

On PEI:

Phillip Jennings and five other P.E.I. farmers are growing 300 acres of hemp under contract to Dosecann, an extraction facility in Charlottetown. Jennings also grows 750 acres of hemp in the United States.

Tyler Macdonald of Red Earth Cannabis has also been talking to Health Canada about hemp with higher CBD. His company is building an extraction lab for CBD in Brackley, P.E.I. "We'd love to see a new approved cultivar for hemp at least 10-per-cent-plus CBD concentration," Macdonald said. "It's much better for the processor. More oil content and more quality of product as well."

Recommendation:

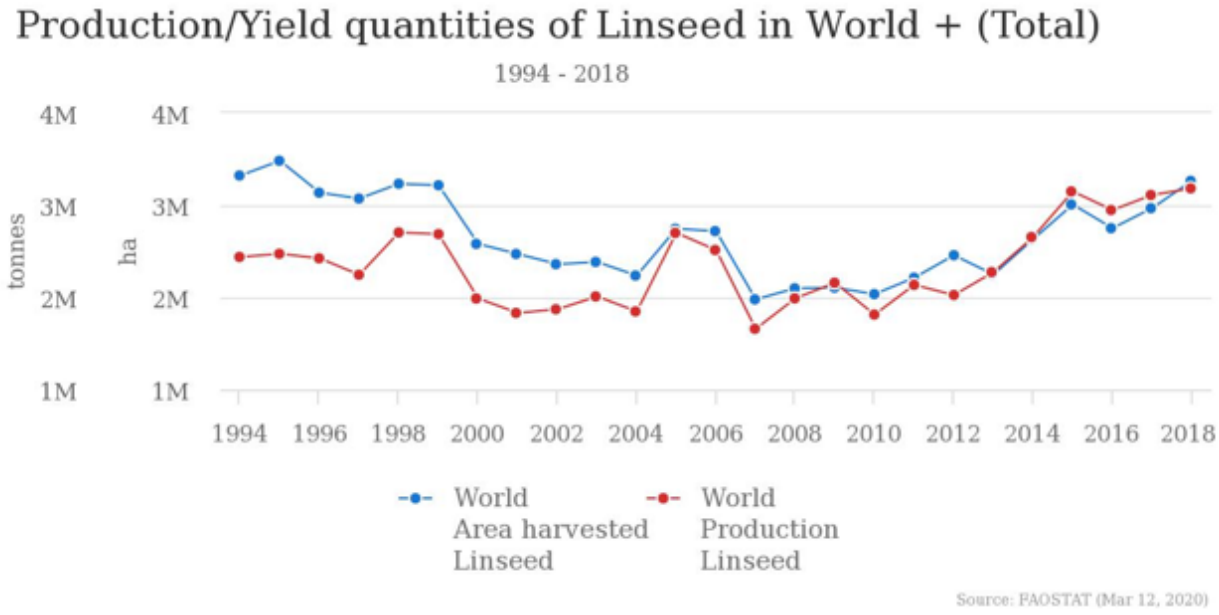
At those prices, the price to weight ratio is very high. This means an opportunity for PEI. Predictably, when that happens, “irrational exuberance” tends to cloud judgements, but this does not diminish the opportunity for PEI organic farmers. Hemp is not easy to grow and the regulations around it can be daunting but given the opportunities this should be a long-term project for PEI organic farmers.

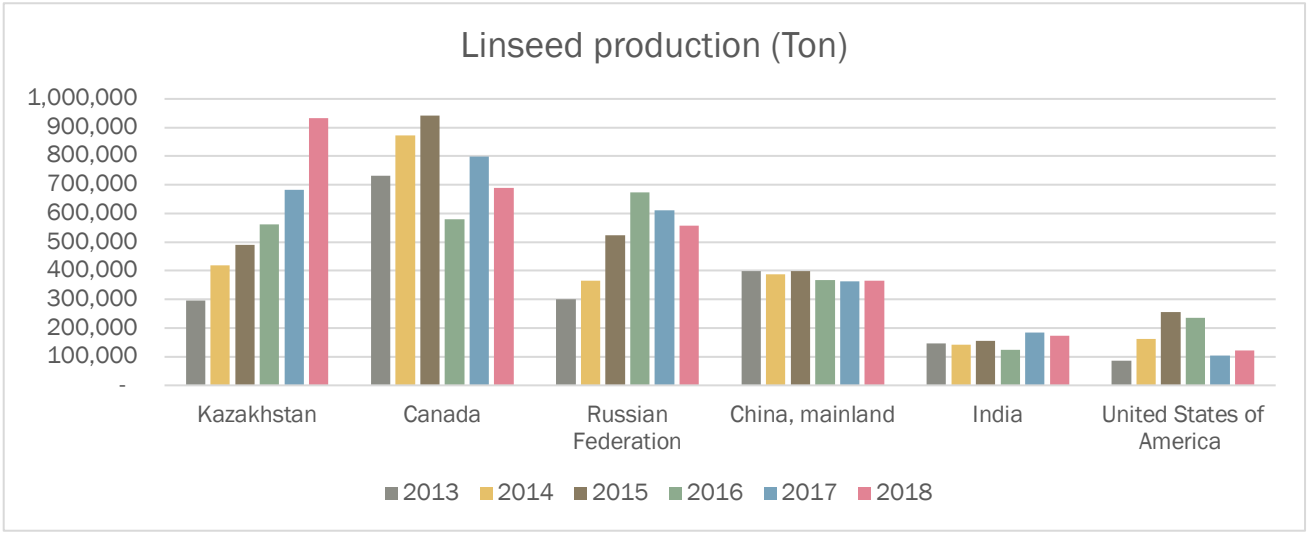
FLAX

The global market for flaxseeds is projected to grow with a healthy CAGR of 11.8% over the forecast period (2019-2024). In the global market, flax seeds can be used for crushing, which results in oil and flax meal production. It can be also used as whole seeds form, roasted form, seeds sprouted and grounded seeds. This flax seed oil and meal are used in the production of human and animal food products. Flax oil is widely used in the industry for linoleum production, varnish, and ink production.

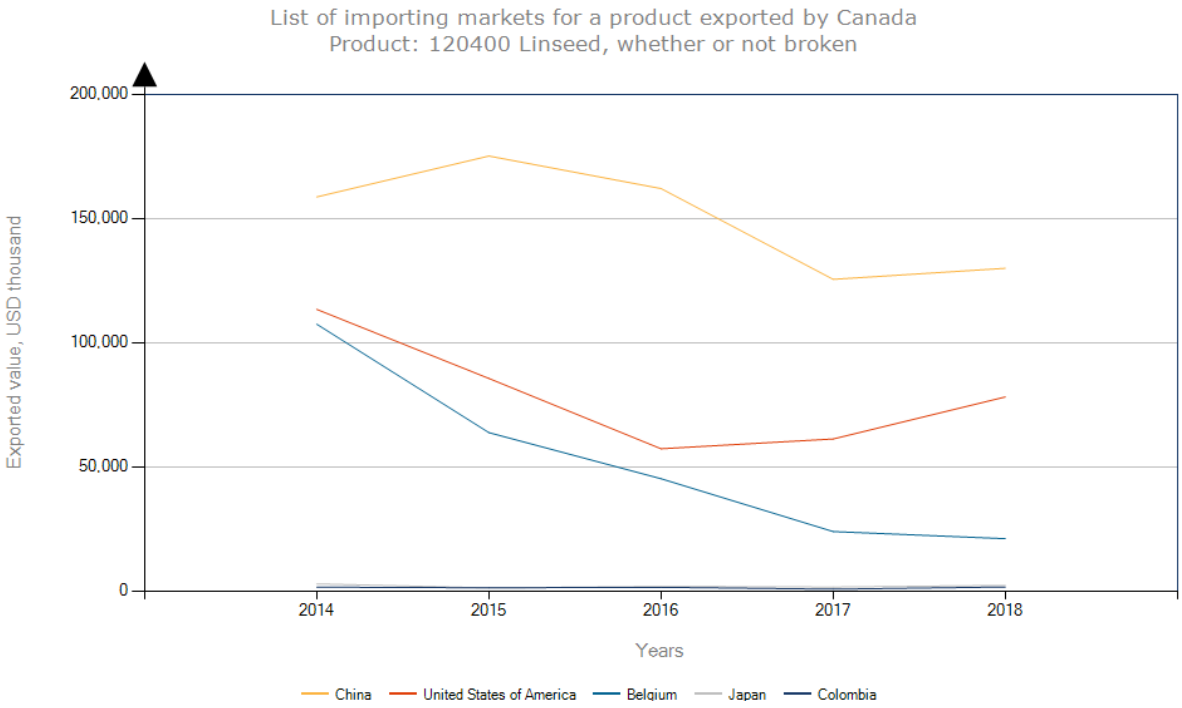
Increasing consumer preference for healthy diets, increasing usage in animal feed and for industrial uses and the fact that flaxseeds are a cheaper alternative to chia seeds and quinoa seeds are the factors expected to drive the market.

The increasing risks of side effects of flaxseed consumption and the high susceptibility of the crop to pests and weeds are expected to restrain the market growth.



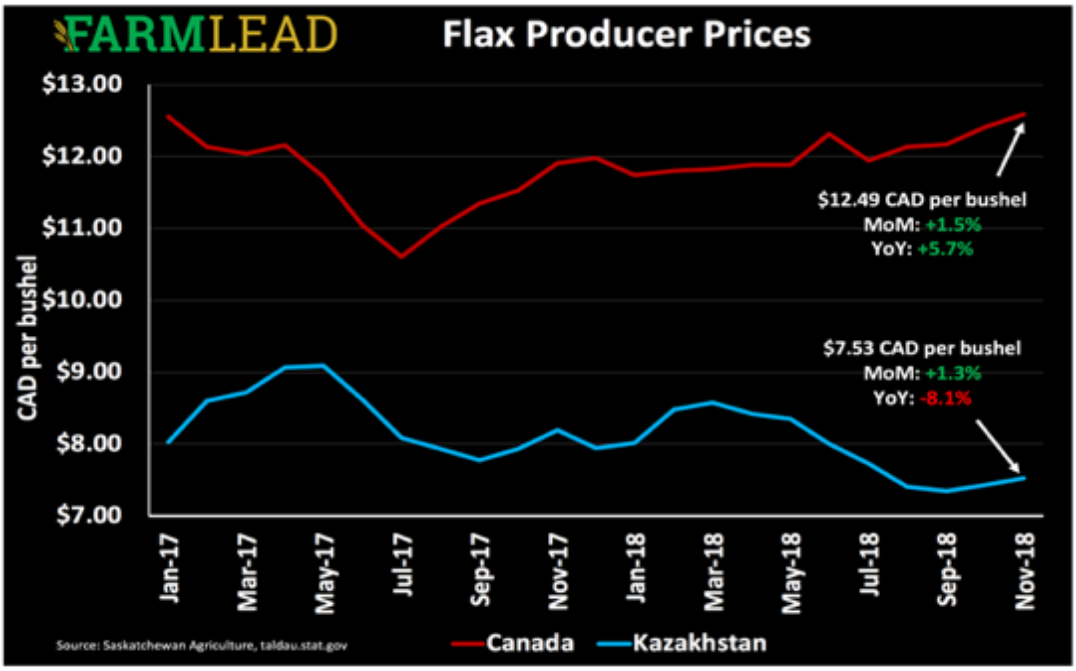


Kazakhstan is rapidly establishing itself as a top producer of Linseed worldwide. This also reflects in the export and import numbers.



Kazakhstan has surpassed Canada in flax production and is drawing even in exports. China's appetite for Canadian flax; the deepening relations between Kazakhstan and China could foreshadow a gradual decline of Canadian flax in international markets.

The next graph easily explains the reason for this: Kazakhstan can compete on price.



Organic

While conventional flax has been losing acreage for many years to other crops, organic flax continues to be a key part of Prairie organic crop rotations, along with cereals and oilseeds.

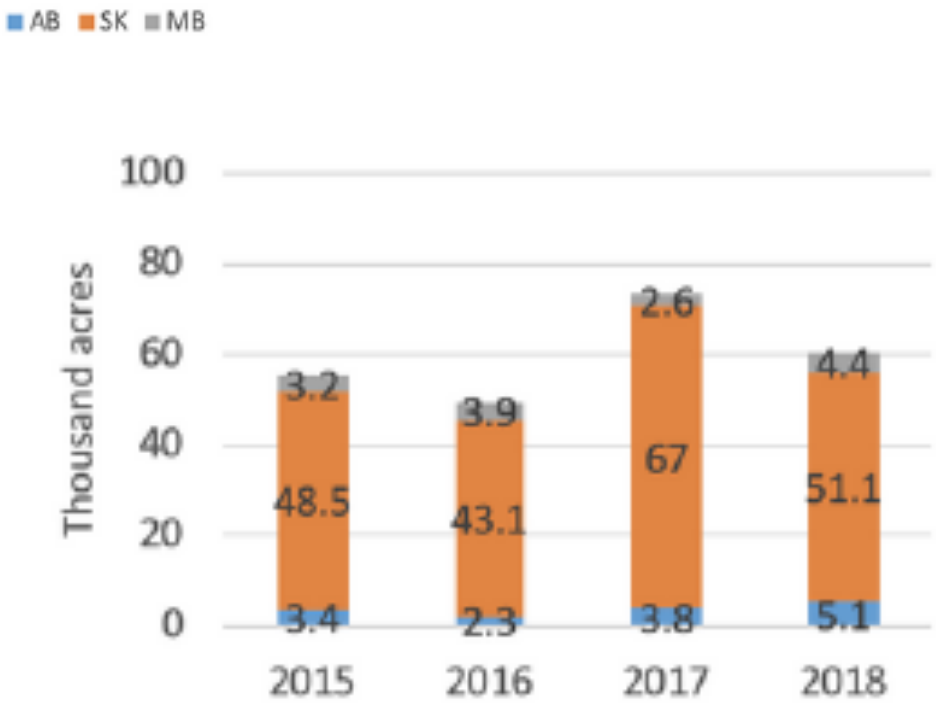
The market price has also been consistently high since 2014. In Manitoba, organic flax now makes up 7% of the total flax harvest - a high percentage compared to other field crops.

In 2018, just over 61,000 ac of organic flaxseed was grown in Canada, with 99% produced in the Prairie region.

	AB	SK	MB	Prairie Total	Cdn Total	% Cdn Total
Flax	5,157	51,104	4,384	60,645	61,363	99%
Mustard	1,595	11,977	486	14,058	14,866	95%
Other oilseeds*	1,010	1,241	916	3,168	56,575	6%
OILSEED TOTAL	7,762	64,321	5,787	77,870	132,804	59%

Source: Diana Zeidan, Canada Organic Trade Association

This number has been more or less stable.



Source: Diana Zeidan, Canada Organic Trade Association

Organic Flaxseed is also being exported with the bulk of exports going the US, but the overall volume is low. Overall numbers exported to the US have not grown substantially in the last 4 years.

Canada Exports to the World Organic Linseed/Flaxseed Calendar Year: 2017		
Partner Country	CAD Dollars	Shares
World	2,370,700	100.00
United States	2,165,322	91.34
Hong Kong	73,061	3.08
Taiwan	68,500	2.89
Germany	57,815	2.44
Guatemala	4,462	0.19

Canada Exports to the World Organic Linseed/Flaxseed Calendar Year: 2017		
Partner Country	Quantity (Tonnes)	Shares
World	1,544	100.00
United States	1,355	87.75
Hong Kong	68	4.40
Taiwan	61	3.93
Germany	54	3.50
Guatemala	5	0.31

Organic Flaxseed - Thousands of US$

US Imports - US Census Bureau Trade Data

Partner	2014 Value	2015 Value	2016 Value	2017 Value	2018 Value	Jan - Nov 2018 Value	Jan - Nov 2019 Value
World Total	5,544	6,872	9,012	7,078	5,981	5,723	4,880
Canada	2,793	3,036	4,863	1,634	2,382	2,321	2,328
India	595	1,798	40	50	735	735	823
Argentina	491	0	2,420	2,888	1,959	1,762	679
Kazakhstan	0	136	0	244	0	0	644
Uruguay	0	0	124	1,267	757	757	345
Netherlands	1,664	1,902	1,140	0	0	0	2
China	0	0	0	134	34	34	0
Russia	0	0	0	862	115	115	0
Grand Total	5,544	6,872	9,012	7,078	5,981	5,723	4,880

The largest oilseed crushing plant in Montana is scheduled to open early next year. The plant, known as Montana Specialty Mills, is expected to crush organic canola, non-genetically modified canola and flax, grown by farmers in Western Canada and the northern U.S. Plains. “It will be operational the first of the year 2020,” said Dave Loboy, president of Montana Specialty Mills, located in Great Falls, Mont. The new facility can handle 10,000 bushels per day, or 225 tonnes of oilseeds daily. That’s about 75,000 tonnes per year.

Organic premium:

Price November 2019: $1,299 / tonne
Organic premium: 236%
Cost of production (Manitoba): $495.25 / acre
Yield / acre: 15.5 bushel

On PEI:

Wepoint Ltd is a new bio-tech company which is located at Prince Edward Province Island, Canada. It produced flaxseed oil product and flaxseed meal product by cold pressing technique. All the flaxseeds were from the prairie provinces, the organic feature of product is widely accepted by Canadian customers.

WEPOINT LTD
Address: 261 Kinlock Rd, Stratford, PEI C1B 0B3
Headquarters: 902-316-0372
BC province : 778-868-1536
E-mail: fushengl001@gmail.com

Recommendation:

Because of the high organic premium and the high value to weight ratio, Flaxseed will be part of the priority list for PEI organic farmers. One particular aspect of flaxseed is the high omega 3 content. This makes it an important ingredient for both human and animal nutrition.

MUSTARD

Mustard seed is an important ingredient used in many regional foods as it is rich in minerals, vitamins, phytonutrients, anti-oxidants. The mustard seed is widely cultivated crop across the globe, especially in Asia. It is generally found in round shape and in three different colors such as black, brown, and yellow.

Growing demand for mustard seed and mustard oil in cooking, owing to its various properties is a major factor expected to drive growth revenue in the global market in the next 10 years. Changing consumer preferences and taste is another factor expected to support growth of the target market. Mustard seed is a good source of B-complex vitamins such as niacin, folates, riboflavin, thiamin, pantothenic acid, and others. Mustard seed oil is also used to relieve arthritis pain, muscle pain, and other body ailments. In addition, this oil helps to prevent cancer risk and asthma. These are among some factors expected to fuel growth of the target market to a certain extent.

Among the product type segments, the black mustard seeds segment is expected to account for major revenue share contribution in the global market, due to their antimicrobial properties and its wide use in pickles, chutneys, and others.

The Europe mustard seed market is expected to account for significant revenue share and is projected to maintain its dominance in the next 10 years, owing to growing demand for mustard paste and mustard oil in food preparation in countries in the region. The Asia Pacific mustard seed market is expected to register moderate growth in terms of revenue in the near future. Rising population, coupled with growing demand for mustard seed, and high production of mustard seed in countries are factors expected to drive the Asia Pacific mustard seed market. North America market is projected to grow at a moderate rate in the next coming years, owing to increasing demand for mustard seeds in salad dressing.

Uses for Mustard

Consumer Ready Foods	Mustard as filler Mustard as protein enhancer Mustard as a spice or flavour agent
Spices and Ingredients	Ground mustard powder and flour Mustard as ingredient for sauces and condiments Mustard as oil
Condiments	Prepared mustard of several varieties (yellow, Dijon, etc.) Mayonnaise and salad dressings Barbeque sauces and rubs
Bangladesh	Manufacture mustard oil and oil cakes for use in livestock food and fish food

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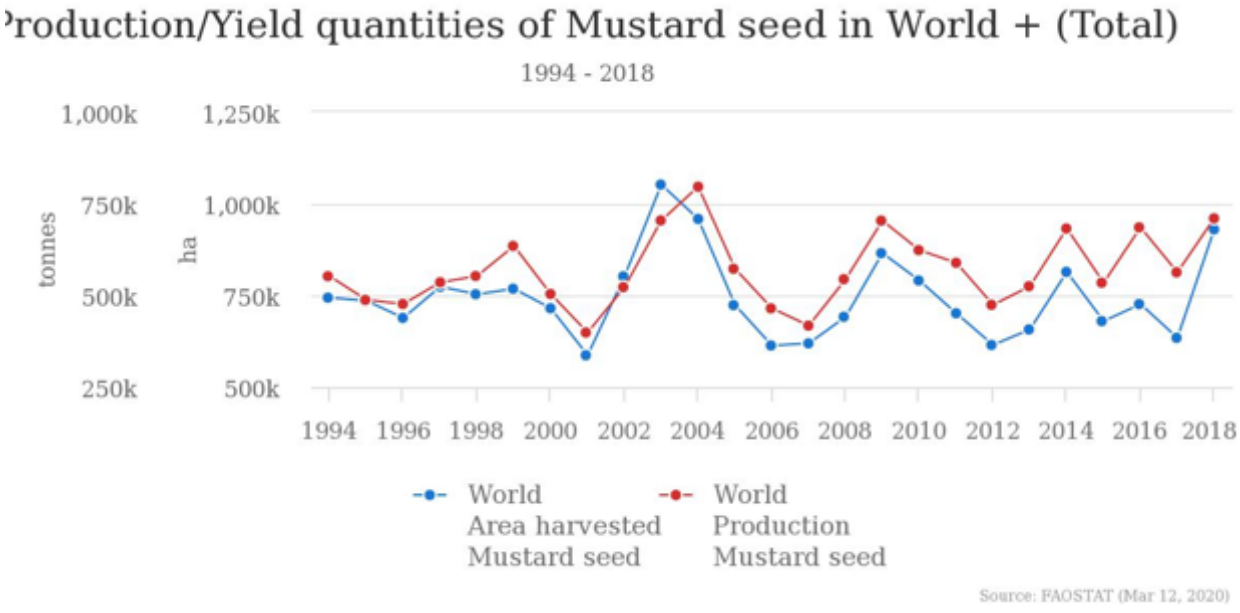
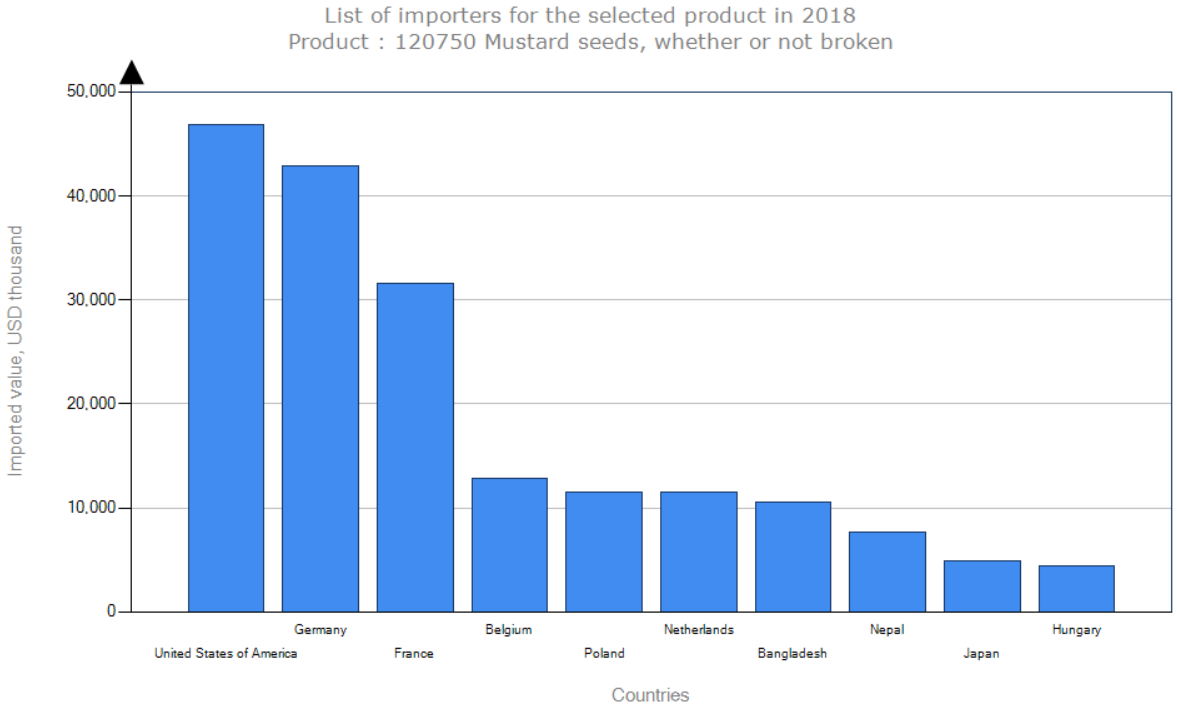
Mustard is in that sense a traditional crop grown for traditional uses. Globally, there is little growth in the sector.



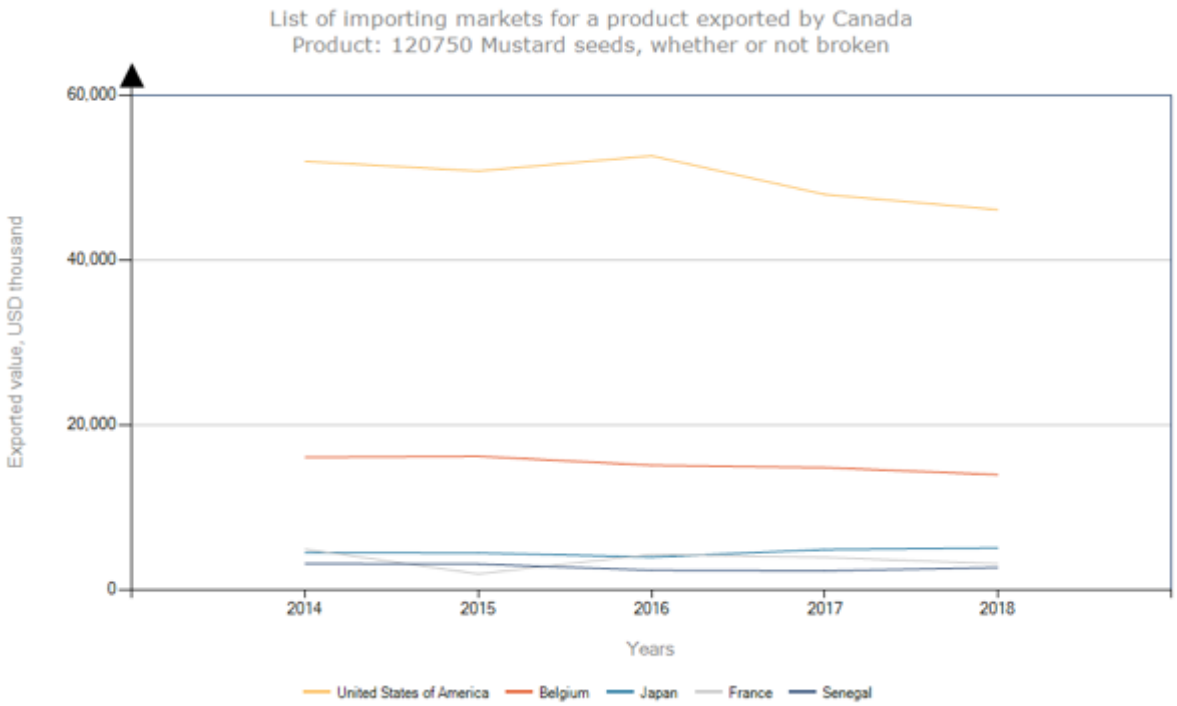
Market leaders in Mustard production are Nepal, Canada and Russia.

	2010	2011	2012	2013	2014	2015	2016	2017
Nepal	155,050	176,186	145,173	142,920	152,263	154,105	171,499	159,710
Canada	182,000	130,000	118,600	154,500	198,000	123,400	235,600	121,600
Russian Federation	36,408	81,676	38,341	50,414	93,159	66,710	72,993	98,319
Myanmar	87,100	60,500	51,100	50,500	48,500	48,600	48,384	42,760
Ukraine	64,400	30,300	30,980	30,170	79,440	43,550	35,580	31,000
United States of America	18,990	7,100	14,160	16,660	13,160	12,210	43,670	27,330
China	18,471	18,363	17,778	17,905	18,032	18,160	18,287	18,415

Top importers for mustard are the US, Germany and France

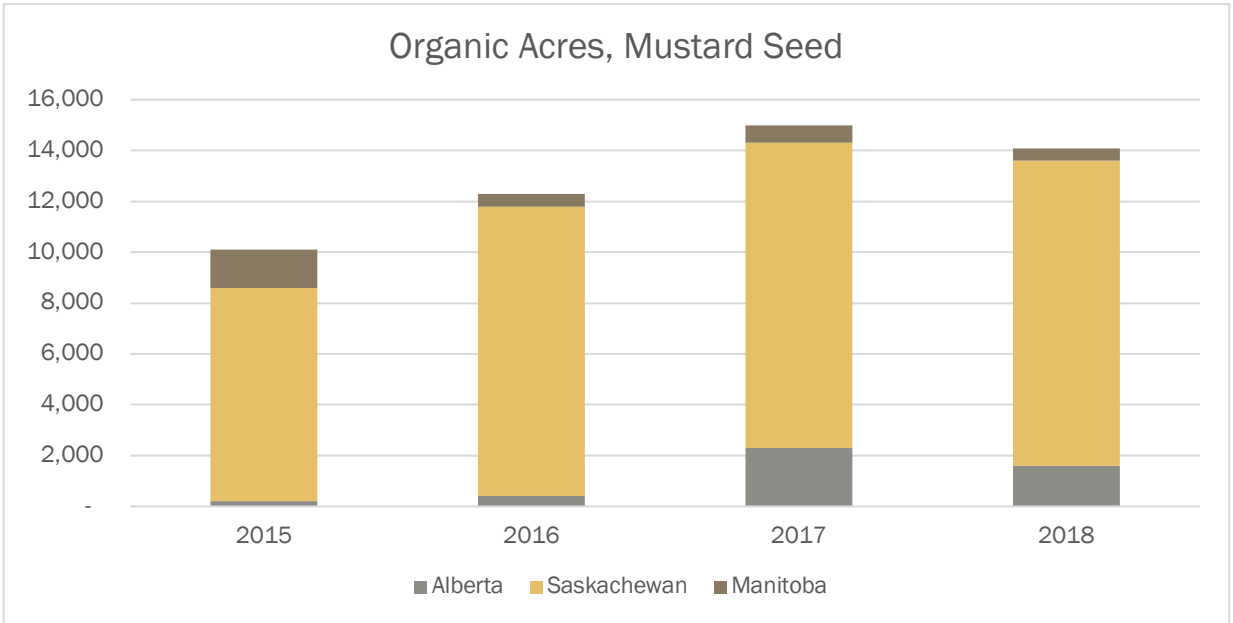


Predictably, Canadian exports heading mostly to the US



Organic:

Organic acreage for mustard is on the increase in Canada, with Western Canada taking the lion's share of 95%.



Many of the key players in Canadian retail for organic condiments are U.S. multi-nationals.

Kraft Heinz Co. has the largest market share of the overall organic category with 13.7% in 2017 (Table 4.27). The company is also the dominant player in the overall category with an 11.2% market share in 2016.

Kraft Heinz has become increasingly interested in the organic market. In 2018, the company announced that it was launching a new business called Springboard Brands. The goal of the new company is to identify and nurture emerging natural and organic food products."

"U.S. company, Primal Kitchen has introduced an unsweetened ketchup. It contains only tomato concentrate, balsamic vinegar and seasonings with only 2 g of carbohydrates per tablespoon. The company's organic mustard ingredients list is similarly short with only water, vinegar, mustard seeds and seasonings.

The Netherlands are a well-known gateway not only for conventional but also for organic commodities, with special ties to Scandinavian countries, like Denmark and Sweden, as well as other countries like Germany and The United Kingdom.

According to the Saskatchewan crop insurance program,

CROP (COMMERCIAL)	BASE GRADE	2020 BASE ($/T)	2020 LOW PRICE ($/T)	2020 BASE ($/BU)	2020 LOW PRICE ($/BU)
MUSTARD (BROWN)	1 CANADA	660	561	14.97	12.72
MUSTARD (ORIENTAL)	1 CANADA	550	468	12.47	10.60
MUSTARD (YELLOW)	1 CANADA	770	655	17.46	14.84
MUSTARD (BROWN)	1,518	1,290	34.43	29.27	
MUSTARD (ORIENTAL)	1,485	1,262	33.68	28.63	
MUSTARD (YELLOW)	1,617	1,374	36.67	31.17	

Organic premiums are projected to be

- 230% for brown mustard
- 270% for oriental mustard
- 210% for yellow mustard

On PEI:

W.A. Grain and Pulse Solutions, which opened an $8 million pulse processing plant in Slemon Park in 2018, is one of the partners in the research.

"How much of a benefit is it as far as quality, are there any yield benefits for mustard before potatoes," said Chris Chivilo, the company's president and CEO.

"Quantify all of those things so that when farmers are making a decision, they have some real numbers and data to go on."

Chivilo's company also sells mustard seed grown in the Maritimes and sees lots of potential, including a large market in Europe.

"For the last two years, we've bought a total of about 500 [metric] tonnes of mustard from farmers that have harvested it, to two different buyers," Chivilo said.

"One buyer liked the Island mustard so much, he'll take anything we can grow — up to four or five thousand tonnes."

Recommendation:

Organic mustard acreage in the prairies is an indicator of a growing market. The US seems to generate enough demand to absorb Canadian production, but should there be a need to diversify markets, Europe seems to offer an alternative. This crop should be on the watch list for PEI organic farmers, especially in view of the price to weight ratio.

CHAPTER 4: OTHER CROPS

FORAGE

Hay / Fodder / Alfalfa / Timothy

At more than 34 million acres, the land that is devoted to cultivated forage production takes up ~39% of the total land devoted to all crop production in Canada, the largest crop by acreage in the country

While the term forage has a broad definition, the term forage crop is used to define crops, annual or biennial, which are grown to be utilized by grazing or harvesting as a whole crop.

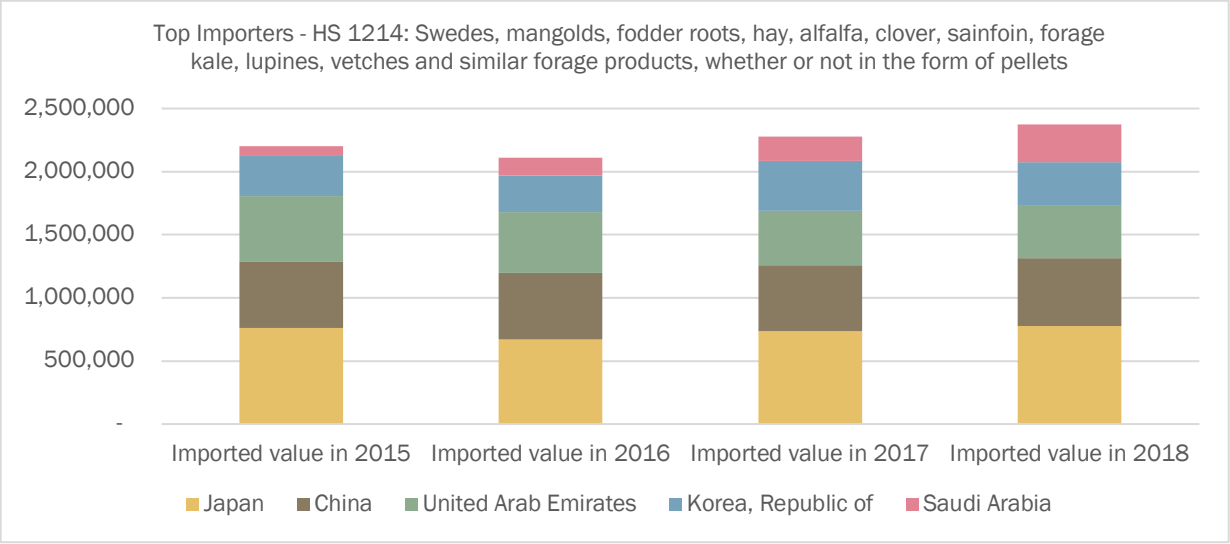
Cultivated forages include high pedigree seeds which are planted similar to row crops and can utilize sophisticated irrigation systems but can also be as simple as the cutting and baling of natural grasses. Forage is considered an important part of a crop rotation program with many cash crop.

Most forage is typically harvested from the field and compressed into bales, either round or rectangular in shape, to be easily transported, stored and then fed to livestock.

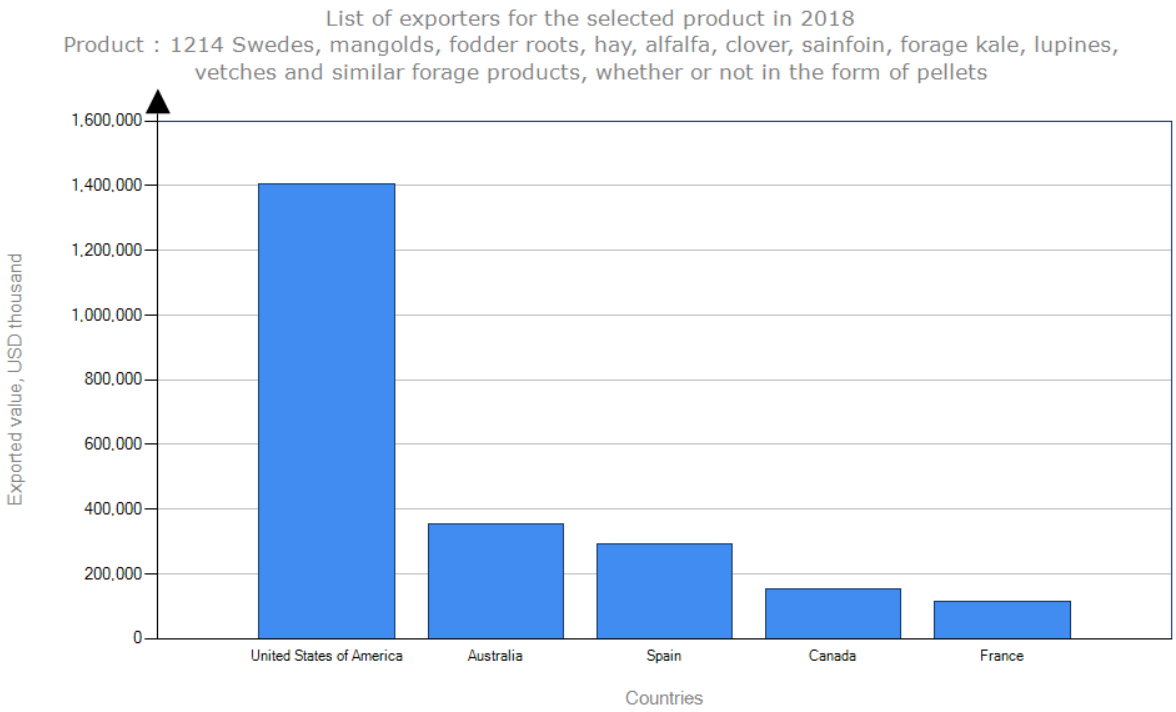
Demand for Canadian forage as an export product has encouraged the industry to discover increasingly efficient methods of compacting bales to a better weight-to-volume ratio for overseas logistics. Double-compressed bales can fit more forage into shipping containers increasing the value toboth the end customer and the producer.

A more intensive means of forage production is to process it into pellets and cubes and is done by chopping up the crop, mixing with water and a binding agent and then compressing it into either cube or pellet shapes and dried to an ~11% moisture level. Cubes and pellets are mostly used in the equestrian market and are also popular for export due to the weight-to-volume-to-nutritional value ratio. Pellets can be processed on farm but are typically processed by larger commercial operations which sell the products into either the domestic or export markets.

Anywhere from 95-99% (Saskatchewan forage council) of the Canadian forage crop is domestically consumed in any given year and is most commonly consumed by the farmer's own livestock.



An important development in the past decade has been the emergence of China and Middle Eastern markets. These rose from negligible amounts in 2007 to millions of MT per year in 2018 for alfalfa. This increase was driven primarily by rapid expansion of modern dairy farms in China and Korea, and limitations of water resources in Saudi Arabia and the UAE. Water limitations and distance to markets are also major limitations in China.



The US is by far the largest exporter, but domestic acreage there has fallen. Despite this export growth, alfalfa production in the US has fallen over the same period, nationwide and in those areas dominating the export market. Competition from other crops and water resource limitations have been key factors in this decline in western states.

Impacts on Domestic US Markets. Exports as a percentage of production has increased but is still minor compared with many agricultural products. This rapid rise in export demand has been welcomed by cash hay growers but regarded as a negative by domestic dairy and other livestock hay buyers, who have had to compete for forage supplies with foreign buyers.

According to Glacier FarmMedia, Ontario farmers are being told they need to get back into hay production: “We want farmers to consider hay production as a complement to row crop and cash crop production to renew soil,” said Fritz Trauttmansdorff, a farmer and founding member of the Ontario Hay and Forage Co-operative.

Beef cattle farms are disappearing, which reduces the need for growing forages, said Trauttmansdorff. One million acres of hay are needed to counteract bad soil, but a hay market is needed to find a home for that extra production and to encourage more growers to take up forage crops.

The co-operative has proposed a double compacting hay facility in southern Ontario. It would handle up to 100,000 tonnes of hay annually and cost about $15 million. The target markets would be Asia, the Middle East and the European Union.

Ontario producers can already ship hay in containers to the United States without difficulty, but this year the harvest was poor, so business was down.

Organic

The market for organic hay seems to be closely linked to the market for organic dairy.

Organic dairy farms are one of the many avid consumers profiting off of this kind of hay—in order to maintain the organic integrity of their products, they purchase only organic hay to feed their herds and, in turn, get a premium price on the dairy output. Calling livestock organic is contingent upon the animals' sole consumption of organic hay: no organic hay, no organic cows. High quality hay means strong cows, better milk production and more cash in the dairy farmer's pocket. Dairies are not the only ones benefitting from organic hay as organic beef provides a viable customer base, too.

Hay prices fluctuate from day to day. The average cost of organic hay cost per bale can range from around $4 to $5 per bale, depending on the quality, type of hay, delivery, freight, and storage charges, etc. As an example, the price per ton for organic alfalfa that is FOB (free on board at place of origin) without any delivery or other fees is priced by quality. An example of pricing as of September 2019 includes:

Fair: $177 per ton

Premium: $185 per ton

Supreme: $334 per ton

The Saskatchewan crop insurance program prices conventional hay:

Forage Crops

CROP (FORAGE)	2020 BASE ($/T)	2020 LOW PRICE ($/T)
ALFALFA	166	141
ALFALFA/GRASS	147	125
DEHY	35	30
GRASS	137	116
GREENFEED	122	104
SWEETCLOVER	122	104
TIMOTHY HAY	230	196

This suggest an organic premium, but due to the many different grades, it is difficult to calculate.

The cost for organic hay can differ from one region to another as well as from one grower to another. The price differences often reflect the quality of hay, weather, regional demand, and other factors."

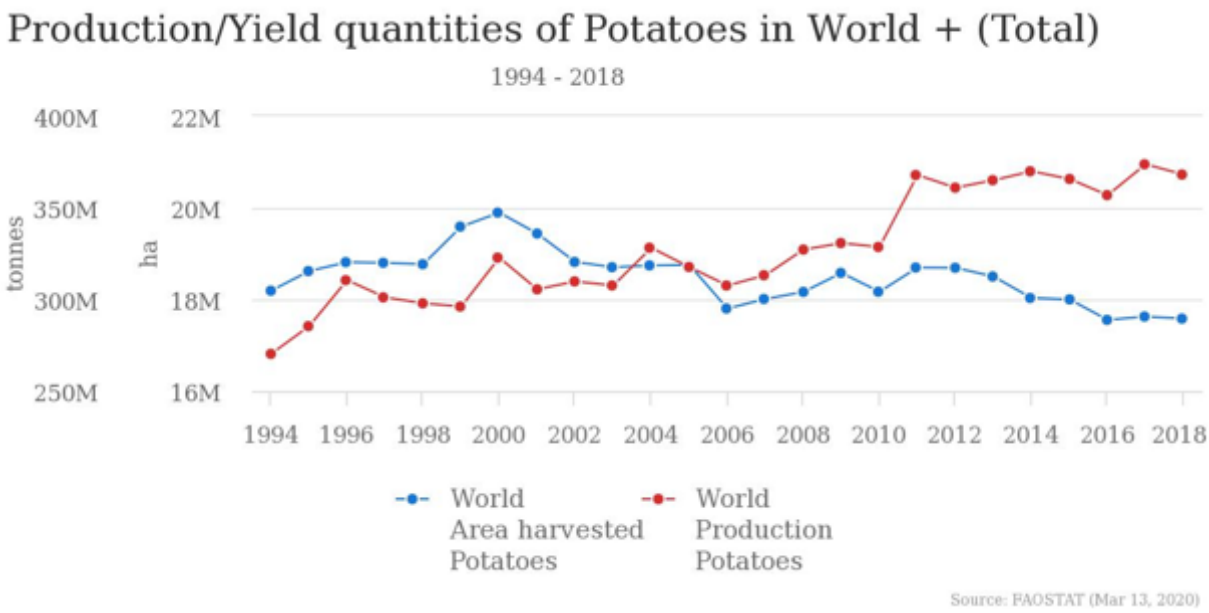
Hay consisting of high protein legumes, such as alfalfa and clover, is quite popular, but alfalfa alone isn't kind to a cow's digestive tract due to lack of fiber. Not to mention, more protein than cattle can use results in too high a level of milk urea nitrogen, so a varied diet is critical. A grass/alfalfa blend of organic hay has actually been shown to increase milk production. Corn, cowpeas, oats, soybeans, barley, mixed hay, etc. are also big sellers. As in any economic venture, the decision to grow hay

organically is risky, but the need is higher than ever. Organic hay, like the organic meats, breads, fruits, and vegetables touted for their healthfulness in the grocery store, is very nutritional, actively promoting herbivores' gastrointestinal and dental health. It is not even limited to nourishing livestock alone—animals like guinea pigs, rabbits, prairie dogs, hamsters, gerbils, rats, and a multitude of other herbivores enjoy the tasty treat. Some farmers will argue there is no actual difference between organic hay and regular hay, but the marketplace would beg to differ."

Recommendation: There certainly is a market for organic hay. It is likely to be found with the organic dairy producers in Quebec or New England. The low price per ton however will pose challenges in terms of reaching these markets in a cost-effective manner.

POTATOES

The importance of the potato as a food source and culinary ingredient varies by region and is still changing. It remains an essential crop in Europe, especially Northern and Eastern Europe, where per capita production is still the highest in the world, while the most rapid expansion in production over the past few decades has occurred in southern and eastern Asia, with China and India leading the world in overall production as of 2014.



China is now the biggest potato producer, and almost a third of all potatoes is harvested in China and India.

But global consumption of potato as food is shifting from fresh potatoes to added-value, processed food products. One of the main items in that category is frozen potatoes, which includes most of the french fries ("chips" in the UK) served in restaurants and fast-food chains worldwide. The world's appetite for factory-made french fries has been put at more than 7 million tons a year. Another processed product, the potato chips is the long-standing king of snack foods in many developed countries.

Dehydrated potato flakes are used in retail mashed potato products, as ingredients in snacks, and even as food aid. Potato flour, another dehydrated product, is used by the food industry to bind meat

mixtures and thicken gravies and soups. A fine, tasteless powder with “excellent mouth-feel,” potato starch provides higher viscosity than wheat and maize starches and delivers a tastier product. It is used as a thickener for sauces and stews, and as a binding agent in cake mixes, dough, biscuits, and ice-cream.

In eastern Europe and Scandinavia, crushed potatoes are heated to convert their starch to fermentable sugars that are used in the distillation of alcoholic beverages, such as vodka and akvavit.

Potato peel and other “zero value” wastes from potato processing are rich in starch that can be liquefied and fermented to produce fuel-grade ethanol.

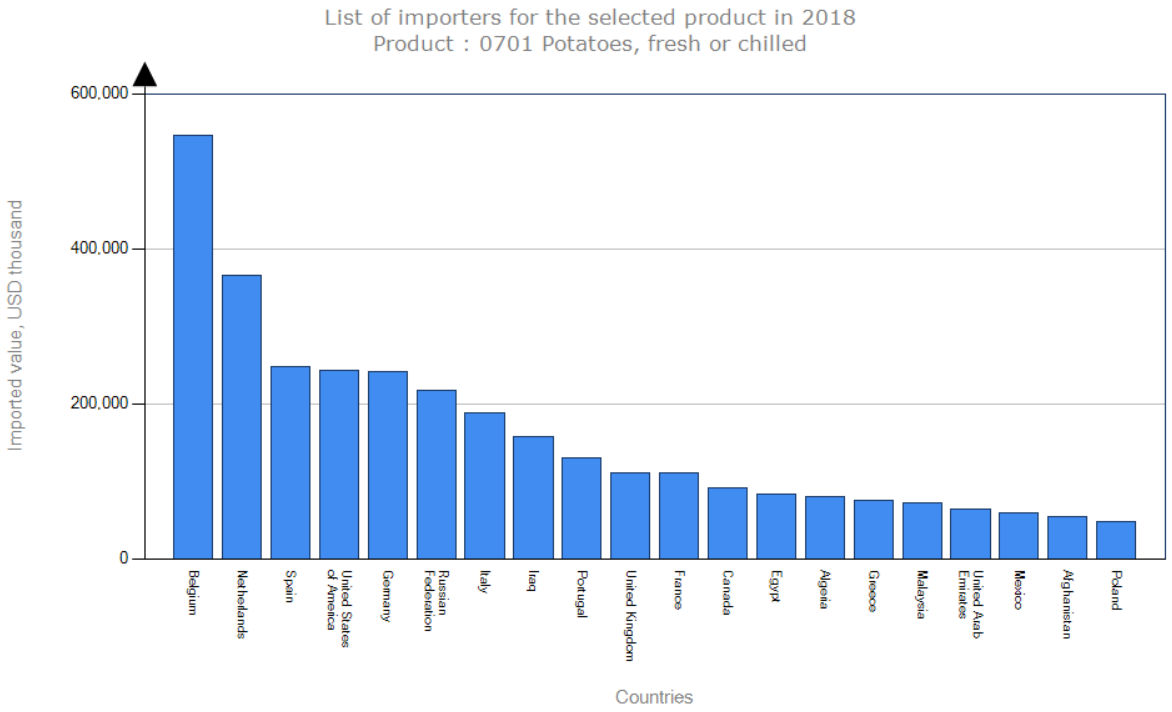
In the Russian Federation and other east European countries, as much as half of the potato harvest is used as farm animal feed. Cattle can be fed up to 20 kg of raw potatoes a day, while pigs fatten quickly on a daily diet of 6 kg of boiled potatoes. Chopped up and added to silage, the tubers cook in the heat of fermentation.”

Only a small share of potatoes is traded internationally. The trade in fresh, seed, and frozen processed potatoes made up around 7% of total potato production in 2017. Yet growth remains on the horizon.

Frozen processed potato trade grew from around 4m metric tons to more than 7m metric tons over the last ten years, driven by an increase in consumption in Asia, the Middle East, and Latin America.

Dutch exports dominate the trade in seed potatoes, with a market share of over 50% of global trade.

International trade in fresh potatoes is limited, but has increased fairly substantially, with trading seen by various North African and Asian countries such as Egypt and China.



Frozen Processed Potato Trade Is a Tale of Four Countries

Whereas potatoes grow in almost every country around the world, there are only four countries that have a significant frozen processed potato sector: the Netherlands, Belgium, Canada, and the US. Combined, these countries export more than 80% of all frozen processed potatoes. Although all four countries increased exports, frozen processed potato processors in Belgium were most successful. Belgium expanded its share in global exports from 18% in 2007 to 29% in 2017.

Cost-effective production of frozen processed potato products requires a year-round supply of high-quality potatoes. To achieve the yield necessary for processing, potato growers in North America and Northwestern Europe invested in knowledge, mechanization, storage, and irrigation. As a result, the yield per hectare is more than 40 metric tons in both regions.

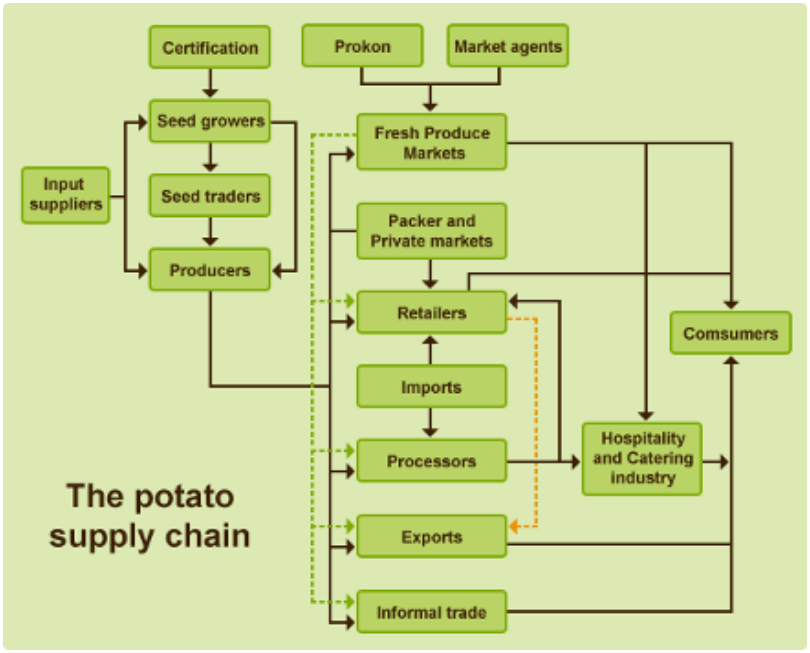
The global potato starch market size was USD 473.06 million in 2018 and is projected to reach USD 762.63 million by the end of 2026, exhibiting a CAGR of 6.2% during the forecast period.

Canadian Production

“Potatoes are the largest vegetable crop in Canada, accounting for 28.0% of all vegetable receipts. Potato receipts totalled $1.28 billion in 2018, up 3.4% from 2017.

Total production in 2018 was estimated at 4.7 million metric tons of potatoes (or 2.6% less than 2017 production). The main producing provinces were Prince Edward Island (21.9%), Alberta (21.4%), Manitoba (19.6%), New Brunswick (15.2%), Quebec (11.4%) and Ontario (6.7%). Of the total Canadian production, approximately 69% was destined for the processing sector, 19% to the fresh sector and 12% to the seed sector.

Canada has been a world leader in the production of seed potatoes for more than 90 years and is the eighth largest seed potato exporter in the world.



Organic

Statistics for organic potatoes are hard to come by, but there is plenty of anecdotal evidence of a growing market:

Organic accounts for a far smaller portion of the fresh potato market than the national average for produce, however. According to scan data, only 4% of fresh potato sales are organic. Although still a small portion of overall sales, the organic potato market share has nearly doubled since 2014. “The growth in the conventional potato category is generally flat, at around two percent,” Stachelek of Albert Bartlett USA said (September 2019). “Bite-sized, fingerlings and organics are seeing the most growth. Organic potatoes took longer to gain momentum compared with other fruit and vegetables in terms of acreage planted, but it is now growing at a much healthier pace versus the rest of the produce category.” “Organic potato sales rose by more than 14% in 2016. Potatoes are a good entry point for consumers into the organic market because they are a staple item and the price difference is not insurmountable.

Challenges seem to point to a lack of critical mass in the industry:

FSN President and CEO Kathleen Triou told Organic Produce Network that there is a wide disparity among retailers as to how well organic potatoes sell. She also noted that the organic supply lacks “consistency,” therefore, making it difficult for retailers to devote consistent floor space to the category

Kettle Food’s website suggests that lack of availability of organic potatoes year-round is the reason that the company offers only a few of its chip flavours as organic.

The North America organic starch market size was estimated at 10,231.1 kilotons in 2016. Rising demand for convenience foods coupled with growing end-use industries in the U.S. is expected to drive the market over the forecast period.

U.S. organic starch market is undergoing a rapid growth. Led by tremendous benefits offered by them, their demand has witnessed an upsurge in the food and beverages industry of the U.S. Growing trend towards adoption of convenience foods owing to increasingly hectic lifestyles has supported to achieve more conductive environment for the incorporation of starch in foods and beverages.

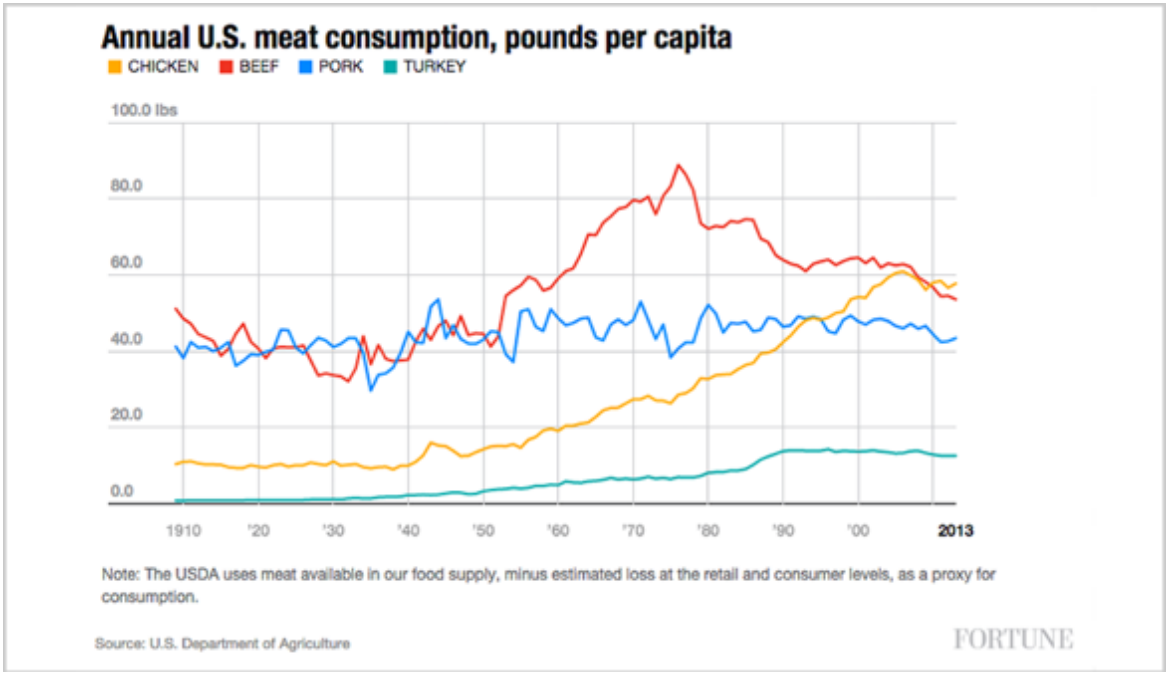
Cross-linked starches are used to produce various convenience food items including sauces, soups, bakery products, and desserts. Despite the price inflation in 2016, the demand for processed food remained steady. Changing consumer lifestyles, which have resulted in growing demand for ready-to-eat food, coupled with an increase in the number of retail stores selling packaged food are factors contributing to the market growth.

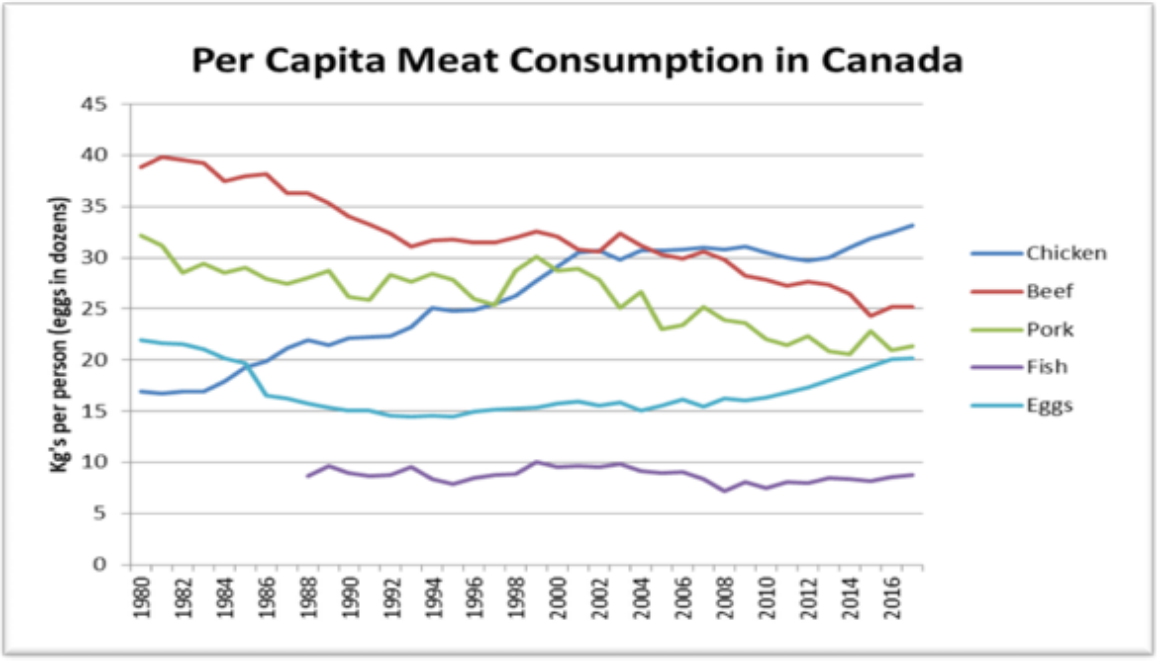
Recommendation: It would be foolish for a place with so much potato growing experience not to pursue organic potatoes. Island organic farmers have shown it is possible to grow potatoes, but the industry seems to be stuck in a scale that is too small to be able to deliver consistent supply to processors for snacks or starch. Interviews should explore the potential to increase annual acreage collectively.

BEEF

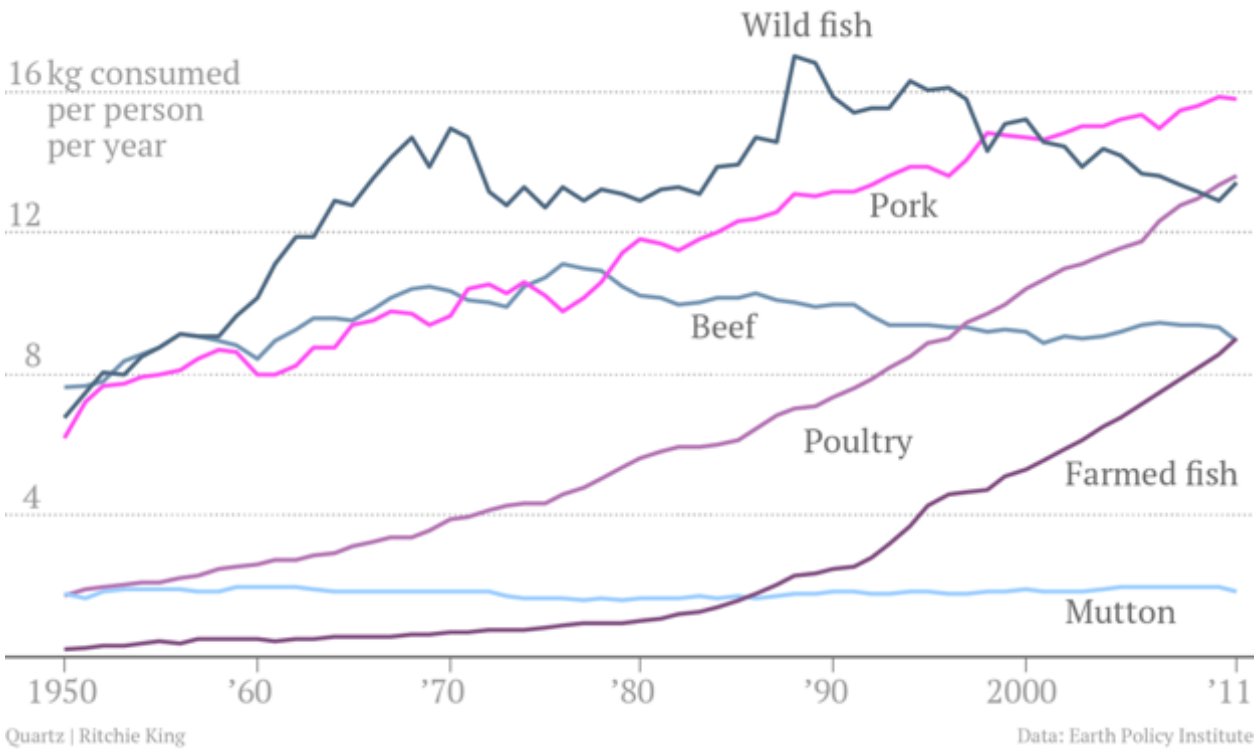
Beef production is intertwined with the history and culture of the Americas. Before the new world was settled, Beef was not widely consumed. The opening of vast new territories in North America and the Argentinian Pampa made beef production more viable and accessible to mass consumption. There is a reason why the Hamburger is associated with North American culture.

What we can observe is the general decline of Beef consumption in the US and Canada since its peak in the 80's. Since then, poultry has replaced Beef on the top of the charts.





Globally, the decline is slightly mitigated by the increased consumption of beef in China and Brazil, but the trend is the same.



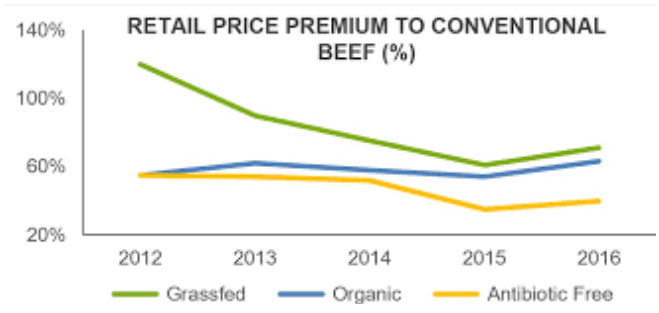
Data: FAO

The causes are increased scrutiny of the Beef industry as it is viewed through the lens of humane treatment of the animals, their nutrition and their carbon footprint. Unsurprisingly, the price to the consumer has seen a bigger increase than any of it's "protein competitors".

This moves Beef from the position of an everyday protein into a meal served at special occasions, places (steakhouses) and seasons (BBQ). It is increasingly becoming a luxury good.

On the organic side, Beef has a comparatively uphill struggle when it comes to positioning as there are other, competing quality standards: "Grass-fed" beef and "Free-from" beef.

In the graph below, a Texas Beef company Blackdirt Capital, explains the differences in price premiums:



For PEI beef farmers, this positioning dilemma is compounded by the fact that "PEI Beef" is generally considered as wholesome and more natural and local as well, even when offered in a Toronto butcher shop.

An additional challenge is the small herd size of certified organic cattle on PEI. Any attempt to consistently supply even a small market required significant investment on the grower's side. Any marketing opportunity would first have to set its sights on the antibiotic free market, before developing a fully certified organic product.

Since the outbreak of COVID-19, an opportunity for PEI organic Beef has presented itself though: The potential of provincially licensed slaughter facilities being allowed to supply Canadian markets from coast to coast represents a game changing opportunity.

The launch of an antibiotic free, PEI branded product could act as an interim program to develop a launch pad for further certified organic development. Interviews with Dolan Foods, a Toronto-based company marketing specialty beef have confirmed that there is an interest.

FURTHER DEVELOPMENTS

Since the submission of the interim report in March 2020, the following work has been undertaken:

1. In December 2020, an updated version of the findings was presented during the Organic summit, organized by the COPC. The organic markets have generally been found to have outperformed the conventional food markets, leading to strong growth across all product categories. Shortages of organic grains and a doubling, even tripling of local consumer demand for organic food has been reported by the organic farmers in the region.
   The demand for organic animal feed in the US kas also kept pace with previously recorded growth rates. The root cause for this revival of fortunes on the organic sector was the heightened interest in any factors contributing to human health and the dramatic shift from food service to retail due to ongoing lockdowns. Organic food has always been stronger in retail. The PPT has been included in the annex.

2. COPC has invested in a subscription to MERCARIS, a company providing market intelligence and brokerage services to organic producers. It provides regular market reports, pricing trends and a list of organic buyers across North America. An additional buyers list is included in the report and shared with the COPC membership.

3. COPC has begun investigating the frozen vegetable market due to the opportunity connected with a processing plant of organic frozen potato product. This work is ongoing.

4. As a result of the interim report, COPC has undertaken the initiative of a "Grains Hub". This working group has focused its effort on the collective production and marketing of grains and oilseeds. A separate report on this initiative is also included in the annex. The work is ongoing.