

GLOBAL PULSE MARKET, PART III

FOOD OF THE PAST ... AND FOR THE FUTURE

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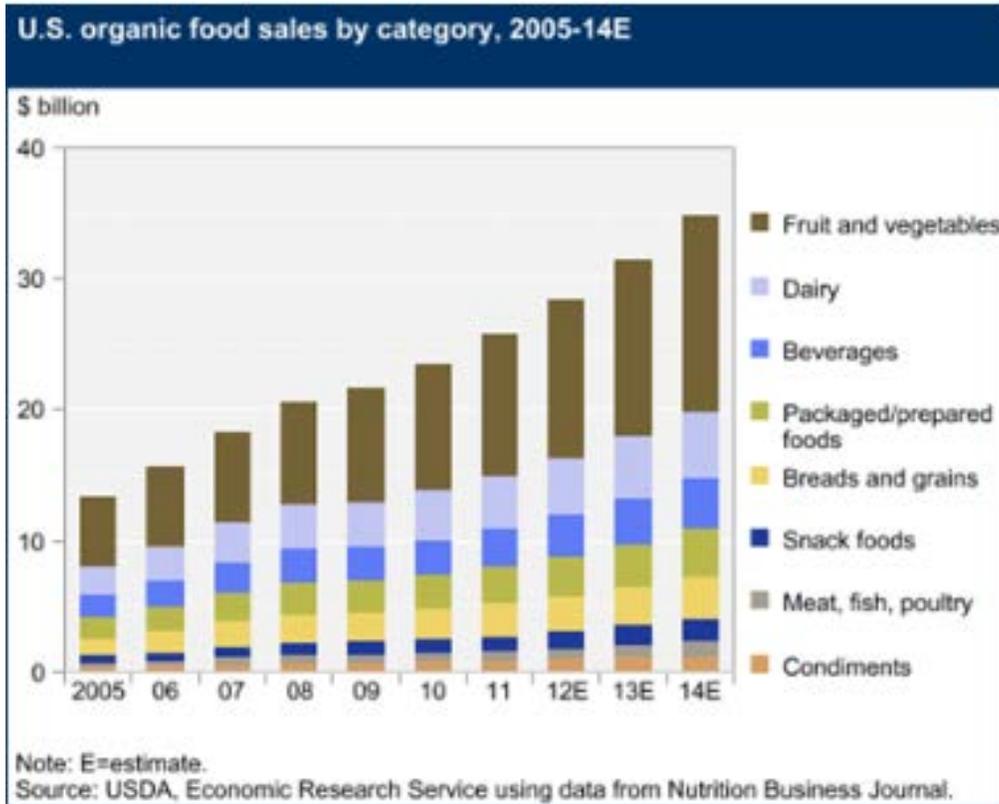
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ORGANICS – NORTH AMERICA

Global organic food sales were \$116 billion in 2015. They are expected to total \$327 billion by 2022. The United States represents 40% of sales and is growing 8% per year, against 1% growth in total food sales in the country. The demographics are compelling. Millennials are purchasing more organics per average than their elders, and the rapid expansion of middle and upper classes in developing economies is opening a vast new consumer frontier.



According to the Organic Trade Association (OTA) in 2017, 80% of Americans incorporated organics to some degree. Based on the OTA's research, U.S. organic sales have increased at a compounded rate of 14.82% between 1997 and 2015. U.S. organic sales in 1997 were less than \$5 billion and exceeded \$45 billion in 2017. The table below shows the organic food sales broken down by category.



In the past decade, organic food sales have grown from 3% of total U.S. food sales to 5.5% of total food sales. If the growth trend continues, organic food sales in the U.S. would exceed 10% of total food sales within the next decade.

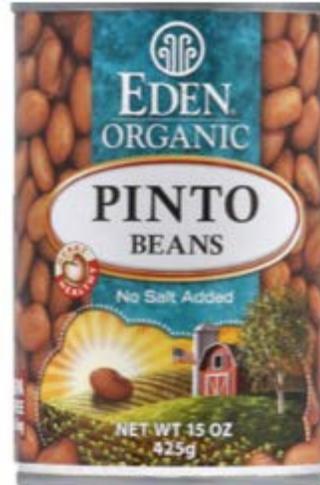
U.S. Organic Food vs. Total Food Sales, Growth and Penetration, 2008-2017

Category	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Organic Food	20,393	21,266	22,961	25,148	27,965	31,378	35,099	39,006	42,507	45,209
Growth (%)	17.5%	4.3%	8.0%	9.5%	11.2%	12.2%	11.9%	11.1%	9.0%	6.4%
Total Food	659,012	669,556	677,354	713,985	740,450	760,486	787,575	807,998	812,907	822,160
Growth (%)	4.9%	1.6%	1.2%	5.4%	3.7%	2.7%	3.6%	2.6%	0.6%	1.1%
Organic (as % Total)	3.1%	3.2%	3.4%	3.5%	3.8%	4.1%	4.5%	4.8%	5.2%	5.5%

Source: Organic Trade Association's 2018 Organic Industry Survey conducted 1/25/2018 - 3/26/2018 (\$mil., consumer sales).

As with the U.S., other major industrialized nations – including Germany, France, United Kingdom, and Canada – have also seen large increases in organic food sales. As nations continue to develop, organics will become affordable for more and as a result will become more widespread. Not only are more producers growing organics for fresh produce, but several new snack and food companies have moved towards organics. Locally sourced organic foods have become popular in restaurants, and continued growth in vegetarian food habits for people continue driving organic, plant-based diet sales.

Specifically, as it relates to pulses, the Organic Trade Association's 2018 Organic Industry Survey specifically noted a **9% growth rate in 2017 for legumes and plant-based products, including dry beans, dry peas and lentils.**

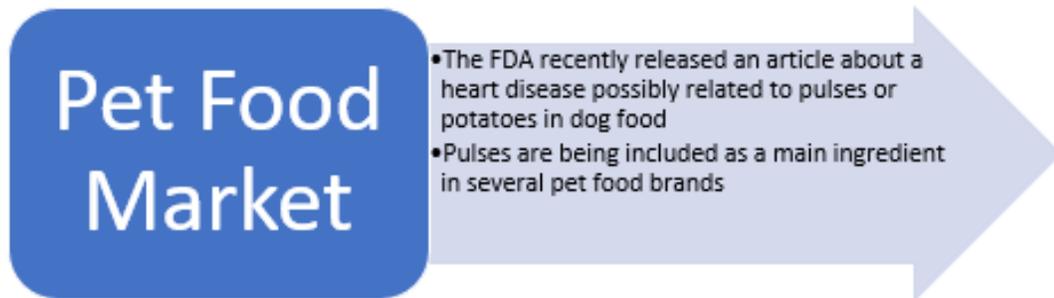


We expect to continue to see high single digit increases in the sales of organic pulses in North America. One word of caution, however, is that the data that is issued by the U.S.D.A. on organic markets is not as robust as it has been in prior years, as there has been some shifts in the various agencies at U.S.D.A. that gather and publish data.

Among private market intelligence organizations that monitor organic markets, the most comprehensive resource available is Mercaris (www.mercaris.com), which has developed a very robust platform. Most of the data is proprietary.

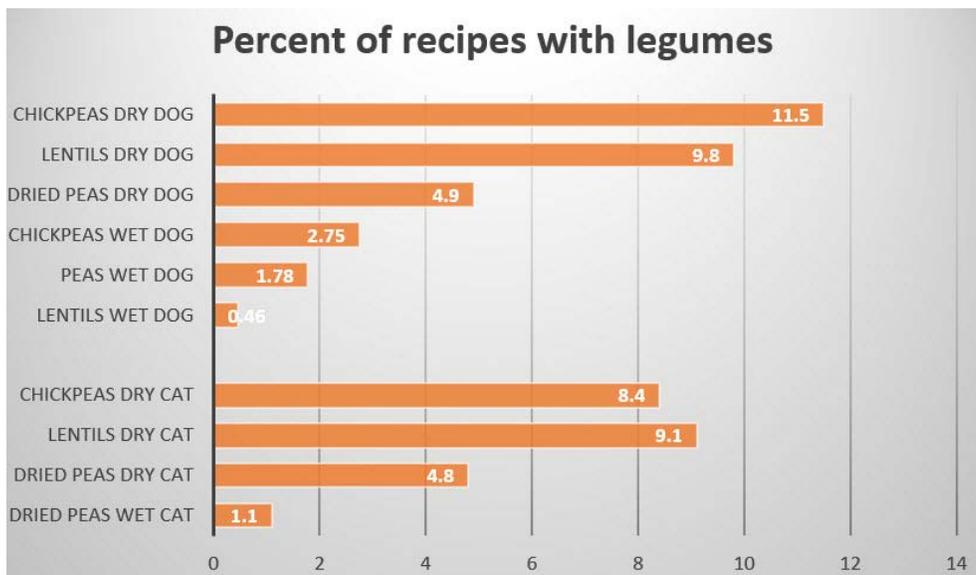
Pulses are an increasingly popular ingredient in pet food. In addition to a variety of meat, poultry and fish ingredients, pet foods have traditionally included plant ingredients such as corn and soybean meal. Recent consumer trends in the past few decades, coinciding with pet humanization, has led a move towards a healthier diet for pets and the development of grain-free pet food formulations. Pet food brands have capitalized on the consumer’s willingness to spend money on pet foods by enhancing their research and development and supply chain to produce healthier – and more expensive and profitable – pet foods.

These changes – especially over the past decade – have opened the door for new entrants into the pet food market and for large companies to adapt to changing demand. Some brands have been using pulses as the second or third most concentrated ingredient in pet foods.



According to PetfoodIndustry.com, in dry dog food, chickpeas are included in 11.5% of pet food recipes, lentils at 7.8%, lentil beans 0.5% and green lentils at 1.5%. Lentils are in nearly 10% of the recipes for dry dog food. Peas are found in nearly 5% and are listed as dried peas on almost all labels, with four recipes referring to dehydrated peas. In wet dog food, peas are listed in fewer than 2% of the recipes and lentils at 0.5%.

Dry cat food follows a similar pattern with chickpeas in nearly 8.4% of recipes. Lentils are used in 9.1% of the dry cat food recipes, with lentils listed in 7% of recipes, lentil beans 0.6% and green lentils 1.5% for a total of 9%. Dried peas show up in 4.8% of wet cat food recipes and 1.1% of wet cat food recipes. Chickpeas, lentils and peas make up a large percentage of the dry recipes in which they appear.



Recent studies from the FDA have found that pulses or potatoes may be a cause of a dilated cardiomyopathy, also known as DCM. The disease is a heart disease for canines. Dogs that are not prone to the disease began to be diagnosed with it, and since have been led to believe it is because the pulses or potatoes in the dogs' diets. If the information becomes more concrete and widespread, pet production in pulses could slow down or pulses could become a less concentrated ingredient. The report was released in July 2018. Studies have not yet revealed whether pulses or potatoes were the primary cause.

PEA PROTEINS AND PEA FLOURS

New markets for pea proteins and pea flours have increased recently as consumers look to find gluten-free alternatives and healthier options for bread. Companies have already developed a variety of pulse flours, fiber, proteins, and starches. New consumption habits have increased demand in developed nations, namely the U.S., Canada, and the E.U. Yellow peas are a large piece of the market, but innovations across the board with all pulses are taking place.



OTHER TRENDS

Below is a table showing several uses of pulses. Each day new products hit the market and innovation is continuing to take place using pulses.

Pulse Use	Chickpeas	Peas	Lentils	Beans
Basic uses:	Canned Frozen Dry	Canned Frozen Dry	Canned lentils Frozen lentils Dry	Canned - all types Frozen Dry Refrigerated
Snacks:	Hummus Roasted Dips/Spreads	Dips/Spreads Pea chips Health bars	Dips/Spreads Lentil chips Health bars	Dips/Spreads Bean dip Bean chips
Pastas/Other:	Chickpea flour Soups Curried Falafel	Pea flour Soups Pea protein Bread	Lentil flour Soups Lentil lasagna Lentil burritos Bread	Bean flour Soups Refrigerated Falafel Bread

PROCESSORS, STORAGE FACILITIES AND WHOLESALERS

Each part of the supply chain in the pulse industry is highly competitive. While the industry is competitive with upstream players – i.e., growers and grower co-ops, the further downstream the product moves, the more competitive the market gets. There are several companies that compete in activities such as storing, processing, and wholesaling. Some examples are Ilta Grain, Columbia Grain, Inc., Dakota Dry Bean, Viterra, ADM, and AGT Foods, and Scoular.

The following table identifies some of the prominent North American companies involved in either processing, storing or wholesaling pulses.

Processor/Wholesalers	Info/Notes	Employees	Revenue (MM)	Headquarters	Ownership	Organics	Pet	Human
ADM Company	Public company (NYSE:ADM) that obtains, transports, stores, processes, and merchandises a range of agricultural products. The company is focused on innovation and customization for customers.	31,300	63,491	Chicago, IL	Public	X	X	X
AGT	Pulse processing and food company. Industry leader. Owns CLIC and Saskcan.	2,000	1,580	Regina, Canada	Public	X	X	X
American Pulse Processing LLC	Very small company	-	-	Taylor, MI	Private	X		X
Columbia Grain, Inc.	45 location-strong company. Processor plant and exporting company to many international locations.	286	148	Portland, OR	Public (Marubeni)	X		X
Dakota Dry Bean	Dry bean company that processes and produces pea starches, pea flour and pea protein as well as traditional peas and barley.	-	70	Grand Forks, ND	Private			X
Eden Foods, Inc.	Produces dry grocery organic foods including beans, soy products, fruit juices, etc.	139	47	Clinton, MI	Private	X		X
F. Garcia Wholesale	Wholesales edible dry beans to places in the US and outside the US.	10	6	Miami, FL	Private			X
Faribault Foods, Inc.	Produces and supplies beans, pastas, beverages, etc. Operates as a subsidiary of Arizona Canning Company, LLC	428	185	Faribault, MN	Private (Subsidiary)	X		X
Globeways Canada	Distribution company with logistics division too. One of the sponsors for the Pulse Canada event in July. One of Profit 500 Canada's fastest growing companies in 2016. Owned by a Dubai agrifood company called Hakan Agro	-	-	Mississauga, ON	Private (Subsidiary)			X
HiemCo	Not a processor but a grain brokerage. Also a sponsor for the big Pulse festival in Canada in July	-	-	Mississauga ON	Private			X
Ilta Grain	Processor/exporter of pulses (lentils, peas, beans and chickpeas), grains/oilseeds and other special crops. Six locations across Canada.	105	-	Surrey, BC	Private	X	X	X
JM Gain	Processor/packager in North Dakota and Montana. Sources from local farmers and exports.	15	6	Great Falls, MT	Private	X	X	X
Scoular	Processor/marketer/exporter of pulses and specialty grains. Locations across U.S. and Canada.	1,000	500	Omaha, NE	Private	X	X	X
Seaboard Corporation (SEB)	Massive agricultural company that has several divisions including a pulse division called Seaboard Special Crops	11,800		Merriam, KS	Public	X	X	X
South Dakota Pulse Processors	Very small company	5	-	Harrold, SD	Private			X
SRS Commodities	Small company, only beans	21	-	Maryville, ND	Private			x
Victoria Pulse Trading Corp	Pulse trading company	-	-	Vancouver, BC	Private			X
Viterra	Massive company that handles, processes, distributes, etc., grains and oilseeds. Also works with pulses.	5,108	6,496	Regina, Canada	Public (Glencore)		X	X
W.A. Grain and Pulse Solutions	Processor in Canada	-	-	Innisfail, AB	Private			X

AGT Foods

AGT Foods is the largest pure play company in the pulse market. Founded in 2007, AGT quickly established itself as a global competitor by making a number of strategic acquisitions. AGT changed its name from Alliance Grain Traders to AGT Food and Ingredients in 2014 and has sought to transform itself from commodity exporter to a diversified food business. AGT has extensive pulse processing facilities across Canada, Turkey and Australia, and sales presence throughout Europe and Asia.

One of AGT's recent acquisitions was its 2014 purchase of CLIC, a Montreal canning company, which moved the company further downstream into the food retailing and distribution business. CLIC provides a variety of food products including conventional and organic pulses. AGT also has "Pulse Plus," a division that has animal and human products that include different types of fibers, starches, proteins, and flours derived from pulses. AGT's aggressive push with acquisitions has left it undercapitalized. Consequently, in 2018, the company entered into a take private transaction with two Canada-based investment firms; that deal is slated to close by the end of the first quarter of 2019.

Other Market Participants

Four large diversified multi-national corporations are extensively active in the pulse market – ADM, Marubeni (Colombia Grain), Glencore (Viterra) and Seaboard. Each company has made acquisitions over the past decade to bolster their scope and capabilities in the pulse market. Many of the other public, large, diversified grain companies continue their push into the pulse market.

The two largest, privately held processors that are material players in the pulse market are Scoular and Iita Grain. Cargill also continues to invest into the pulse market.

Faribault Foods and Eden Foods are two of the largest privately held companies with a consumer-facing brand focus in the pulse market.

Several of the companies on the list operate in a narrower segment. Dakota Dry Bean handles pea starches, pea flour, and pea protein while F. Garcia Wholesale focusses mainly on edible dry beans.

CONSUMER BRANDS

Below is a table showing several brands and initiatives relating to unique uses of pulses.

Companies	Info/Notes	Employees	Revenue (MM)	Headquarters	Ownership	Organics
Banza	Banza LLC uses chickpeas to make pastas.	18	4	Detroit, MI	PE	
Barilla	Italian food company that offers a variety of products and services and aims to be good for the planet as well as for consumers.	>5000	3,468	Italy	Private	X
Beanfields	Invested in by Powerplant Ventures. Sells snacks and chips made from beans.	12	10	Los Angeles, CA	PE	
Biena	All sorts of chickpea snacks including ranch and chocolate covered chickpeas. Invested in by three capital groups for a total of \$ 2.8 MM raised.	>11	2	Boston, MA	PE	X
C&F Foods, Inc.	Production/packaging plants in US, customers in 30 countries, 60 varieties of non-GMO specialty ethnic beans, peas, grains, lentils and rice in supermarkets and warehouse clubs around the world.	400	457	City of Industry, CA	Private	X
Calbee North America	Largest snacking food company in Japan, owns several brands sold in the US including "Harvest Snaps," which are pea/lentil snacks.	375	130	Fairfield, CA	Public (Subsidiary)	
Enjoy Life Foods	Full-range snack company with lentil chips and unique snacks. Owned by Mondelez, the same company that owns Nabisco.	50	25	Schiller Park, IL	Public (Subsidiary)	X
Honeyville	Formerly known as Honeyville Grain, Inc. Very large company that offers array of food products.	218	181	Brigham City, UT	Private	X
Off the Eaten Path	Snack line by Frito-Lay (PepsiCo) that has legumes as a top ingredient.	-	-	Plano, TX	Public (Subsidiary)	
Saffron Road	Also under the name American Halal Company. The company is a strong company in meals, naan, etc. and snacks that include pea and lentil based ingredients.	28	32	Stamford, CT	Private	X
Simple Supple Foods	"Rosted" lentil brand that offers lentil-based	-	>1	Detroit, MI	Private	
The Good Bean	Bean snacks, largely chickpeas and other pulses. Have roasted chickpea snacks, Fruit and No-Nut bars and new chips made of pulses.	8	4	Berkley, CA	Private	
World Peas	Owned by "Snack it Forward" who has 15.3mm in revenue from its other company that makes snacks made from fruit.	8	15 (largely from other company)	Austin, TX	Private (Subsidiary)	

Several companies on the list are doing unique, innovative things in the pulse industry. Some highlighted companies include:

Banza

Banza is currently the fastest growing pasta brand in the country, and sold in several large retail stores as well as online. Banza's first product is made from chickpeas and will most likely add more products as brand-recognition increases.

Banza®



Biana:

Biana Snacks are also made from chickpeas. Biana Snacks started in just one store and now can be found at over 15,000 retail locations. Biana has flavored chickpea snacks ranging from sea salt to habanero. Biana also has a wide variety of flavors and types, but notably has chocolate covered chickpeas.



Enjoy Life Foods

Enjoy Food Foods is a brand that strives to provide options that are allergy friendly, non-GMO, gluten-free, and made with all-natural ingredients. While pulses are not the company's primary focus, the company does offer lentil chips. Enjoy Life Foods is a subsidiary of Mondelez, the company famously known for snacks such as Oreos, Ritz Crackers, Chips Ahoy, etc. Mondelez is penetrating new markets with brands such as Enjoy Life Foods as the shift towards healthier snacks continues to change consumer demand.



Off the Eaten Path

Off the Eaten Path has several varieties of snacks, including veggies crisps that are made with rice, peas, and black beans, hummus crisps made with rice and chickpeas, and sweet potato crisps made with rice and sweet potatoes. The snacks are similar to chips and would act as a replacement. Off the Eaten Path is another food company similar to Enjoy Life Foods, as in it is a subsidiary of a massive food corporation. Off the Eaten Path is a product by Frito-Lay, a division of PepsiCo.



The Good Bean

The Good Bean is another company making innovative, healthy snacks. The Good Bean has replaced nuts with beans in granola bars, created roasted chickpea snacks, and made chips largely from pulses. One of the most

recent products released by The Good Bean is a tortilla-style chip made from chickpeas, navy beans, red lentils, pea protein, sweet potatoes, and quinoa. Another highlighted product by The Good Bean is a blend of fava beans and peas with seasoning.



The market for specialty foods and snacks is extremely competitive. While some of the companies in the table are multi-million-dollar companies, several others such as Biena and Simple Supple Foods are relatively small. There are thousands of products on the market who never achieve a million in sales and retreat from the market.

PET FOOD

Another competitive area of the supply chain is pet food manufacturers and brands. Below is a table showing a few examples of pet food companies that include lentils in their products.

Companies	Info/Notes	Employees	Revenue (Mm)	Headquarters	Ownership
Mars	Mars' revenue largely comes from its other brands, but has some pulse products. Mars owns three of the top five pet food brands in the world: Pedigree, Whiskas, and Royal Canin. Mars also owns Nutro, Greenies, Sheba, Cesar, IAMS, and Eukanuba. Several brands include pulses.	75,000	32,086	McLean, VA	Private
Nature's Variety	Large pet food brand name with subsidiaries. Some varieties include pulses. Parent company is M.I. Industries.	177	127	St. Louis, MO	Private (Subsidiary)
Nulo	Pet food with balanced amounts of meat, vegetables, etc. with pulses included as an ingredient but not the main ingredient.	32	20	Austin, TX	Private
Solid Gold Pet	Solid Gold Pet offers products for pets including specific types with peas and lentils.	25	13	St. Louis, MO	Private/OE
WellPet LLC	WellPet LLC owns and operates several different brands including Holistic Select, Eagle Pack, and Sojos. Brands differ and include freeze dried,	257	99	Tewksbury, MA	PE

There have been thousands of entrants in the pet food market in recent years. The trend is away from traditional corn-based food to a meat-based food with vegetables included. Contrasted below are two companies from the table.

Mars

Mars is a major food company that has several brands. Mars is known for brands such as M&Ms, Skittles, Wrigley Gum and more. Mars also owns pet food brands and pet hospitals. Mars owns three of the top five pet food brands in the world and several others. Mars owns companies such as Pedigree, Whiskas, Royal Canin, Nutro, Sheba, IAMS, and more. Several of the brands include pulses in the product.

MARS



Nulo

Nulo is much different than Mars in that Nulo is not owned by a major food company. Nulo is a pet food company that offers food with a balance of meat and various types of plants, including pulses. Nulo was started in Austin, Texas, and is a company with estimated revenues of \$20 million.

HEDGING

The pulse market is not as large or mature as the North American corn, wheat and soybean markets. Due to inconsistency and price fluctuations, companies at different points in the supply chain often seek to hedge against price fluctuations through entering into contracts with well-funded counterparties.

Marketing special crops can be complicated because there is more pressure to time the market, and there are limited contracting options to help manage price risk, as there are with futures-traded crops. Additionally, there are fewer end-use markets for special crops, and this means supply and demand signals often conflict, making pricing more volatile. The risk is selling too soon or too late.

As an example, during the 2015-16 Canada growing season, the price for red lentils varied by \$19/bushel over just four weeks. Compare this to canola, where the biggest price swing in history was just \$9/bushel over 13 months in the 2007-08 season.

With the difficulty in hedging complete crops, some risk transfers through the supply chain. When the ability to hedge against entire yields is present, risk can be mitigated more thoroughly, often limiting potential upside for farmers from a price hike in the harvest but eliminates heavy downsides as well to help with poor production years. For most companies in the supply chain, long-term contracts allow a hedging effect to take place by mitigating the risk of future price changes. Excess revenues one year may be used in long-term contracts to reduce future volatile revenues another year.

Regarding the supply chain, soybeans derivatives are sometimes used to mitigate risk, though this is an imperfect hedging instrument. Often 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.

Pulses are often used to diversify a farmer's portfolio the same way a pulse farmer looks to expand his portfolio and crop rotation with alternatives such as soybeans or wheat. By having an adequate amount of working capital, broad customer base, and using a range of hedging techniques, companies in the supply chain can mitigate a significant portion of their risk.

BEAN SPECIFIC DYNAMICS

Dry beans cost more to farm than most other grains due to higher seed costs, stricter conditions for farming, and a higher susceptibility to insects and diseases. Cleaning, storage, and transportation costs can also drive up the price on edible beans. Despite higher costs for producers, consumers of edible beans often pay more for the beans than that of soybeans and some other types of plants (www.hort.purdue.edu). Through this higher cost on the consumer's end, dry edible bean production can yield higher margins for companies in the supply chain if prices stay reasonable and the market does not become flooded with new entrants.

Value is derived from the strong reputation of the U.S. bean market. The U.S. has a significant role as a bean producer with a strong reputation for the taste and quality. According to a study done by USDryBeans.com, the U.S. is a substantial exporter due to its high quality, consistency, good value, and reliability (www.USDryBeans.com). The U.S. is known for producing food safe to eat, providing a similar if not homogenous crop production for consumers. Efficient productivity, a vast country that has different regional weather patterns, and a stable political system, ensure reliability in crop production and order fulfillment for national and

international end-users. Due to these factors, the U.S. can sell edible dry beans at a reasonable price, even in light of the considerable freight disadvantage to exporting product to the other side of the globe.

VALUE DRIVERS

Food processors prefer to locate in close proximity to its regular suppliers and buyers, which reduces transportation costs and ensures higher margins. By continually investing in technology in inventory management and labor processes, food processors remain competitive. The North American pulse market has demonstrated that it is one of the most efficient pulse markets in the world – notwithstanding its considerable freight disadvantage to Indian, European and Black Sea processors, Canada and U.S. exporters have been able to maintain their sizeable market share. The North American processors have invested considerably in the last decade to keep the pulse industry as the most advanced in the world.

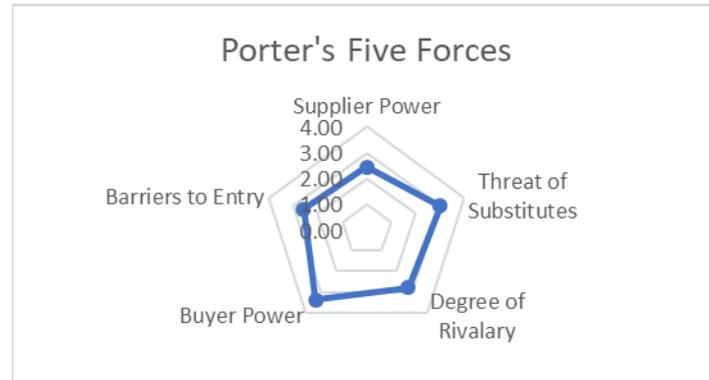
The wholesale pulse market has features of an oligopsony. An oligopsony is the reciprocal of an oligopoly. An oligopoly has a limited number of sellers, meaning the sellers can raise prices to its customers. An oligopsony does the opposite – puts the pressure on the sellers through only having a few buyers. In the wholesale pulse market, there is in a shortage of processors, which means growers have limited options to whom they sell. These limited options are not only limited based on the number of potential processors but on the geographic location of each one and the transportation costs associated with moving product to different processors. This gives processors and storage companies stronger bargaining power over farmers to purchase products. Through the bargaining power of the processors, the purchase price from farmer to the processor is lowered, ultimately providing consumers with lower costs (www.asgecon.unl.edu). Wholesalers, storage facility companies, packaging companies, and consumers all capture value because of the bargaining power of the processors. This is partly countered by farmers' co-ops and attempts to sell in bulk with other local farmers.

Geographic location plays a role in the value chain because of different regional demand and supply. Canada and the U.S. both have a strong ability to efficiently export product to different regions of the world, but they nevertheless have a significant disadvantage to certain other producer nations. Transportation and logistics costs act as a barrier to entry into the global supply chain. Countries like France and Lithuania can efficiently ship large amounts of pulses to other European countries, eliminating the U.S. in some trade flows to parts of the E.U. Russia, Ukraine, and Turkey also grow large amounts of pulses, a much less expensive transportation route to the E.U. than competitors in Australia, Canada and the U.S. have. Despite efficient systems in the U.S. and Canada, global competition is a threat due to other countries' locations and transportation advantages.

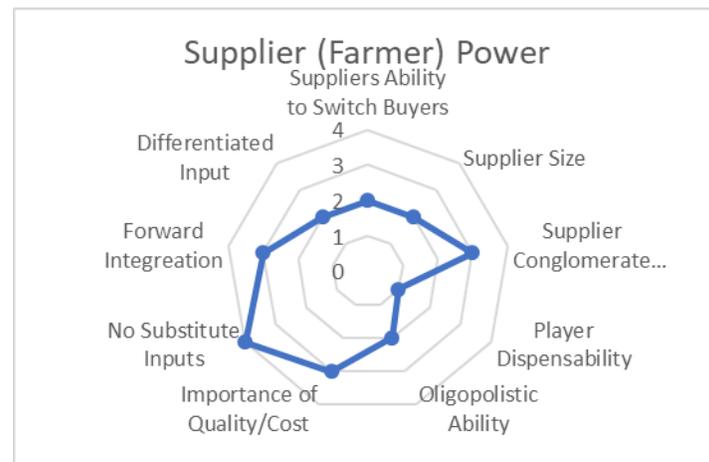
Looking deeper into the geographic situation, certain areas weather patterns restrict them from growing certain crops. Latin America struggles with efficient pulse yields compared to Canada and the northern parts of the U.S. due to heavy rainfall and warm climates. India has large fluctuations in crop production because the monsoon season often hurts production. Various weather patterns across the globe change the dynamic of the value chain because it changes the suppliers' ability to meet demand. The uncertainty of supply and yields change the flow of trade in the global pulse market. This is an opportunity for value for countries with frequent bumper crops. A large bumper crop can be sold to nations with weaker yields. The distribution and logistics costs also play a role. Countries in the Black Sea Region and South Asia region have a logistical advantage to ship out products to large consumers such as India and the Middle East. Value is created when efficient distribution pipelines are formed, and demand-heavy countries have weak yields.

FIVE FORCES ANALYSIS

The following analysis compiles industry information as a whole and analyzes different stages of the supply chain using Porter's Five Forces. Each factor of Porter's Five Forces is discussed. Storage facilities and processing companies are referred to interchangeably as parties often provide both services to an extent.



FACTORS INFLUENCING POWER OF SUPPLIERS



The factors that influence the power of suppliers is very important in all industries. If suppliers have strong bargaining power, then the entire supply chain may be predicated upon the ability of the suppliers to increase prices.

- a. Suppliers' Ability to Switch Buyers:
 - i. **Farmers** have relatively low supplier power due to geographic restrictions and limited processing plants to whom they can sell their product. There may be only one or two processing plants within a reasonable distance, giving more power to the processing plant than the farmer.
 - ii. **Processors** become the supplier when the processing companies sell the product to the next party in the supply chain. The ability to switch buyers largely depends on the

geographic region of the buyers, but pulse processors' ability to switch buyers is much stronger than pulse farmers' ability.

- b. Supplier Size:
 - i. The **farmers'** size is often localized and small, while the **processors** are increasingly regional and larger.
- c. Supplier Conglomerate Abilities:
 - i. **Farmers** have an opportunity to conglomerate through the creation of co-ops or vertical integration, providing some supplier power.
 - ii. **Processors** have little opportunity to conglomerate.
- d. Substitute Inputs:
 - i. **Farmers** have strong power regarding substitute inputs because pulses are already affordable and efficient, and grown in specific areas, so few substitutes exist in the same price range.
- e. Further analysis:
 - i. The stronger the logistical power, the stronger supplier power. With low margin products, the entire industry is predicated upon efficiencies and volume.
 - ii. The threat of vertical integration can affect all parties in the supply chain. Through mergers and acquisitions, farmers, processors, and storage facilities, with adequate capital or investors, may vertically integrate. With vertical integration, any company may possess the ability to avoid suppliers or skip parts of the supply chain. The ability for a farmer – at least on an individual basis – to vertically integrate is less feasible than for processing and end-product companies.
 - iii. In the bean market specifically, the U.S., as a large supplier has stronger bargaining power against other countries based on its reputation for quality, consistency, reliability, and availability.

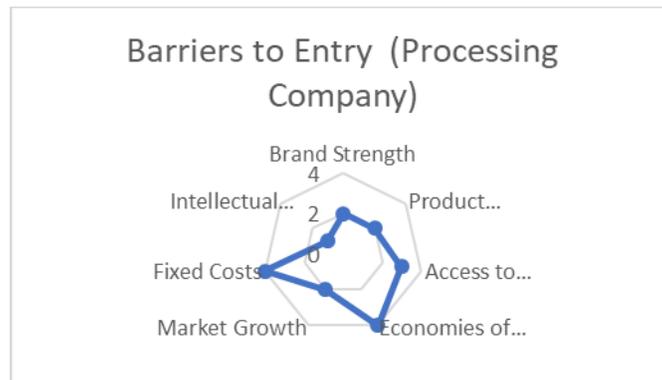
FACTORS INFLUENCING POWER OF BUYERS



The power of buyers is essential when looking at the pulse industry.

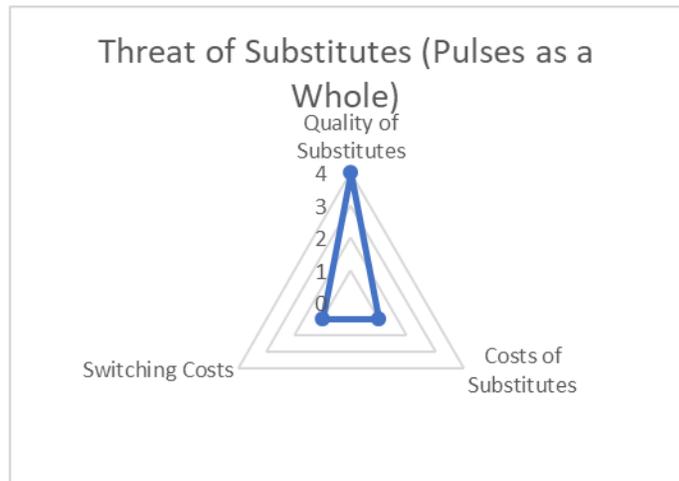
- a. Ability to Switch Suppliers

- i. The **processors** have a high ability to switch suppliers because there are many more farmers than there are processing companies.
 - ii. **Consumers** and **food brands** also have a strong ability to switch suppliers because there are not only regional and domestic options for supply, but also international.
- b. Backward Integration:
- i. **Processors'** ability to integrate is weak because of the large amount of volume needed to effectively integrate.
- c. Oligopsonist Abilities:
- i. **Processors** have an oligopsony-like effect on farmers, as discussed earlier. This oligopsony allows processors to maintain supplier relationships and leverage bargaining power to create better margins.
- d. Further Analysis:
- i. Beans are considered an inferior product and respond differently than many other commodities. As opposed to demand for "normal goods," which goes up as income increases, demand for inferior goods goes down as income increases. For example, as China has strengthened economically over the past 30 years, its pulse consumption has fallen in half even though its population has increased materially.
 - ii. Poor weather conditions are a leading cause of price hikes in the industry. With a two-year shelf life of many pulses, such as beans, buyers, especially wholesalers and storage facilities, can buy in large volume and less frequently. Without proper planning and consideration, this may result in uneven cash flows and cyclicity for producers. Hedging is key to mitigate risk.



The threat of new entrants is low in several parts of the supply chain in the pulses industry. Processors and storage facilities have high barriers to entry for multiple reasons.

- a. Economies of Scale and Fixed Costs: **Processors** are only able to achieve economies of scale after high amounts of capital for fixed costs have been deployed. With specific seasonal variations in the industry, storage facilities and processors can utilize different crops to hasten scale. However, the ability to scale is still limited by geographic location and production within each region.
- b. Product Differentiation: Product differentiation is a low barrier to entry. While there has been increasing development of varieties of pulses in the last decade, from the processor's perspective, there is a limited universe of products grown in any single market and therefore sold into the market.
- c. Brand Strength: New entrants often lack brand strength, which may deter specific parties, such as **farmers** or **processors**, from entering into long-term contracts with the new entrants for fear of default. However, with the limited number of processors, high transportation and distribution needs of companies in the supply chain, and tight margins, companies will be able to enter into a portion of the market purely based on availability, distribution efficiencies, and lower prices.
- d. Further Analysis:
 - i. Regulation: Both domestic and international companies face large regulation requirements. Regulation requirements when dealing with food distribution are high, and the process becomes significantly more stringent when companies package and export products to other countries. The costs associated with monitoring processes, sources, and hygiene of pulses is a barrier to entry.



Substitution is less common in the industry due to the high costs of substitutes.

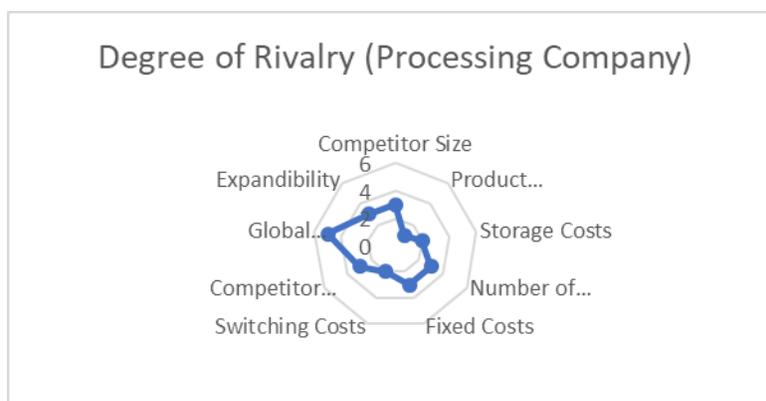
a. Quality of Substitutes:

- i. Among pulses world-wide, there are many different pulse varieties that serve as substitutes for other varieties – such as kidney beans for pinto beans. More generally, pulses are rich in protein, and the substitute for them are foods such as tofu, nuts, meat, poultry and seafood. These high-quality substitutes have traditionally been viewed more favorably as protein sources in developed nations, though there is a growing trend against animal protein sources and favoring plant protein sources.

b. Cost of Substitutes and Switching Costs:

- i. The cost to consumers switching from peas and beans to meat is high. The cost of switching to meat makes the threat of substitutes low in the industry. With a slight rise in veganism and vegetarianism helping to offset the minor changes in developing nations' food intake (e.g., India seeing economic growth and a larger portion of the population that demands meat products), the threat of substitutes is low but subsists.

DEGREE OF RIVALRY



Without regard to geographic region and limitations, the pulse industry is highly competitive. There are many farmers, multiple processing companies and storage facilities, and many net producer countries with which to compete.

a. Global Competition

- i. The global pulse market is very competitive. While brand identity is important, prices takes precedent over reputation. Weather and tariffs can change the entire dynamic within a short time-span by spiking prices, causing countries to switch importers.

b. Further Analysis

- i. Competition in the industry encompasses all parts of Porter's Five Forces. The barriers to entry, while relatively high, still allow new entrants because of the ability to vertically integrate. Bargaining power for both suppliers and buyers vary depending on where companies fall in the supply chain. Overall, the industry is a competitive industry. The industry is a high volume, low margin industry.

RISKS

There are several risks associated with the pulse industry, including the following:

- a. *Political*: Tariffs, as seen in India in 2017 and 2018, play a large role in the industry. Tariffs in one sector, i.e., aluminum and steel, may lead to tariffs in other areas, whether for true economic reasons or retaliatory reasons. The imposition of tariffs can happen relatively quickly which may disrupt global export and import numbers, leaving companies in the supply chain with too much product relative to the amount to export. Political unrest also plays a role. When countries, such as Venezuela, face turmoil politically, agricultural trade may be affected by damaged fields, inaccessible distribution channels, or hyperinflation.
- b. *Supply chain*: Weather is the largest factor influencing crop production. Risk from weather comes in the form of drought, flooding, unexpected freezes, and more. Weather conditions have affected Central America, the US, and Mexico dry bean production in 2018. Weather risks may be partially deterred using hedging strategies, imperfect though they may be. Other areas of the supply chain that pose risks is during the distribution of the production. Small fluctuations in fuel cost may not dilute margins, but the risk of OPEC making large changes in oil extraction laws may spike oil prices and force distribution companies to raise prices. On agricultural products with relatively small margins, large oil price changes can cause losses to occur
- c. *Competition*: Competition poses a risk to all areas of the supply chain, as in most industries. Global competitors may have a bumper year and can drop prices below other competitors. As seen in the last couple years, India's high production and strong yields in pulses have induced tariffs to keep global supply out.
- d. *Foreign Exchange Risk*: Currency fluctuations and exchange rates add to risk when dealing with small margins. Hedging with forward contracts may help reduce this risk.
- e. *Freight Risk*: The risk of loss in shipping may be reduced by cargo insurance, but the transportation market can also see very material fluctuations in ocean freight costs, which are very difficult – if not impossible to hedge.

PULSES

- a. The UN General Assembly named 2016 the Year of Pulses. The Year of Pulses was mainly a PR push to introduce pulses as a crop to be grown more and included in everyday diets. The Year of Pulses pushed pulses as an alternative source of protein for people and an environmentally sustainable option for farmers. With the rise of veganism and vegetarianism, the Year of Pulses was timed perfectly. The Year of Pulses shed light on recent research done in the pulse sector and initiatives by pulse groups, farmers, and nutritionists.
- b. Full integration of pulses into the global diet would likely mean successful ventures for farmers, stronger exports for pulse producing countries (such as Canada, a strong proponent of pulse advertising and marketing), and cheaper alternative sources of protein for people to counteract food insecurity issues. For pulses to find more success, more research money must be contributed to various groups performing research on seed genetics, germplasm resources, and modeling and analysis of various techniques, growth patterns, etc. Also, stronger marketing campaigns and PR campaigns must be made to increase awareness of the health benefits, affordability, and versatility, of pulses. With a stronger push in these sectors, global pulse demand may increase and positively affect the market and help boost bottom lines of players already placed firmly in the supply chain and with infrastructure in place.

BEANS

- a. The market outlook for the edible dry beans industry is an upward trend in the next few years. However, the edible dry bean market will still not be a large growth market. The bean market faces fluctuations each year based on global supply and demand. The crop availability in one country may allow nations to set tariffs in place and have lower prices for their crops. With an increase in bean consumption comes an increase in bean production. While companies that are already established have the best economic advantage in this situation, global production will still increase. Farmers will allot more lands to beans and introduce more bean plants in their crop rotations. The demand will be met quickly as crops are seasonal and can be switched frequently. Higher demand and higher supply will mainly keep margins constant but increase volume. This is an opportunity for companies already in the supply chain to make similar margins on beans but more gross dollars. The primary driver for the increase in bean consumption is likely the push for people to eat healthier and eat more organic food.
- b. Economic development does not always equate to success for the bean industry. A case study would be in Yangon, Myanmar, the world's largest producer of edible dry beans based on some standards. Heavily populated and largely impoverished, the country relies on local produce and affordable food options. Within the last two to three years, the city of Yangon (with nearly seven million people) has introduced several American fast food chains. The developing economy allows consumers to have excess income and the wherewithal to

purchase convenient, fast food, despite the premium in price compared to a plate of beans and rice.

- c. The market growth with some consumers seeking healthier options and affordable protein alternatives should be stronger than the counter growth in some developing nations. Overall, the edible dry bean market should face enough growth to keep all major players competing for lower prices and allow the same companies to increase production, specifically in the organic category.
- d. The Dominican Republic sanctions on beans are starting to lift and should be entirely lifted by 2020. Central America has had a weak harvest for its first bean harvest due to drought conditions and high temperature, as well as civil unrest in Nicaragua that made receiving credit difficult. Also, Mexico had irregular weather patterns over the summer months which may result in a weak yield. This may be pivotal as Mexico planned increase bean production on nearly all bean types for 2018.

1. Enter the global market trade by shipping both domestically and internationally to protect against price swings and cyclicity.
2. Evaluate costs to vertically integrate or create distinct partnerships.
3. Evaluate the current regional demand for organics.
4. Find the balance between highly concentrated and thoroughly diversified.
5. Improve cash flow by utilizing scale and operating equipment at full capacity.
6. Increase public education into the health benefits of pulses.
7. Invest in and encourage the governmental agriculture departments to invest in research for the pulse industry to recognize market trends and inefficiencies.
8. Lobby and incentivize the promotion of plant-oriented diets to local governments and customers.
9. Stimulate private equity investments to continue growing the industry and deploying new capital that can help improve returns and drive innovation.
10. Develop new hedging strategies and products to help market participants address price volatility.