

# Early Generation Seed Case Study

Saskatchewan Pulses

July, 2018



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## Saskatchewan Pulses Case Study

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**Crop:** Pulses  
**Location:** Saskatchewan, Canada

# University of Saskatchewan Breeding Program Enables the Seed System

## VARIETAL DEVELOPMENT & SEED DEPLOYMENT



### Varietal Development

Varietal development for Saskatchewan pulses is conducted through the University of Saskatchewan's Crop Development Centre (CDC) and is supported by the Saskatchewan pulse levy, provincial government grants, and royalties on varieties marketed outside of Saskatchewan.



### Seed Multiplication

Most pulse breeder seed produced at CDC is distributed and managed through licensing agreements with the Saskatchewan Pulse Growers (SPG). SPG manages a Varietal Release Program, through which Select Status growers can purchase CDC breeder seed varieties for multiplication as pedigree seed. These growers maintain decision rights over production, marketing, and pricing.



### Certified Seed Production

Seed producers must be members of the Canadian Seed Growers Association, which is recognized by the federal Seeds Act and Regulations as the official Canadian pedigreering agency. Growers may choose to demote seed of any stage (e.g. select, foundation, registered) and have it certified without completing all multiplication steps.

## FARMER PRODUCTION, MARKETING, AND KEY DEMAND SEGMENTS



### Farm Production

Saskatchewan is home to 17,000 pulse growers<sup>1</sup>, and in this system, commercial and seed growers are often one in the same. Most farms are large and family run, with 1,000 to 2,000 acres of production. Growers use pulses to improve soil nitrogen fixation in rotation with oil and cereal crops. Growers operate independently, with no co-ops present, but are connected through industry associations.



### Industry Advocacy

The size of the Canadian pulse industry is complemented by a number of industry advocacy groups including provincial pulse grower associations; Pulse Canada, which manages the branding for pulses grown inside the country; Ag-West Bio, a bridging organization dedicated to industry growth; Saskatchewan Food Industry Development Centre, which provides pilot testing for value-added products; and the University of Saskatchewan, which helps bring research and industry together.



### Demand Segments

Saskatchewan pulses are shipped internationally, with \$3.6 billion exported in 2016<sup>2</sup>. The demand for pulses worldwide is being driven by a few main factors, including consumer desire for alternative protein sources, doubling as value-added products, and consumer averseness to crops produced with GMO technologies. Pulses are also used widely as animal feed additives.

SOURCE: (1) [http://saskpulse.com/files/annual/report/Final\\_AR\\_-\\_Low\\_Res.pdf](http://saskpulse.com/files/annual/report/Final_AR_-_Low_Res.pdf)

SOURCE: (2) Saskatchewan Advantage PDF from Saskatchewan Ministry of Agriculture

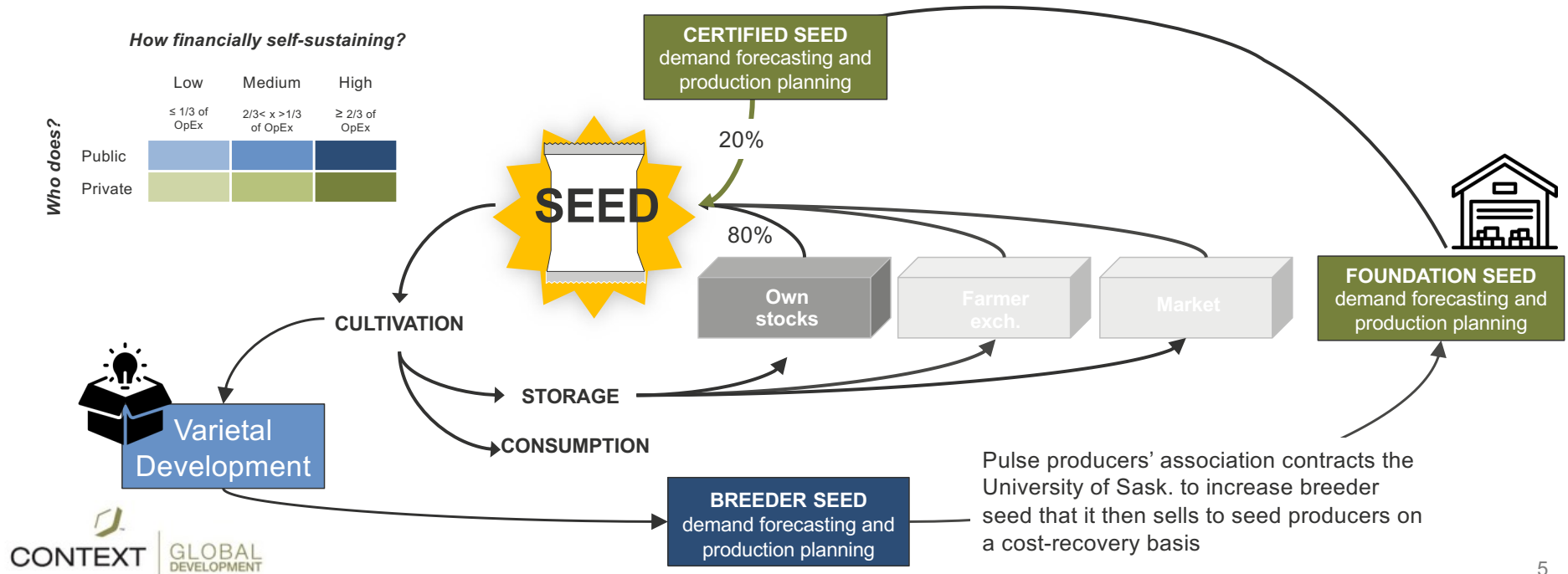
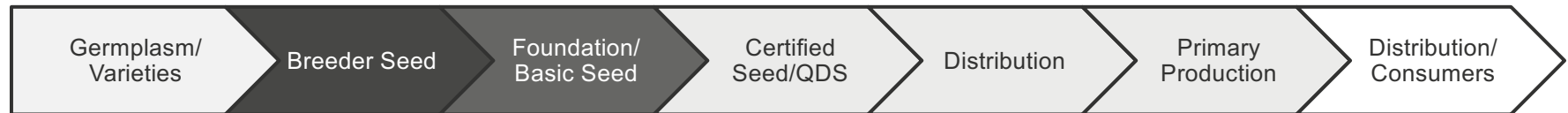
## ENABLING ENVIRONMENTSTAKEHOLDERS

[Crop Development Centre](#) | [Saskatchewan Pulse Growers](#) | [Canadian Seed Growers Association](#) | [Pulse Canada](#)



## SEED SYSTEM STRUCTURE

# University-Led Varietal Development Program and Commodity Levy Support Seed System





## KEY SUCCESS FACTORS

# Financial Sustainability



**Public and Private Sector Reliably and Jointly Fund Research, Breeding, and Bridging Organizations**

Private and public sector stakeholders are jointly committed to fund the operations that enable varietal development, research programs, and bridging organizations. The Saskatchewan Ministry of Agriculture provides the largest share of the Crop Development Centre's (CDC) funding, with additional funding coming from SeCan, Saskatchewan Pulse Growers, royalties collected on released varieties sold outside of Saskatchewan. Bridging organizations, such as the Saskatchewan Food Industry Development Centre (Food Centre) and Ag-West Bio, exist as part of government mandates and receive governmental funding for their operations.



**Growers Fund Varietal Development Through Commodity Levies and Are Willing to Pay for Improved Varieties**

Saskatchewan pulse growers value and support an end-point levy for research funding, which is applied on the sale of (pulse) grain. Growers' commitment to supporting research is exemplified by the SPG's decision to double the levy in 2002, from 0.5% to 1%. The end-point levy, captured at the sale of the commodity, applies regardless of whether the production originated from saved or purchased seed (25-30% of pulse area is planted with certified seed annually). The end-point levy reduces growers' input costs, as compared to a varietal royalty scheme, and better links the timing and cost of funding research with when growers realize the value of past research.



**Pulse Growers Association Licenses and Distributes University Developed Germplasm to Saskatchewan Growers On a Royalty-Free Basis**

Saskatchewan pulse growers pay for certified seed of SPG-licensed varieties, but do not pay a royalty as a part of those transactions. SPG is able to avoid charging royalties because it is funded almost exclusively through the aforementioned grower-legislated levy on commodity sales. Royalties are assessed on SPG-licensed varieties sold outside of Saskatchewan and CDC has executed distributor contracts with select seed companies that are responsible for royalty collection and remittance.



**Pulse Growers Association Contracts the University to Increase Breeder Seed That is Sold on a Cost-Recovery Basis**

SPG is able to leverage the physical and technical resources of CDC to increase and deploy breeder seed of improved varieties to the market. SPG contracts CDC to produce breeder seed of its licensed varieties, which it in turn sells to hundreds of Select Seed Growers on a cost recovery basis. SPG funds the production of breeder seed by the CDC Breeder Seed Unit, which utilizes University of Saskatchewan-owned fields, equipment, and technical staff to produce breeder seed in quantities of between half-a-ton to two tons per variety.



**University is Anchor for Large Research Institutions, Drawing Funding and Infrastructure**

Several national research organizations (i.e. Agri-Food Canada Research Station & National Research Council) are located on the University of Saskatchewan campus and support university research programs. The National Research Council (NRC) funds researchers that contribute to organizations outside of NRC, such as the Global Institute for Food Security, and allows its research labs and equipment to be used by researchers at the University of Saskatchewan. Agri-Food Canada partners with CDC to conduct regional varietal testing for pulse varieties. System-wide collaboration allows for the additional benefits of infrastructure and capital (people and funding) brought in by these national research organizations to be best utilized.

## KEY SUCCESS FACTORS

# Demand Planning and Operations



**Pulse Growers Association is Responsive to Farmer-Member Needs and Market Dynamics**

SPG advocates for the interest of pulse growers and seeks to anticipate and respond to market dynamics. In 2016, when pulse acres were up and production was higher than forecasted, SPG gave growers the option to lower the current levy, allowing growers to capture more of the profit from the increased production. When neighboring provinces decided to discontinue agreements with SPG that formerly allowed growers royalty-free access to CDC varieties, SPG entered into agreements with two seed companies to ensure outside growers access to the CDC varieties.



**Select Seed Growers Match Supply to Demand and Establish Certified Seed Pricing**

SPG builds safety stock assumptions into its annual breeder seed production plan to hedge against demand variability. SPG determined that the potential net loss of overproduction is worth the larger gain of having enough breeder seed available each year to satisfy the market. SPG produces breeder seed on a cost-recovery basis, but being the sole producer of improved pulse varieties in the Canadian market provides a captive demand that must be met year-to-year, even considering that certified seed only accounts for 20% of planted pulse acreage in Saskatchewan.



**Pulse Growers Association Hedges the Risk of Breeder Seed Stockouts by Maintaining Safety Stocks**

A highly-networked group of hundreds of seed growers resolve supply and demand tensions through a decentralized seed system in which each actor develops individualized demand forecasts, makes seed production and demotion decisions over multiple planting seasons, and sets their certified seed price.



**Collaborative Demand Planning Process Between Breeding Program & Growers Association**

For more than 20 years, SPG and CDC have collaborated to determine breeder seed amounts for new varieties. This collaboration is made up of a series of meetings leading up to the introduction of new varieties between the two groups and is run similar to how a seed company would meet to plan for demand. This long-standing process has proven successful for the system in the past, however, the programs are open to evolving this system to include a seed company to assist in this process.



**Vertically Integrated Seed Growers' Overproduction Risk Is Mitigated by the Ability to Plant Own Seed**

There are a few hundred Select Growers eligible to buy CDC breeder seed, and for even the most popular varieties, an average of 30-40 growers are actually buying an improved variety at one time. Many of these growers will multiply the breeder seed all the way through the certified seed stage (which is the commercial level of pedigreed seed). The ability for these growers to save seed and plant it in their own fields the next year or sell to neighboring growers helps mitigate their risks related to overproduction.

## KEY SUCCESS FACTORS

# Enabling Environment



### Main Actors in EGS Deployment System Have Clearly Defined Roles

Each step of the seed deployment model has one main actor with a few defined roles associated with the success of that step. Breeder seed is produced by CDC before it is handed off to SPG for release to Select Growers. SPG is responsible for the sales of breeder seed, allowing CDC to focus solely on producing improved varieties. Individual growers are responsible for subsequent multiplication steps and seed sales, assuming all risk during multiplication. CSGA is the group responsible for certifying seed and for choosing Select Growers to grow breeder seed. All of these actors depend on each other for success, but their defined roles allow for greater specialization and efficiency in seed deployment.



### Close Proximity of Actors & Trust-Based Relationships

The University of Saskatchewan's campus acts as a central hub for important actors in this system. The main organization involved in new variety development and testing (CDC), the provincial commodity association (SPG), the key bridging organizations (Ag-West Bio, Food Centre), and national research organizations (NRC, Agri-Food Canada) are all located either on the university campus or within a 15-minute drive. The campus is located in the heart of the main pulse-growing region in Saskatchewan. A strong level of trust has been built between these key system actors, which is facilitated by their close proximity and ability to meet in-person, formally or informally.



### Bridging Organizations Exist as Local Glue For Industry and Catalysts to Create Strong, Trusted Networks

Bridging organizations (i.e. Saskatchewan Food Industry Development Centre Inc., Ag-West Bio), exist as the main conduits to bring industry together on a regular basis to discuss key industry issues, in both formal and informal settings. Not only are these groups all located in close proximity to each other and to Saskatchewan industry leaders, they also often exist as government mandates and draw their funding from the provincial or federal government. These groups act as the bridge between research organizations (University of Saskatchewan (public), POS Bio-sciences (private)) and business and enterprises (producers, processors, traders).



### Federal and Provincial Government Incentives Exist to Encourage Several Levels of University and Industry Collaboration

At both the federal and provincial levels, incentive programs exist to encourage collaboration between pulse system actors, both for combining industry and university efforts and within different university programs. An example of this is the Federal Supercluster Initiative, Protein Industries Canada, that uses significant federal monetary investments to create an industry-led program to increase the visibility and viability of alternative protein sources made from Canadian Pulses. Industry is tasked by the government to lead the charge, and match federal investment dollars, while the university breeding programs support varietal development.



### Strength of Pulse Industry Is Driven By Long-Term Planning and Solutions

A current focus of the pulse industry is the development of value-added products, including non-meat alternative protein sources, as well as sustainable ways to produce these items. Several groups exist in this system that provide services that help system actors plan for future uses of pulses in pilot testing capacities and also provide input on the viability of different uses of pulses. The Food Centre and POS Bio-sciences both provide space for innovators to test out new pulse product ideas, but will not approve the testing unless the products are marketable and profitable. These downstream information sources help with industry planning and contribute to the success of alternative pulse uses, potentially increasing overall demand for pulses.



## Saskatchewan Pulses EGS System

	1900-1949	1950-1999	2000-Present
FINANCIAL Levies   Royalties	<p><b>1899-</b> Competition (funded by the Canadian Commissioner of Agriculture) begins for farm children to select the best heads of wheat and barley on their farms</p> <p><b>1902-</b> Seed plot competition expanded through a private donation of 10,000 CAD and runs for several more years</p>	<p><b>1984-</b> Check-off collection begins at the request of growers; 0.05% is collected from each grower in Saskatchewan based on their value of production that is marketed for food, feed, or seed</p>	<p><b>2004-</b> Saskatchewan pulse grower levy increased to 1% of farm gate value</p> <p><b>2016- 2017-</b> SPG lowered the pulse grower levy from 1% to 0.67% in response to increased pulse production</p> <p><b>2018-</b> Canadian government and SPG invest \$18 million to fund a research cluster focused on improving pulse crops, exploring nutrition, and enabling universities and research institutions to undertake new research</p> <p><b>Continued</b> support of breeding and other pulse research by SPG</p>
DEMAND PLANNING/OPERATIONS Technology   Systems	<p><b>1900s-</b> As a result of the seed plot competitions, farm families realize the benefits of quality seed and become the first original members of the Canadian Seed Growers Association- this marks the beginning of the Canadian seed industry</p>	<p><b>1971-</b> Crop Development Centre founded at the University of Saskatchewan; funded by the Canadian National Research Council (NRC) for the first three years of operation</p> <p><b>1997-</b> Saskatchewan Pulse Growers Variety Release Program began</p>	<p><b>2000-</b> SPG Board est. Transportation Committee to concentrate on railway and government transportation policy</p> <p><b>2015-</b> All new PBR-protected varieties become protected under new legislation that conforms to UPOV 1991 convention</p> <p><b>2018-</b> SPG licensed distribution rights outside of Saskatchewan to SeCan for a 10-year period on 2018 pulse varieties</p>
ENABLING ENVIRONMENT Policies   Stakeholders	<p><b>1904-</b> The Canadian Seed Growers' Association established; leadership was only made up of officials from the Federal Government</p> <p><b>1926-</b> Canadian Seed Growers' Association elects first grower President</p> <p><b>1928-</b> The Saskatchewan Seed Growers Association incorporated as a non-profit organization to support pedigreed seed growers</p>	<p><b>1970s-</b> Saskatchewan Pulse Crop Growers Association was the forum for growers to share market information and growing experiences</p> <p><b>1984-</b> Saskatchewan Pulse Crop Development Board (and current SPG) est. under federal and provincial legislation to collect check-off funds</p>	<p><b>2016-</b> The Pulse Brand is created to market pulse products around the world as part of the International Year of Pulses</p>

## Saskatchewan Pulses EGS System Key Takeaways

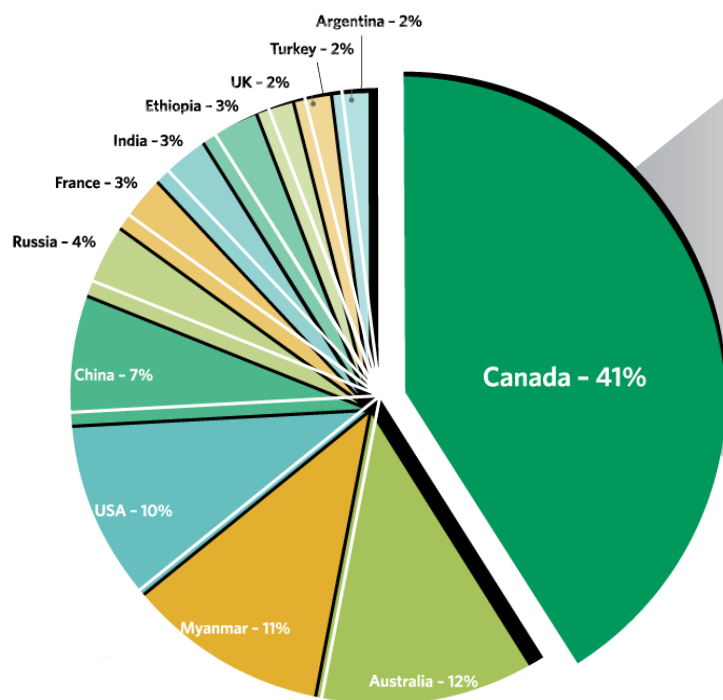
- In 1899, the Canadian commissioner of Agriculture donated \$100 for prizes to junior farmers to collect the best hundred heads of wheat and barley on their fathers' farms. The following year, Sir William C. Macdonald of Montreal donated \$10,000 CAD to continue the program and develop a larger seed plot competition for farm children. The competition lasted three years and developed a strong following including the parents of the children involved in the competition. After the completion of the competition, the parents of those children expressed a desire to continue the work of selecting better seed. As a result, the Canadian Seed Growers' Association (CSGA) was established in 1904 and those parents would eventually become the first original members of the Association. (From [CSGA Rooted in History](#))
- Saskatchewan Pulse Growers are willing to adjust levy amounts as province-wide pulse production fluctuates. SPG operates as a non-profit organization and when growers were seeing record production, the levy was lowered to cover only SPG operational costs, allowing growers to keep their increased profits from additional production
- Saskatchewan growers pushed for the development of the check-off fund following increases in pulse production in 1970. Pulse growers wanted more control over the uses of the check-off funds than they would have if the funds went directly to the government. Federal and provincial support enabled the creation of a Board to collect and distribute the funds to the grower-desired projects once they were collected



# Market Dynamics

## Canada is the World Leader in Pulse Trade and Pulse Production is Spread Across the Provinces

**World Pulse Trade Share  
(By Quantity)**

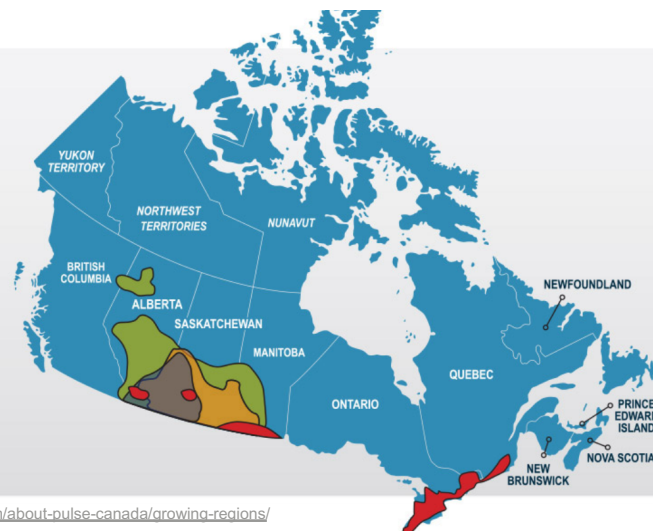


SOURCE: <http://www.adascan.ca/wp-content/uploads/world-pulse-trade-by-quantity-2013>

**Canadian Pulse Growing Regions**

**GROWING REGIONS**

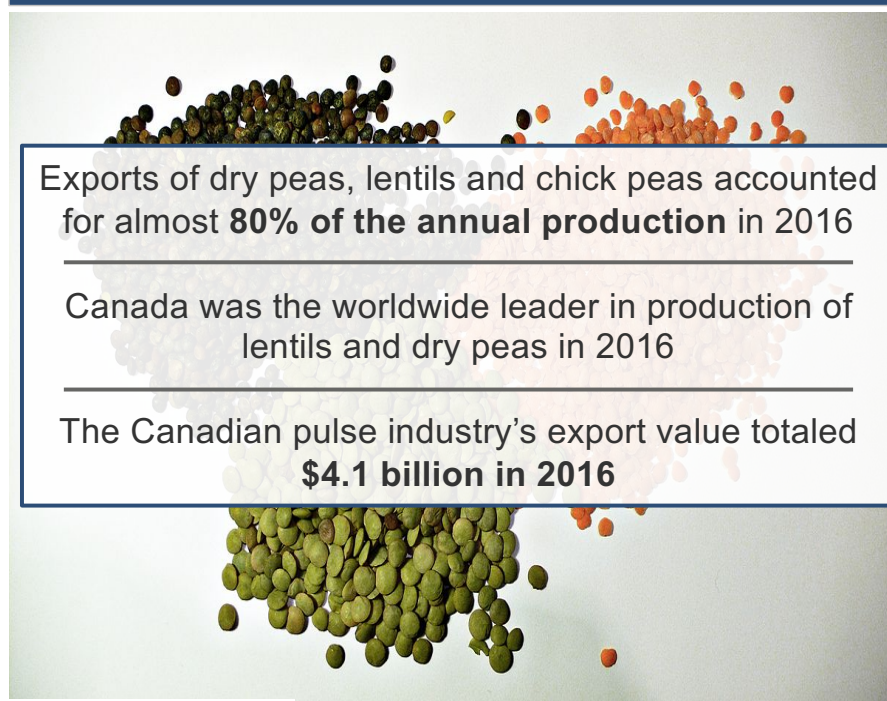
- B** BEANS
- C** CHICKPEAS
- L** LENTILS
- P** PEAS



SOURCE: <http://www.pulsecanada.com/about-pulse-canada/growing-regions/>

# Canada is the World Leader in Lentil & Dry Pea Production

## A Large Portion Of Pulses Produced In Canada Are Intended For Export Markets<sup>1</sup>



SOURCE: (1) <http://www.agr.gc.ca/eng/about-us/publications/discover-agriculture/pulse-potential-why-are-lentils-and-beans-rising-canadian-crop-stars/?id=1412020012289>

Canadian Pulse Production, 2016			
Pulse Class	Production (in tonnes)	Share of Total Global Production	Global Rank
Lentils	3,233,800	51.2%	1st
Dry peas	4,611,100	32.1%	1st
Chickpeas	106,900	0.1%	11th
Dry beans	249,400	0.1%	19th

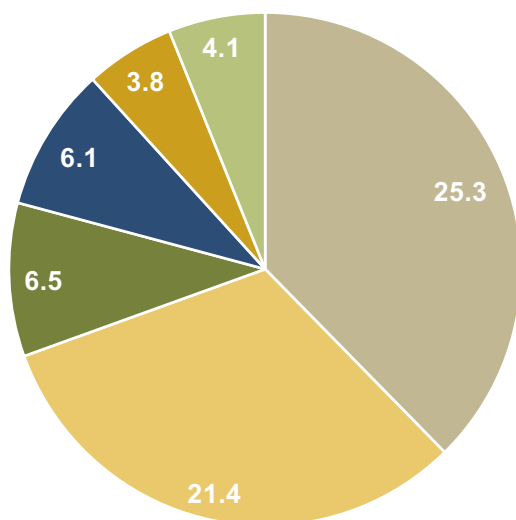
SOURCE: FAO, 2016



## Pulses: A Success Story in Strengthening Farm Profitability and Resilience as a Key Rotational Crop

Canadian Principal Field Crop Areas, 2018 Estimates  
(Millions of Seeded Acres)

- Wheat
- Canola
- Soybeans
- Barley/Oats
- Grain Corn
- Lentils/Peas



“Although wheat and canola continue to dominate field crop area, pulse area has increased significantly since the 1980s. Canada has become a leading producer and exporter of pulses worldwide. Several factors played an important role in this success story.

The **Canadian prairie soil** and **climate conditions**, research for **developing new varieties** that resist lodging and disease or have a shorter growing season, agronomic and economic benefits when planted in **rotation** with other field crops and the growth of **processing facilities** all contributed.”

Pulses in Canada (2014)  
Ellen Bekkering, Agriculture Division of the Government of Canada

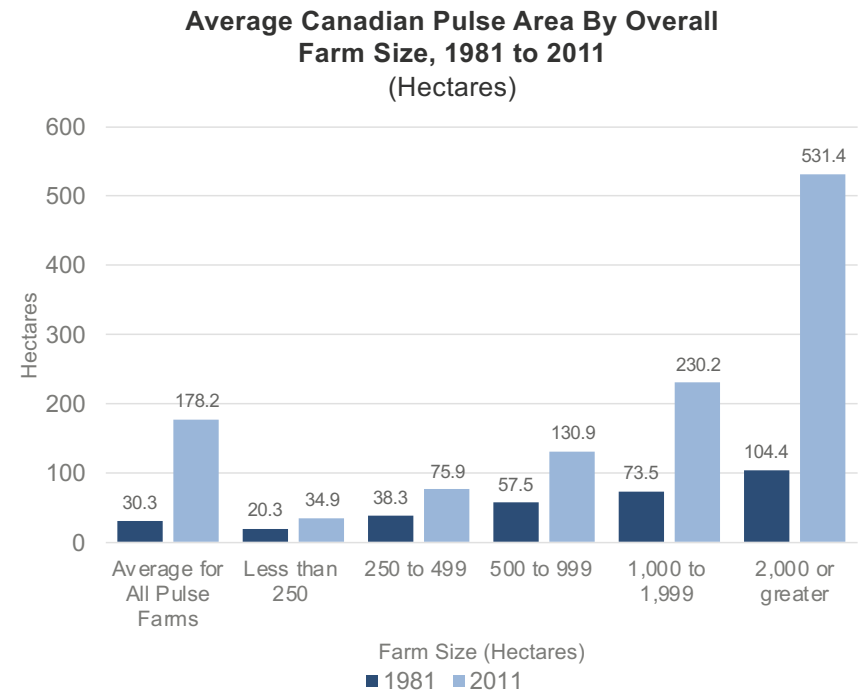
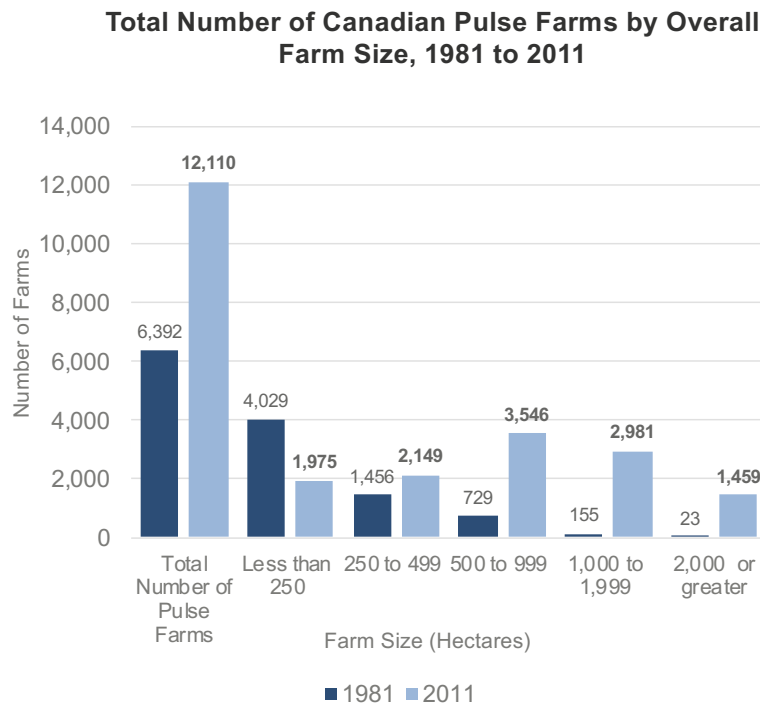
## CANADA: PULSES AND SPECIAL CROPS SUPPLY AND DISPOSITION

February 16, 2018

Grain and Crop Year (a)	Area Seeded ----- thousand ha -----	Area Harvested ----- thousand ha -----	Yield t/ha	Production ----- thousand tonnes -----	Imports (b)	Total Supply ----- thousand tonnes -----	Exports (b)	Total Domestic Use (c)	Carry-out Stocks	Stocks-to- Use Ratio %	Average Price (d) \$/t
<b>Dry Peas</b>											
2016-2017	1,733	1,677	2.88	4,836	32	5,042	3,944	798	301	6	300
2017-2018f	1,656	1,642	2.50	4,112	8	4,421	2,500	821	1,100	33	240-270
2018-2019f	1,300	1,280	2.50	3,200	15	4,315	2,600	815	900	26	220-250
<b>Lentils</b>											
2016-2017	2,254	2,221	1.44	3,194	98	3,365	2,455	595	315	10	575
2017-2018f	1,783	1,774	1.44	2,559	50	2,924	1,500	524	900	44	480-510
2018-2019f	1,300	1,280	1.56	2,000	50	2,950	1,800	400	750	34	455-485
<b>Dry Beans</b>											
2016-2017	133	120	2.07	249	91	355	337	16	2	1	885
2017-2018f	135	131	2.45	322	110	434	345	29	60	16	710-740
2018-2019f	125	123	2.24	275	80	415	335	25	55	15	765-795
<b>Chickpeas</b>											
2016-2017	62	44	1.86	82	27	129	108	16	5	4	1,000
2017-2018f	68	68	1.35	92	55	152	140	7	5	3	1170-1200
2018-2019f	80	79	1.84	145	45	195	125	20	50	34	1000-1030

SOURCE: Canada: Outlook for Principal Field Crops  
[http://www.agr.gc.ca/resources/prod/doc/mish/mag-qam/fco-ppc/fco-ppc\\_2018-02-16-eng.pdf](http://www.agr.gc.ca/resources/prod/doc/mish/mag-qam/fco-ppc/fco-ppc_2018-02-16-eng.pdf)

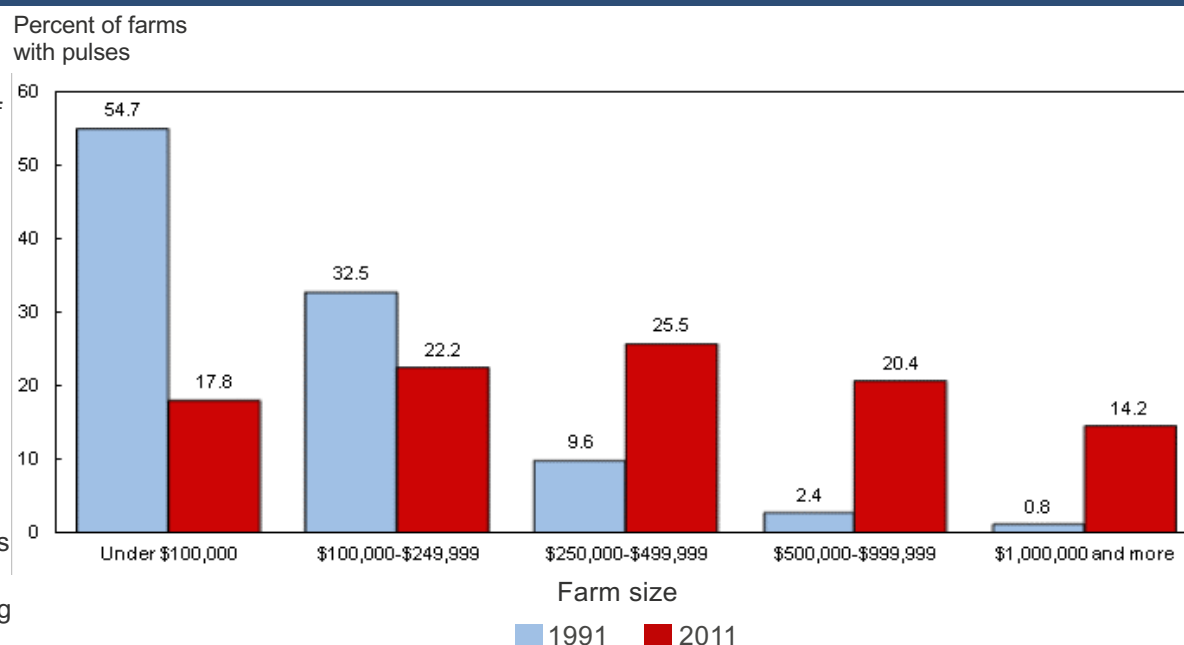
## The Size of Pulse Farms and the Number of Canadian Pulse Producers Has Increased Dramatically Since 1981



# Pulse Farm Receipts are Increasing as Average Farm Sizes Increase

Farms growing pulses by farm size (income), Canada, 1980 and 2010

According to the 2011 Census of Agriculture, the largest proportion of farms reporting pulses (25.5%) earned \$250,000 to \$499,999 in gross farm receipts. There were 1,715 farms reporting one million dollars or more of gross farm receipts. These million-dollar pulse farms represented 14.2% of farms reporting pulses and earned 53.2% of the total gross farm receipts for farms reporting pulses. Three decades earlier, these million-dollar farms made up less than 1% of all farms growing pulses. Smaller farms earning less than \$100,000 dominated in those days, accounting for 54.7% of all farms reporting pulses.

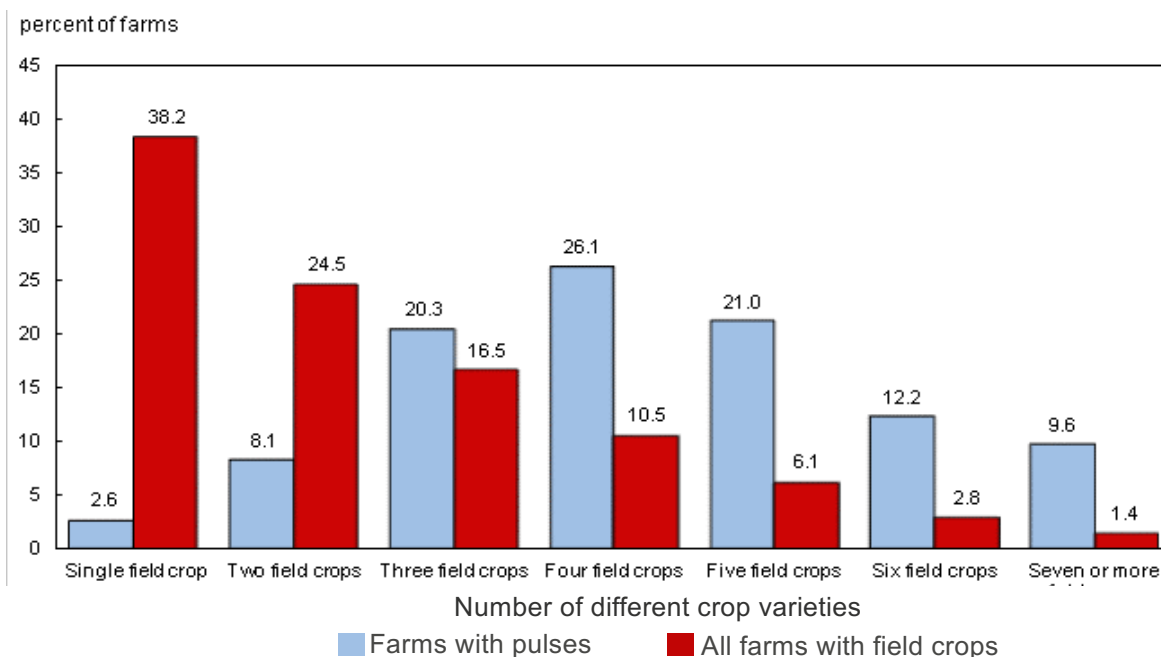


**Note:** Farm size categories established with 2010 constant dollars.  
**SOURCE:** Statistics Canada, Census of Agriculture, 1991 and 2011

## Farms Producing Pulses Tend to Feature a Higher Number of Field Crops Than Farms Without Pulse Production

In 2011, 97.4% of farms that reported pulses also reported other field crop varieties, mainly wheat (62.6% of farms), canola (61.2%), and durum wheat and barley (both 33.4%). In general, farms that reported pulses also tended to produce a larger variety of crops, with 26.1% of all pulse-producing farms reporting four field crop types. Nearly 1 in 10 (9.6%) farms reporting pulses reported seven or more field crop types on an operation.

Number of field crop varieties, Canada, 2011



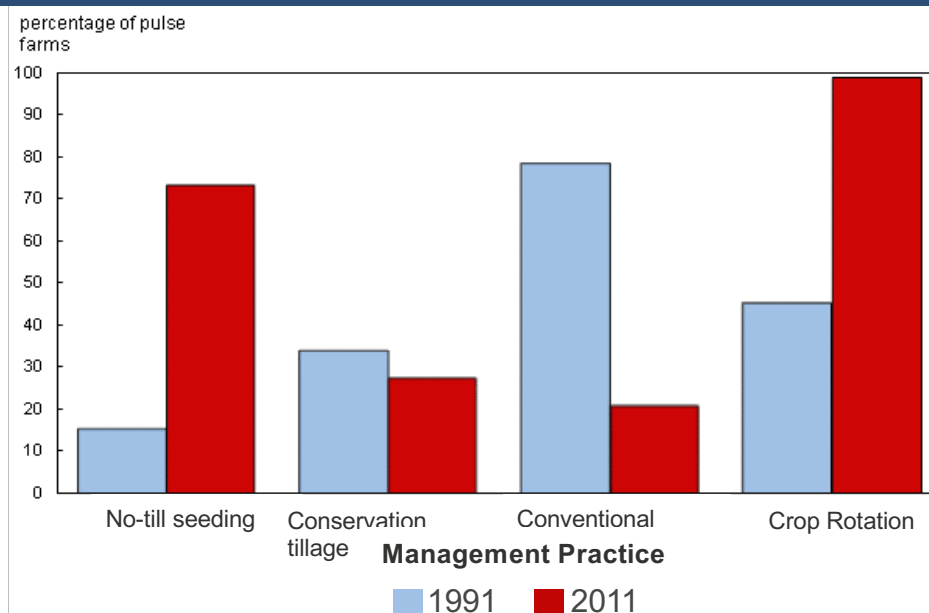
**Note:** All farms with field crops also include farms with pulses.  
 SOURCE: Statistics Canada, Census of Agriculture, 2011



## Crop Rotation and No-Till Seeding Are Common Practice Among Canadian Pulse Producers

Growing pulses in rotation with other grains and oilseeds can disrupt disease and insect cycles and also adds nitrogen to the soil,<sup>Note 3</sup> reducing the need for fertilizers. Due to these agronomic benefits tied to the economic benefit of spending less on inputs and being able to sell pulses at relatively good prices, pulses have gained popularity as a rotational crop. In 2011, 98.3% of farms with pulse areas reported using crop rotation. In 1991, they were only 44.8% of farm with pulses using rotation (Chart 2). The growth of conservation tillage methods may also have led their introduction into farmers' crop rotation systems.

Pulse Farms By Different Land Management Practices, Canada, 1991 and 2011



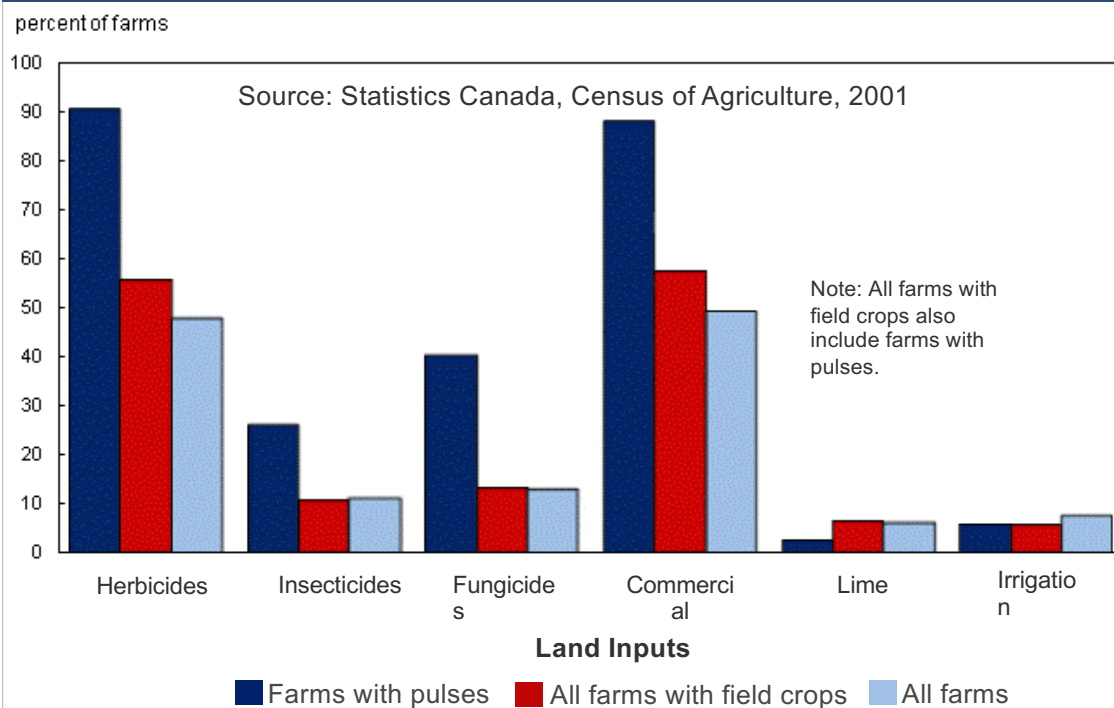
SOURCE: Statistics Canada, Census of Agriculture, 1991 and 2011

## Pulse Farms Utilize Herbicides, Insecticides, and Fungicides at a Higher Rate than Farms With Field Crops

Almost 9 out of 10 farms with pulses reported using herbicides or commercial fertilizers in 2011.<sup>Note4</sup> In contrast, more than half of farms with field crops reported using these inputs. The use of insecticides and fungicides was also more prevalent with farms growing pulses.

Farms growing other intensively managed field crops, such as canola, also had similar proportions of input use (91.7% of farms growing canola reported using herbicides).

Input uses for farms with pulses and field crops Canada, 2011



## In 2010, Saskatchewan Represented Over 65% of the Total Pulse Farms on ~80% of the Total Pulse Area in Canada

Region	Farms		Area		Pulse Share of Total Field Crop Area in Each Province
	number	percent	hectares	percent	percent
<b>Canada</b>	<b>12,110</b>	<b>100%</b>	<b>2,157,841</b>	<b>100</b>	<b>6%</b>
Maritime provinces	35	0.3%	327	0.0%	0%
Quebec	174	1.4%	4,138	0.2%	0%
Ontario	998	8.2%	39,557	1.8%	1%
Manitoba	491	4.1%	49,133	2.3%	1%
Saskatchewan	7,951	65.7%	1,711,498	79.3%	12%
Alberta	2,363	19.5%	348,965	16.2%	4%
British Columbia	98	0.8%	4,223	0.2%	1%

**Note:** No pulse area was reported in Newfoundland and Labrador.

**SOURCE:** Statistics Canada, Census of Agriculture, 2011

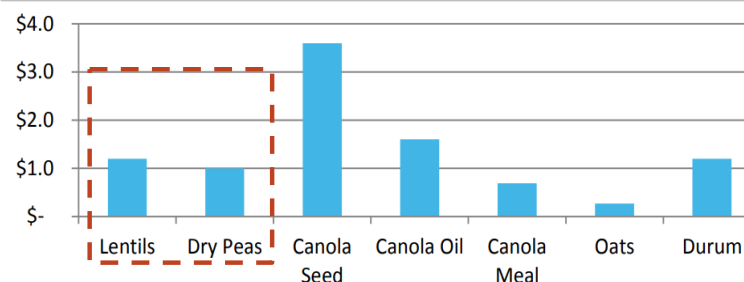
## Saskatchewan is the Dominant Pulse Producing Province of Canada; Leads the World in Lentil & Dry Pea Exports

Canadian Provincial Share of Seeded Acreage, 1991 to 2015 average

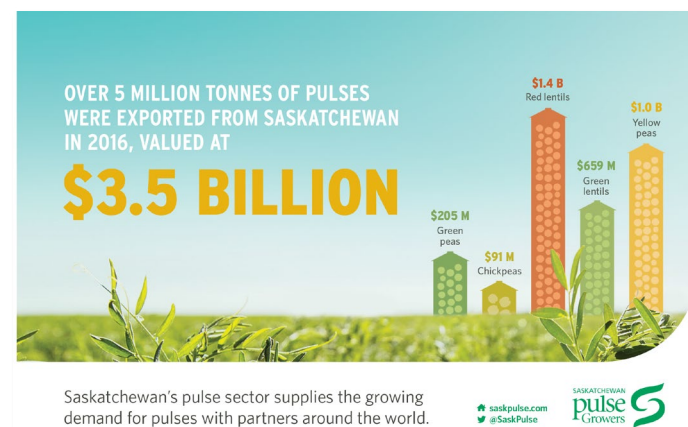
Crop Type	Saskatchewan	Manitoba	Alberta
Lentils	96%	2%	3%
Field peas	72%	5%	24%
Dry beans	0%	75%	25%
Chick peas	92%	0%	8%
Canary seed	92%	6%	1%
Flax	70%	26%	4%
Oats	48%	20%	32%
Barley	40%	10%	50%
Winter wheat	40%	38%	23%
All spring	53%	17%	30%
Durum	84%	1%	15%

SOURCE: Statistics Canada

Saskatchewan Agri-Food Exports Ranked First in the World, 2017  
(Value of Production, \$ Million)



SOURCE: <http://publications.gov.sk.ca/documents/310/93204-Saskatchewan's%20Agri-Value%20Advantage.pdf>



# Global and Local Trends Affecting Pulse Demand & Supply



**Pulses are Strong Rotational Crops**



**Consumers Are Seeking Out Gluten-Free Options<sup>1</sup>**

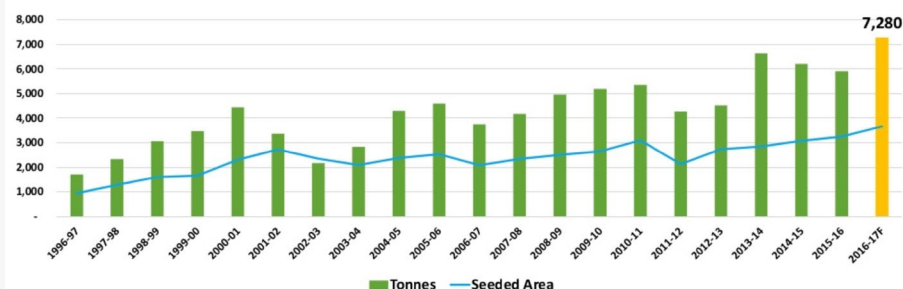


**Consumers Are Seeking Out Alternative Protein Sources**



**Consumer Preferences For Non-GMO Products**

**Pulse Production in Canada  
(thousand tonnes and hectares)**

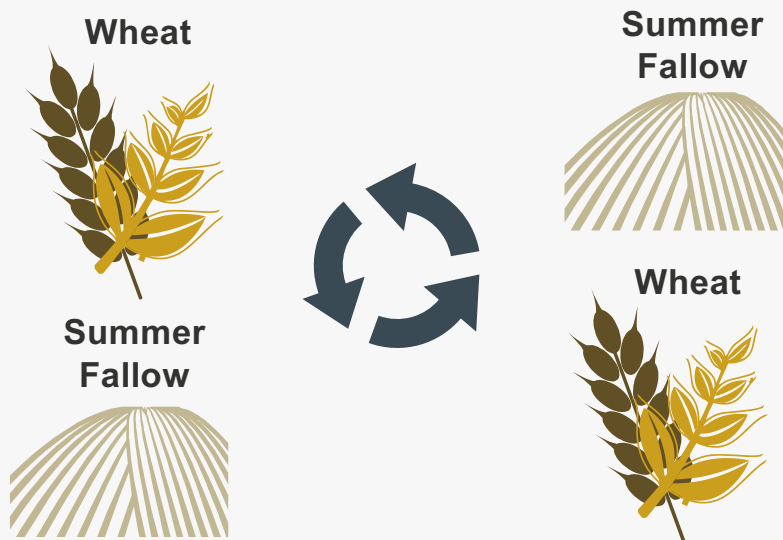


SOURCE: Pulse Canada Presentation to the International Food Policy Research Institute, <https://www.slideshare.net/southasia-ifpri/ifpri-export-of-pulses-from-canada-gordon-bacon-pulse-canada-63559608>



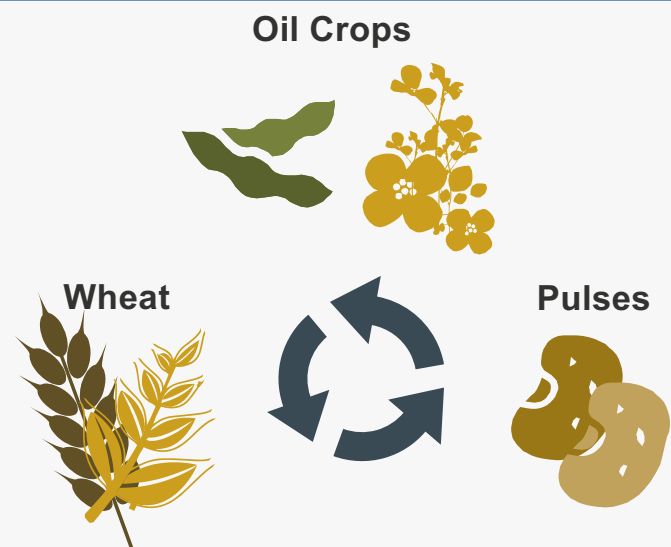
## Saskatchewan Growers Leverage Pulses in Crop Rotations to Improve Soil Biodiversity and Nitrogen Fixation

### Past Saskatchewan Crop Rotations<sup>1</sup> (1970s-1990s)



This rotation resulted in poor soils and a backlog of wheat at grain elevators

### Current, Improved Rotations (1990s-Present)



The addition of pulses to crop rotations increased soil biodiversity and potential for nitrogen fixation

# Changes to India's Pulse Import Policies Have Adversely Affected Canada's Pulse Industry

As of 2017, India Requires Any Country Exporting Pulses to the Country to Treat the Crop with Pesticides That Are Prohibited in Canada

## Issues for Canada<sup>1</sup>:

The chemical required for the pesticide treatment is **illegal** in Canada

The pest at the source of the ruling **does not exist** in Canada

According to Saskatchewan's minister of agriculture, this ruling has driven the price of lentils down by **nearly half**, as compared to normal prices

## 'A huge loss to our producers': Restrictions on pulse exports to India driving prices down

'India's made concessions to other countries on this matter, but not Canada,' says Sask. agriculture minister

CBC News · Posted: Nov 30, 2017 2:03 PM CT | Last Updated: November 30, 2017



India has not extended its waiver on pest fumigation to Canada for the first time since 2004. (Wikimedia/Creative Commons)

## Pulse Industry Partnerships are Key to Ensuring Global Export Access<sup>2</sup>

1

**Pulse Canada** continues to work with and support the **Government of Canada** in reaching a long-term resolution in India, a key Canadian pulse export market

2

**SPG** has partnered with **grower groups** from other provinces and **pulse exporters** through our national association, **Pulse Canada** to tackle issues such as transportation, maximum residue limits, and free trade agreements

3

Representatives from Pulse Canada and SPG visited India to press for **predictability** and **transparency** in India's trade policies relating to pulses, to ensure pulses already en route be exempt from policy changes, and that Canada **not be required to fumigate pulse shipments**, as there is no science-based risk associated with Canadian pulse shipments

SOURCE: (1) <http://www.cbc.ca/news/canada/saskatchewan/pulse-producers-india-restriction-1.4426855>  
(2) <http://saskpulse.com/news-events/news/progress-for-canadian-pulses-in-india/>



# Leadership

# University Breeding Program Enables the System

## VARIETAL DEVELOPMENT & SEED DEPLOYMENT



### Varietal Development

Varietal development for Saskatchewan pulses is conducted through the University of Saskatchewan's Crop Development Centre (CDC) and is supported by the Saskatchewan pulse levy, provincial government grants, and royalties on varieties marketed outside of Saskatchewan.



### Seed Multiplication

Most pulse breeder seed produced at CDC is distributed and managed through licensing agreements with the Saskatchewan Pulse Growers (SPG). SPG manages a Varietal Release Program, through which Select Status growers can purchase CDC breeder seed varieties for multiplication as pedigree seed. These growers maintain decision rights over production, marketing, and pricing.



### Certified Seed Production

Seed producers must be members of the Canadian Seed Growers Association, which is recognized by the federal Seeds Act and Regulations as the official Canadian pedigreering agency. Growers may choose to demote seed of any stage (e.g. select, foundation, registered) and have it certified without completing all multiplication steps.

## FARMER PRODUCTION, MARKETING, AND KEY DEMAND SEGMENTS



### Farm Production

Saskatchewan is home to 17,000 pulse growers<sup>1</sup>, and in this system, commercial and seed growers are often one in the same. Most farms are large and family run, with 1,000 to 2,000 acres of production. Growers use pulses to improve soil nitrogen fixation in rotation with oil and cereal crops. Growers operate independently, with no co-ops present, but are connected through industry associations.



### Industry Advocacy

The size of the Canadian pulse industry is complemented by a number of industry advocacy groups including provincial pulse grower associations; Pulse Canada, which manages the branding for pulses grown inside the country; Ag-West Bio, a bridging organization dedicated to industry growth; Saskatchewan Food Industry Development Centre, which provides pilot testing for value-added products; and the University of Saskatchewan, which helps bring research and industry together.



### Demand Segments

Saskatchewan pulses are shipped internationally, with \$3.6 billion exported in 2016<sup>2</sup>. The demand for pulses worldwide is being driven by a few main factors, including consumer desire for alternative protein sources, doubling as value-added products, and consumer averseness to crops produced with GMO technologies. Pulses are also used widely as animal feed additives.

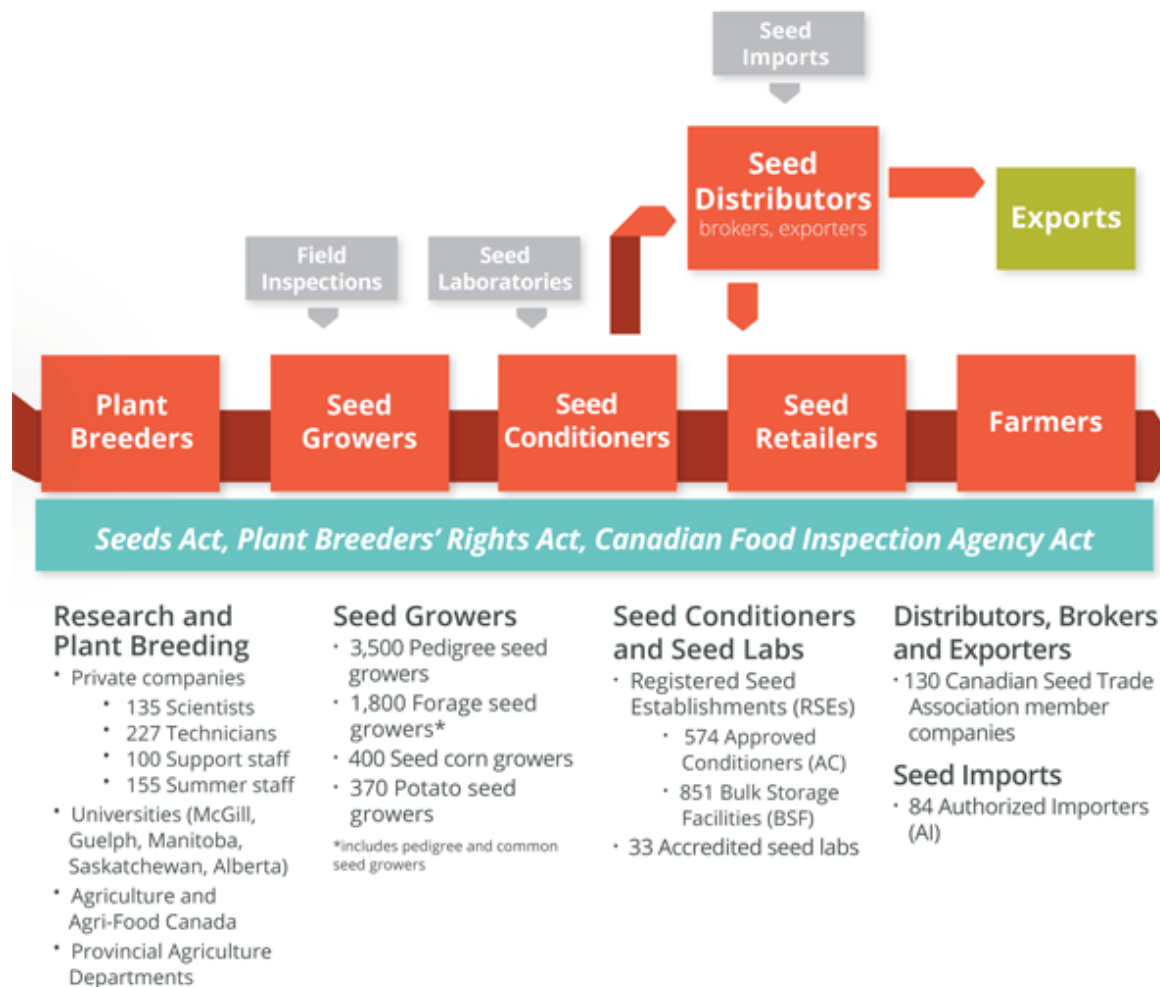
SOURCE: (1) [http://saskpulse.com/files/annual/report/Final\\_AR\\_-\\_Low\\_Res.pdf](http://saskpulse.com/files/annual/report/Final_AR_-_Low_Res.pdf)

SOURCE: (2) Saskatchewan Advantage PDF from Saskatchewan Ministry of Agriculture

## ENABLING ENVIRONMENTSTAKEHOLDERS

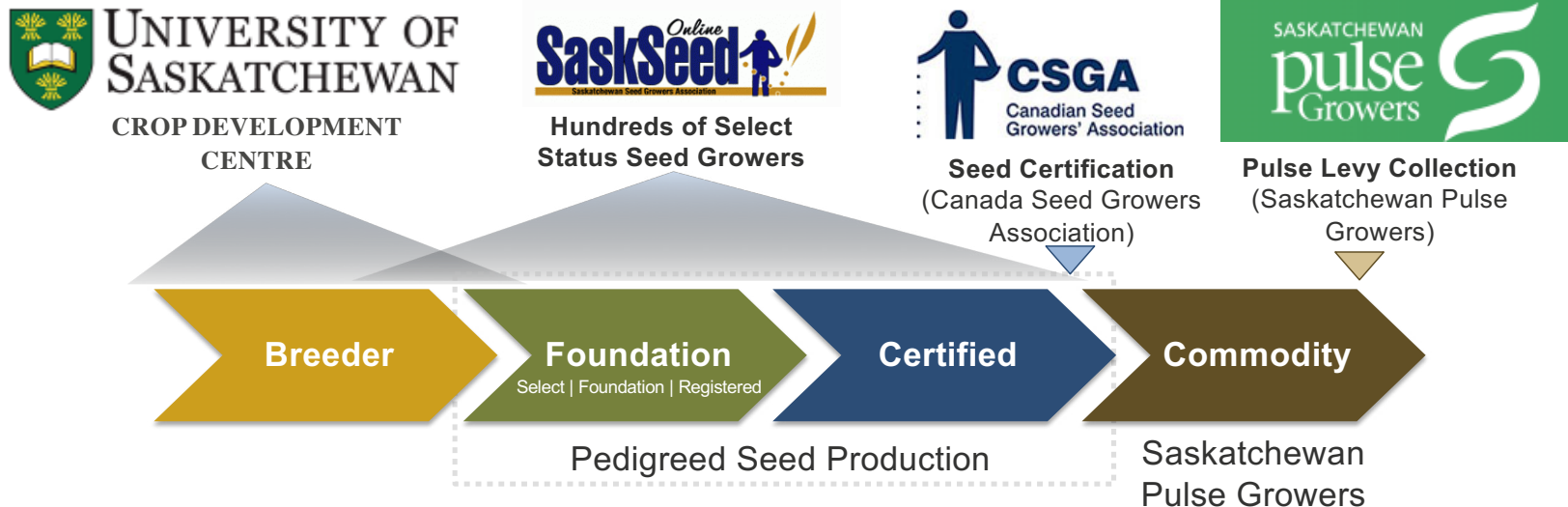
[Crop Development Centre](#) | [Saskatchewan Pulse Growers](#) | [Canadian Seed Growers Association](#) | [Pulse Canada](#)

# CANADA SEED SYSTEM SCHEMATIC



SOURCE: <http://www.agr.gc.ca/eng/industry-markets-and-trade/international-agri-food-market-intelligence/canada/canadian-seed-sector-profile/?id=1405967530785>





## Organizational Leadership by Value-Chain Step





## LEADERSHIP

# Organizational Value Chain Leadership Summary

	A	B	C	D
ORGANIZATION	<b>Crop Development Centre</b> 	<b>Saskatchewan Pulse Growers</b> 	<b>Canadian Seed Growers Association</b> 	<b>Saskatchewan Seed Growers Association</b> 
VALUE CHAIN ROLE	<ul style="list-style-type: none"> <li>• Varietal Development</li> <li>• Breeder Seed Production and Distribution</li> </ul>	<ul style="list-style-type: none"> <li>• Seed grower and pulse industry advocacy, coordination, and oversight</li> <li>• Variety Release Program</li> </ul>	<ul style="list-style-type: none"> <li>• Certification of pedigreed seed</li> <li>• Conferral of Select Seed Grower status</li> </ul>	<ul style="list-style-type: none"> <li>• Pedigreed seed grower advocacy, coordination, and oversight</li> </ul>
MAJOR FUNDING SOURCES	<ul style="list-style-type: none"> <li>• Licensing Fees from SPG</li> <li>• University and Provincial grants</li> <li>• Royalties from seed sales in provinces other than Saskatchewan</li> </ul>	<ul style="list-style-type: none"> <li>• Saskatchewan Pulse Levy</li> </ul>	<ul style="list-style-type: none"> <li>• Membership Dues</li> </ul>	<ul style="list-style-type: none"> <li>• Membership dues</li> </ul>
FINANCIAL SUSTAINABILITY	UNIVERSITY AND INDUSTRY INVESTMENTS	FINANCIALLY SUSTAINABLE	FINANCIALLY SUSTAINABLE	FINANCIALLY SUSTAINABLE



## LEADERSHIP

# The Crop Development Centre (CDC) is the Respected Research and Breeding Arm for U of Sask

## CDC Mission:

"The Crop Development Centre is a **field crop research organization** which seeks to **improve economic returns** for farmers and the agriculture industry of Western Canada by improving existing crops, creating new uses for traditional crops, and developing new crops." -CDC

## About the CDC's Founding:



The CDC was **founded in 1971** to improve economic returns for growers and the agricultural industry in Western Canada

The CDC began as collaboration between the University, the National Research Council (NRC) and the Saskatchewan Department of Agriculture.

For the first three years of operation, the NRC provided all funding for seven breeders and other support staff, with an initial budget of \$324,000<sup>1</sup>. Now, public and private partners have helped expand the CDC's budget and capabilities.

## About the CDC Today:

The CDC produces breeder seed of **65 different varieties** of seed across 12 different crop types



The **CDC's Breeder Seed Facility** is a state-of-the-art, 10,000 square foot seed cleaning facility on the Kernan Research Farm in Saskatoon.

## CDC Professional Staff and Budget:

9  
Plant  
Breeders

2 Pulse  
Breeder Seed  
Growers

2  
Pathologists

200+ Staff  
Members &  
Graduate  
Students

**\$200+ million in Annual Expenditures**

# The CDC Has Released Over 450 Commercial Varieties of Various Crops in 40 Years



## CDC's Research Focus Areas

- |  |   |
|--|---|
| <p><b>1</b> Develop improved crop varieties for growers and end users</p>                        | <p><b>5</b> Work in partnership with the public and private sectors</p>     |
| <p><b>2</b> Develop germplasm for use and exchange with breeding institutions</p>                | <p><b>6</b> Supervise and train graduate students from around the globe</p> |
| <p><b>3</b> Develop new crop kinds and management practices</p>                                  | <p><b>7</b> Provide leadership for agriculture in Saskatchewan</p>          |
| <p><b>4</b> Pursue state-of-the-art scientific technologies to remain at the top of the game</p> | <p><b>8</b> Work nationally and internationally to better agriculture</p>   |

The lifespan of the average CDC variety is ~six to ten years, with high variability between varieties

### CDC's Focus Crops:

Spring Wheat, Durum, Canary Seed, Barley, Oat, Flax, Field Pea, Lentil, Chickpea, Faba Bean, and Dry Bean

### CDC Impacts:

In Canada, CDC varieties account for **95%** of lentil acres, **85%** of dry pea acres, **83%** of flax seed acres, & **75%** of chick pea acres

## LEADERSHIP

# Saskatchewan Pulse Growers



“Saskatchewan Pulse Growers is a Pulse Crop Development Board that is accountable to and funded by growers” –SPG

**SPG Plays Integral Roles in Managing CDC Released Varieties for the Pulse System, including:**

Pulse Industry Levy Collection

CDC Variety Marketing & Research Funding

CDC Variety Release Program

Pulse Market Development & Demand Building



LENTILS



PEAS



SOYBEANS



CHICKPEAS



FABA



DRY BEANS

SPG has the **exclusive commercialization rights** for CDC pulse crop varieties



SOURCE: [https://agbio.usask.ca/documents/centres-and-facilities/CDC\\_FINAL\\_REPORT\\_November2016.pdf](https://agbio.usask.ca/documents/centres-and-facilities/CDC_FINAL_REPORT_November2016.pdf)

**SPG prioritizes research as a portion of its budget, with funding being funneled toward CDC's pulse research:**

**60%**  
OF ANNUAL  
BUDGET  
INVESTED  
IN R&D



**Breeding & Genetic Improvement**  
Delivering improved varieties



**Agronomy**  
Reducing agronomic constraints such as weed & disease pressures



**Processing & Utilization**  
Developing new markets through new uses for pulse ingredients



**Health Outcomes**  
Building scientific evidence for marketing & health claims

SOURCE: <http://saskpulse.com/research/research-priorities/>

## SPG Leadership:



Elected Board of Directors

Administrative Staff

Finance Staff

Research and Development Staff

Marketing & Promotion Staff

LEADERSHIP

# SPG Utilizes Several Digital Mediums as Part of Ongoing Industry Outreach Efforts

## MAGAZINES



## FACT SHEETS



## VIDEO MEDIA



SOURCE: <http://saskpulse.com/resources/media>

ACTIVE GROWERS, WHICH SPG DEFINES AS THOSE WHO HAVE PAID THE PULSE LEVY WITHIN THE LAST TWO YEARS, HAVE ACCESS TO THESE OUTREACH MATERIALS ON THE SPG WEBSITE



## LEADERSHIP

# The Canadian Seed Growers Association is the Sole Certifying Authority for the Saskatchewan Pulse Industry

### ABOUT CSGA:

“The Canadian Seed Growers’ Association (CSGA) is a non-profit organization representing the interest of Canadian seed growers. We provide leadership as the only Canadian organization to monitor and certify pedigreed seed for all agricultural crops in Canada except potatoes.” -[CSGA](#)

### CSGA Advances the Canadian Seed Industry Through:

**Promoting** the benefits of pedigreed seed throughout the seed industry and to end-users

**Cooperating** with researchers, growers and processors to expand the use of pedigreed seed

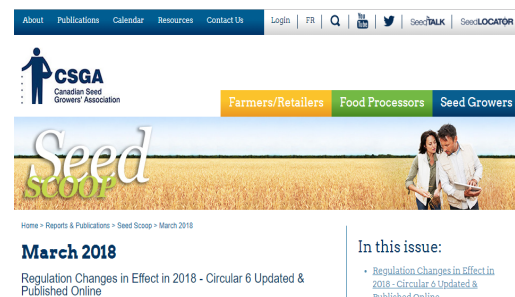
**Advocating** the use of the seed certification system as an integral part of identity preserved and quality assurance programs

**Facilitating** transfer of end-use specific traits from research to commercial use through pedigreed seed

### CSGA Provides Crop Certification Through:

- 1 Developing varietal purity standards and regulations for pedigreed seed crop production
- 2 Maintaining a verifiable seed certification system
- 3 Certifying the varietal purity of pedigreed seed crops

Annual membership fees of \$200 per grower provide access to outreach materials, voting privileges, and industry educational events





# Saskatchewan Seed Growers Association (SaskSeed)



“The Saskatchewan Seed Growers Association is a member-centric organization focused on enhancing pedigreed seed production and the growth of the seed industry in Saskatchewan.” -SSGA

## SaskSeed Accomplishes this Mission Through:



Serving as the **Official Voice** of members to industry and government



Providing members with **learning & networking** opportunities



**Advocating** for the issues and policies important to 550 members



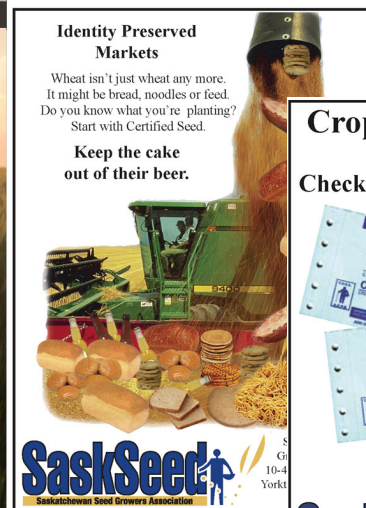
Building **strong relationships** with key industry partners

**Saskatchewan's total pedigreed seed industry is worth \$710 million<sup>1</sup>**

SOURCE: (1) <http://saskseed.ca/>



SaskSeed provides yearly updated seed guides that offer pedigreed seed growers industry news updates, information on available varieties, and growing recommendations



**Crop not performing?**

Check your warranty...



...if you have one.



SaskSeed Advocates for the Use of Certified Seed through advertisements targeted to commercial crop producers

# Canadian Seed Classifications



## Common Seed & Bin-Run Seed

- **Common seed** is a recognized grade in Canadian Seeds Regulations, with mechanical purity and germination requirements that must be met, including grading and labelling with a proper tag
- Since Common seed has no third-party or official certification records to verify varietal purity & identity, it **cannot legally be sold by variety name**
- **Bin-run or farm-saved seed** is commercial grain that has usually been cleaned by farmers for replanting

## Pedigreed Seed

- **Pedigreed seed**, from which Certified seed is derived, is seed that is true-to-type and has been developed for a specific purpose
- Pedigreed seed is **multiplied** from the small amount of **breeder seed** developed by plant breeders through the five multiplication stages
- Following the certified seed multiplication stage, pedigreed seed **can be used for commercial production** after third-party official inspection







# Research & Varietal Development

## 7-Year Stage Gate Process from Cross to Breeder Seed Scale-Up

	Breeding Phase	Varietal Testing Stage	Details
Year 1-2	Genetic Crossing (F1 & F2)	Crossing and Selection	Breeders at CDC are developing and selection the earliest generations of potential new varieties
Year 3-5	Varietal Selections (F3 - F5)	In-Field Yield and Quality Trials	Trials are done on land leased to CDC (about six locations per crop), and number of testing locations increases with each generation. Most test fields are located in Saskatchewan, where breeders and technical staff frequently monitor test fields
Year 6-7	Varietal Selection Concurrent with Breeder Seed Production (F6 - F8)		Beginning of breeder seed development (100kg) by CDC's Breeder Seed Unit (two university employees) and continued varietal development and selection
Year 8	Breeder Seed Scale-Up		Goal is to scale pre-breeder seed up to one to two tons, depending on varietal demand
Year 9-10			Breeder Seed Made Available to Select Growers through SPG

Source: Discussions with CDC Representatives, [http://saskpulse.com/files/general/2018\\_Variety\\_book\\_for\\_web.pdf](http://saskpulse.com/files/general/2018_Variety_book_for_web.pdf)

# Regional Pulse Variety Trials Are Enabled By CDC and SPG

**Pulse Regional Variety Trials** Occur Through **Collaborations** Between CDC, SPG, Agriculture and Agri-Food Canada Research Stations, Provincial Agriculture-Applied Research Management sites, & the Canadian-Saskatchewan Irrigation Diversification Centre<sup>1</sup>

Data is Collected At Several Sites Across Saskatchewan For Each Pulse Crop, Each Providing Multiple Data Points to Inform Grower Decisions

- 14 Pea Trials
- 9 Dry Bean Trials
- 6 Colored Faba Bean Trials
- 10 Lentil Trials
- 7 White Flowered Faba Bean Trials
- 4 Chick Pea Trials

Regional Variety Testing in Saskatchewan relies on support from many organizations, including:



## PULSE CROPS

### Lentil

Main Characteristics of Varieties

Genetic Characteristics of Varieties													
Market Class	Variety	Herit- age 1 & 2	Years Tested	Yield (% CDC Max) 1 & 2	Yield (% CDC Max) 3 & 4	Height (cm)	Days to Flower	Maturity Rating	Resistance To <sup>2</sup> Asco- chyta Disease Rusts	Seed Colour	Colo- red Colour	Seed Weight (g/1000)	
Small Red	CDC Maxim	CL	11	100	100	34	51	E/M	MR	MR	gray	red	40
	CDC Chasne §	CL	5	109	106	32	51	E/M	MR	I	gray	red	39
	CDC Clair	CL	6	97	93	33	53	E/M	MR	I	gray	red	38
	CDC Imax	CL	6	92	78	35	51	E/M	MR	I	gray	red	45
	CDC Impact	CL	6	80	76	30	47	E	MR	MS	gray	red	34
	CDC Impulse §	CL	8	108	95	37	52	E/M	MR	MR	gray	red	44
	CDC Proclaim §	CL	7	105	102	34	51	E/M	MR	MR	gray	red	40
	CDC Red Rider §	CL	6	95	85	34	52	E/M	MR	I	gray	red	45
	CDC Redberry §	CL	6	97	99	34	50	E/M	MR	MR	gray	red	42
	CDC Redcliff §	CL	7	107	103	35	51	E/M	MR	I	gray	red	38
Extra Small Red	CDC Redcoat §	CL	6	105	83	33	50	E/M	MR	MR	gray	red	39
	CDC Redmoon §	CL	7	114	106	33	52	E/M	MR	MR	gray	red	41
	CDC Scarlet	CL	9	104	104	35	53	E/M	MR	I	gray	red	36
	CDC Impala	CL	7	80	90	30	51	E	MR	MR	gray	red	31
	CDC Imperial	CL	6	84	79	30	49	E	MR	MR	gray	red	30
	CDC Redbow §	CL	6	102	99	30	49	E	MR	MR	gray	red	32
	CDC Rosebud §	CL	6	100	99	30	50	E	MR	MR	tan	red	31
	CDC Rose §	CL	7	92	90	33	52	E/M	MR	MR	gray	red	30
	CDC Ruby §	CL	7	102	98	34	53	E/M	MR	MR	gray	red	32
	Large Red	CDC KIR-1	CL	10	110	92	37	52	M	MR	MR	gray	red
CDC KIR-2 §		CL	7	102	90	37	52	M	MR	MR	gray	red	55
Small Green	CDC Inevitable	CL	11	92	80	33	49	E	MR	MR	green	yellow	34
	CDC Kermitt	CL	8	104	99	36	49	E/M	MR	MR	green	yellow	34
Extra Small Green	CDC Viceroy	CL	6	97	98	34	49	E	MR	MR	green	yellow	33
	CDC Ashwin §	CL	9	96	93	30	48	E	MR	I	green	yellow	26
Medium Green	CDC Insignea	CL	7	78	71	44	50	M	MR	S	green	yellow	57
	CDC Impress	CL	6	87	71	34	50	M	MR	MS	green	yellow	52
Large Green	CDC Meteor §	CL	6	102	89	34	50	M	MR	S	green	yellow	51
	CDC Richlea	CL	6	93	80	35	50	M	S	S	green	yellow	51
	CDC Greenland	CL	7	89	70	38	52	M/L	MR	S	green	yellow	64
	CDC Greenstar	CL	8	97	81	40	52	M/L	MR	I	green	yellow	73
	CDC Impover	CL	6	79	63	41	52	M/L	MR	S	green	yellow	64
	CDC Sovereign	CL	6	83	77	40	52	L	MR	MS	green	yellow	66
	CDC Marble	CL	7	102	98	36	49	E	MR	I	green	yellow	34
	CDC Peridot	CL	6	84	84	37	48	E	I	MS	green	yellow	38
Green Cotyledon	CDC GG-1	CL	5	80	65	42	51	M	I	I	green	green	49
	CDC GG-2	CL	7	88	90	40	48	E	I	I	green	green	32
Spanish Brown	CDC GG-3 §	CL	7	73	63	38	53	E/M	I	MR	green	green	46
	CDC SB-3 §	CL	6	88	87	35	51	E	I	MR	gray	yellow	38

<sup>1</sup> CL indicates Certified<sup>2</sup> tolerant variety.  
<sup>2</sup> CL and Regional Trials in Saskatchewan since 2006. Comparisons to the check variety, small red lentil CDC Maxim.  
<sup>3</sup> Maturity ratings: Normal maturity range in days based on May 1 seeding is E = 100, VL = 110 but maturity can be much earlier in dry years, much later in cool wet years. See Page 4 for more information on maturity range in lentils.

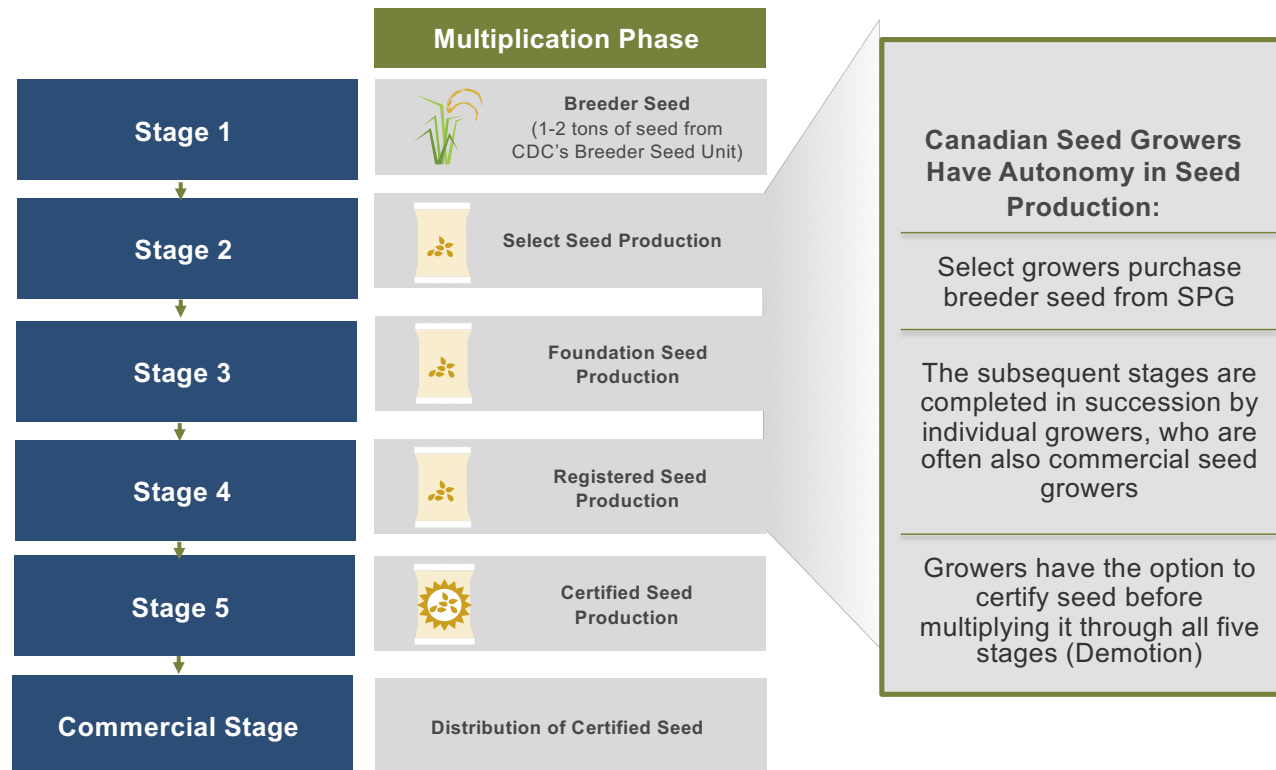
**ADDITIONAL INFORMATION**  
 Seed supplies may be limited for CDC Impulse, CDC Roxy, CDC Proclaim, CDC Redmoon and CDC Kermitt.

Regional Variety Trial Data is Shared by SPG through the **Seed Guide**, posted on the Saskatchewan Seed Grower Association Website<sup>2</sup>

SOURCE: (1) [http://saskpulse.com/files/general/2018\\_Variety\\_book\\_for\\_web.pdf](http://saskpulse.com/files/general/2018_Variety_book_for_web.pdf)  
 (2) <http://saskseed.ca/2018-seed-guide/>

SOURCE: [http://publications.gov.sk.ca/documents/20/96889-Varieties%20of%20Grain%20Crops\\_2018.pdf](http://publications.gov.sk.ca/documents/20/96889-Varieties%20of%20Grain%20Crops_2018.pdf)

## Five Stages Precede the Distribution of Certified Seed



## As of December 2016, CDC Had Released 148 Varieties of Lentil and Field Pea

Crop Type	Number of Varieties Released	Share
Barley	93	20%
Lentils	79	17%
Field Peas	69	15%
Wheat, excluding durum	66	14%
Dry Bean	42	9%
Oats	35	8%
Chick Peas	24	5%
Flax	22	5%
Durum	11	2%
Canary seed	8	2%
Faba beans	7	2%
<b>Total</b>	<b>456</b>	<b>100%</b>

SOURCE: [https://agbio.usask.ca/documents/centres-and-facilities/CDC\\_FINAL\\_REPORT\\_November2016.pdf](https://agbio.usask.ca/documents/centres-and-facilities/CDC_FINAL_REPORT_November2016.pdf)

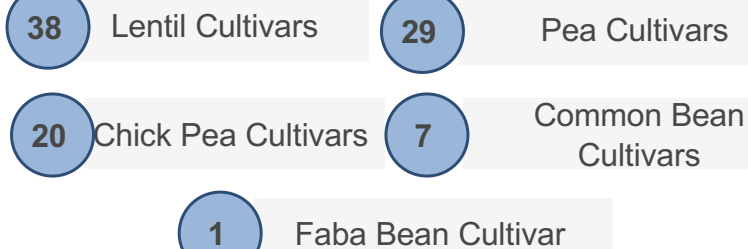
# Cultivar Commercialization

The development and commercialization of pulse cultivars in Saskatchewan has occurred under two programs:

## SPG Variety Release Program (VRP)

SPG provides the CDC's pulse-breeding program with an average of \$1.8 million per year in order to receive **exclusive distribution rights** to all pulse varieties developed by the CDC

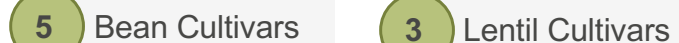
**95** Total Number of Cultivars Released Through VRP since 1997



## Tender Release Program (TRP)

Specialty pulse cultivars are tendered to seed companies on a **royalty-based** commercialization scheme

**8** Total Number of Cultivars Released Through TRP since 1997



Pulse cultivars released under the TRP are **differentiated by end use characteristics**, with private seed companies responsible for **managing the development** of the cultivar and the **collection of royalties** on seed sales

## Between 1997 & 2016, SPG Released More Than 110 CDC Pulse Crop Varieties Through SPG's Variety Release Program<sup>1</sup>

"Through **Saskatchewan Pulse Growers (SPG) Variety Release Program (VRP)**, breeder seed varieties developed by the Crop Development Centre (CDC) are made available to eligible Select Status seed growers in Saskatchewan royalty-free." -[SPG](#)

### Variety Release Program Details<sup>2</sup>:

- Included crops: Pea, Lentil, Chick Pea, Bean, and Faba Bean
- Select Status Grower certification is conferred by the Canadian Seed Growers Association (CSGA) and must be achieved before purchasing breeder seed from the SPG Variety Release Program
- Any nationally recognized Select Seed Grower whose provincial pulse grower organization has an agreement with SPG is eligible to apply for breeder seed through this program
- 197 Select Status Growers currently are a part of the SPG VRP

### SPG Released Varieties:

- Levies paid by growers in Saskatchewan to SPG ensure royalty-free access to CDC varieties
- SPG also enables a seed-royalty system for CDC varieties sold outside of Saskatchewan
- SeCan and SeedNet have Canadian marketing rights for CDC varieties outside of Saskatchewan for 10 years per variety<sup>3</sup>
- Unauthorized sales of seed are in violation of the [Plant Breeders' Rights](#)

(1) SOURCE: [https://agbio.usask.ca/documents/centres-and-facilities/CDC\\_FINAL\\_REPORT\\_November2016.pdf](https://agbio.usask.ca/documents/centres-and-facilities/CDC_FINAL_REPORT_November2016.pdf)

(2) SOURCE: <http://saskpulse.com/growing/varieties/select-seed-growers-program/>

(3) SOURCE: [http://saskpulse.com/files/general/171102\\_Web\\_Final\\_FAQ\\_Varieties\\_Outside\\_SK.pdf](http://saskpulse.com/files/general/171102_Web_Final_FAQ_Varieties_Outside_SK.pdf)



## Information About New Pulse Varieties Is Shared With Growers Through Industry News Articles



### New pulse crop varieties for 2016

These new pulse varieties are hitting the market for the first time this spring

"The most widely grown yellow pea varieties in Saskatchewan in 2015 were CDC Meadow (also the top variety grown in Manitoba) and CDC Golden, but two new varieties — CDC Saffron and CDC Amarillo — have gained rapid adoption by growers. Production of these varieties is expected to increase substantially.

**CDC Saffron** has high yield potential, good lodging resistance and attractive medium-to-large smooth, round seeds with medium protein content and good cooking quality.

**CDC Amarillo** has been one of the strongest yielding varieties in registration and regional trials over the past six years. CDC Amarillo is relatively tall with one of the best lodging resistance ratings among pea varieties. CDC Amarillo also has good resistance to fusarium wilt. Its seed weight is slightly less than that of CDC Saffron. It is round with medium protein content and good cooking quality.

**Abarth** yellow pea, available from FP Genetics, offers competitive yield, good disease resistance, and larger seed size. Abarth has medium maturity with very good resistance to powdery mildew, and fair resistance to mycosphaerella blight and fusarium wilt. It has good lodging resistance with best in class standability for ease of harvesting.

**AAC Lacombe** is a high-yielding, medium-large seeded yellow pea with excellent standability that should be available by the fall of 2016.

**CDC Inca** should be commercially available in 2018. CDC Inca has strong yield potential in southern Saskatchewan and good lodging resistance. It has medium seed size, round seed shape, medium protein content and good cooking quality."

SOURCE: <https://www.grainews.ca/2016/02/25/new-pulse-crop-varieties-for-2016/>

## Information About New Pulse Varieties Is Shared With Growers Through Industry News Articles



### New pulse crop varieties for 2016

These new pulse varieties are hitting the market for the first time this spring

#### Green peas

“**CDC Striker** has been the most widely grown green pea variety in Saskatchewan for the past eight years. The next most widely grown varieties in 2015 were CDC Patrick, CDC Raezer, CDC Sage, and CDC Limerick. With certified seed of CDC Raezer and CDC Limerick now available, area of production for these varieties is expected to grow substantially in 2016.

**CDC Raezer** has good yield and lodging resistance and is powdery mildew resistant, like most new varieties in Western Canada and has good resistance to fusarium wilt. Seed size, shape, and bleaching resistance are very similar to CDC Striker.

**CDC Limerick** is the highest yielding green pea variety currently on the market and has good lodging resistance. CDC Limerick has smooth, round seeds with good bleaching resistance and higher protein content than most pea varieties on the market.

In 2017, look out for **CDC Greenwater**. This variety has strong yield potential and good lodging resistance, with medium seed size and round seed shape. AAC Royce and AAC Radius should have seed available by 2018.”

SOURCE: <https://www.grainews.ca/2016/02/25/new-pulse-crop-varieties-for-2016/>

## Information About New Pulse Varieties Is Shared With Growers Through Industry News Articles



### New pulse crop varieties for 2016

These new pulse varieties are hitting the market for the first time this spring

#### Small Red Lentils

"Small red lentils are the most popular class grown in Saskatchewan and the most widely grown varieties for 2015 were the imidazolinone tolerant, CDC Maxim, CDC Dazil, CDC Imax and CDC Impact.

Limited supplies of commercial seed for a new variety, **CDC Cherie**, may be available in 2016. This variety was released in 2012 and is not imidazolinone tolerant, but is high-yielding.

There are a few new varieties, all higher yielding than **CDC Maxim**, which will be commercially available in a few years. They include imidazolinone tolerant varieties, **CDC Impulse** (IBC 479) and **CDC Proclaim** (IBC 550) and the non-imidazolinone tolerant, **CDC Redmoon** (3646-4)."

SOURCE: <https://www.grainews.ca/2016/02/25/new-pulse-crop-varieties-for-2016/>



## Research Spotlight

Economic Impact of Plant Breeding at the Crop Development Centre Final Report, November 2016

**JRG Consulting Group and SJT Solutions**

**Dr. John Groenewegen, Dr. Shelley Thompson, Dr. Richard Gray**

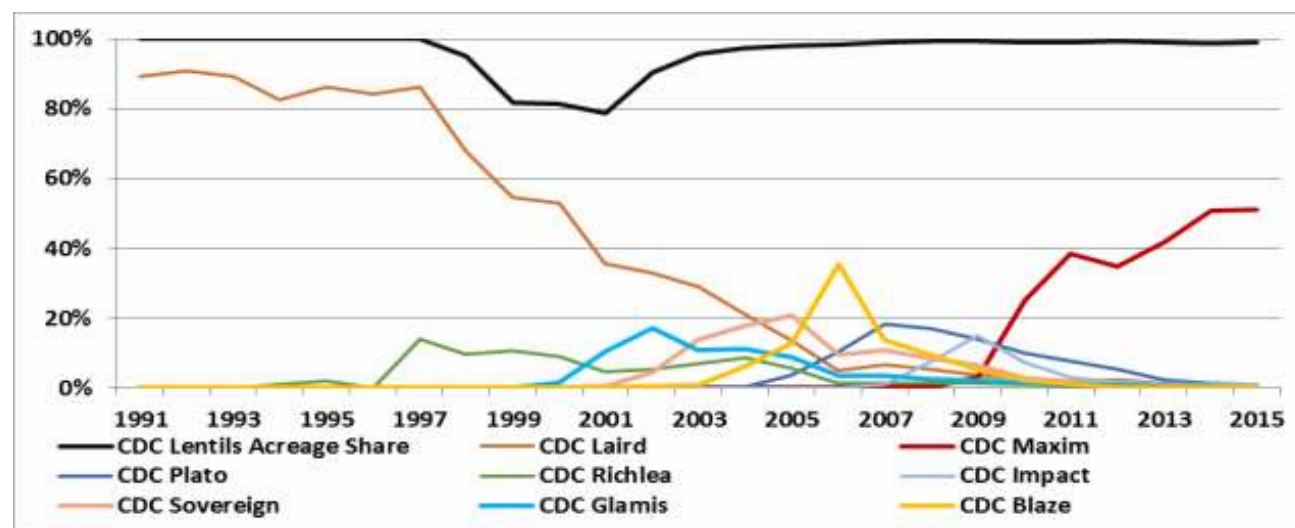
## Measured Increases in Yields Attributed to Plant Breeding

Compounded average annual growth rate of yields for CDC developed varieties in Saskatchewan, by crop type (1991-2015)

	Crop Kind	Saskatchewan
PULSES	Lentils	0.74%
	Field peas	1.99%
	Dry beans	0.29%
	Chick peas	0.65%
ALL OTHER CROPS	Canaryseed	0.26%
	Flax	0.48%
	Oats	0.39%
	Barley	0.39%
	Winter wheat	0.45%
	All spring	0.46%
	Durum	0.50%

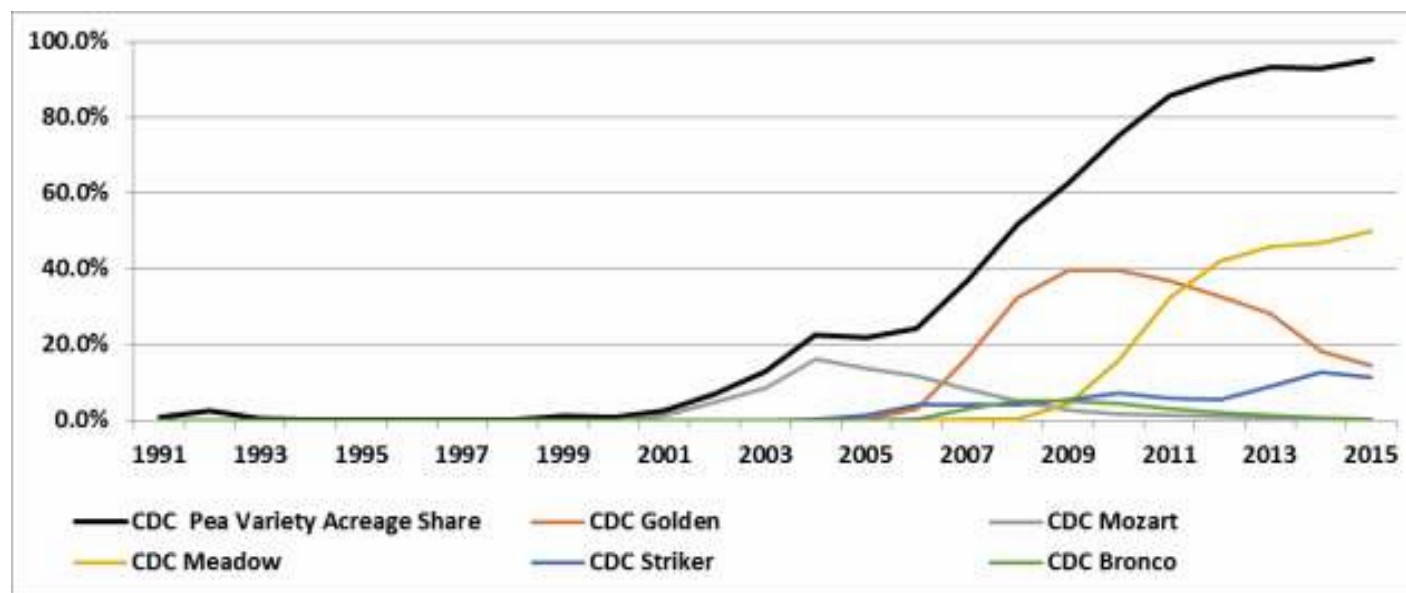
## Acreage Shares of CDC Lentil Varieties, Saskatchewan, 1991 to 2015

Lentil production increased in Saskatchewan from a few thousand acres in the 1970s to over five million acres in 2016. Dr. Al Slinkard developed the large-seeded Laird lentil variety registered in 1978, which was the dominant variety in the 1990's. By 2002, CDC Blaze was the dominant variety, which was replaced by CDC Maxim by 2010, as illustrated in Figure 2.7, with 51% acreage share in 2015. A large number of the 79 lentil varieties released by the CDC are planted by Saskatchewan pulse growers, with CDC varieties capturing more than 98% of planted acreage, aside from the 1998 to 2004 period when the Crimson variety (from Washington State) was used. Saskatchewan production on 3.0 to 5.0 million acres accounts for 95% of Canadian lentil production, and is the world's largest exporter of lentils.



## Acreage Shares of CDC Pea Varieties, Saskatchewan, 1991 to 2015

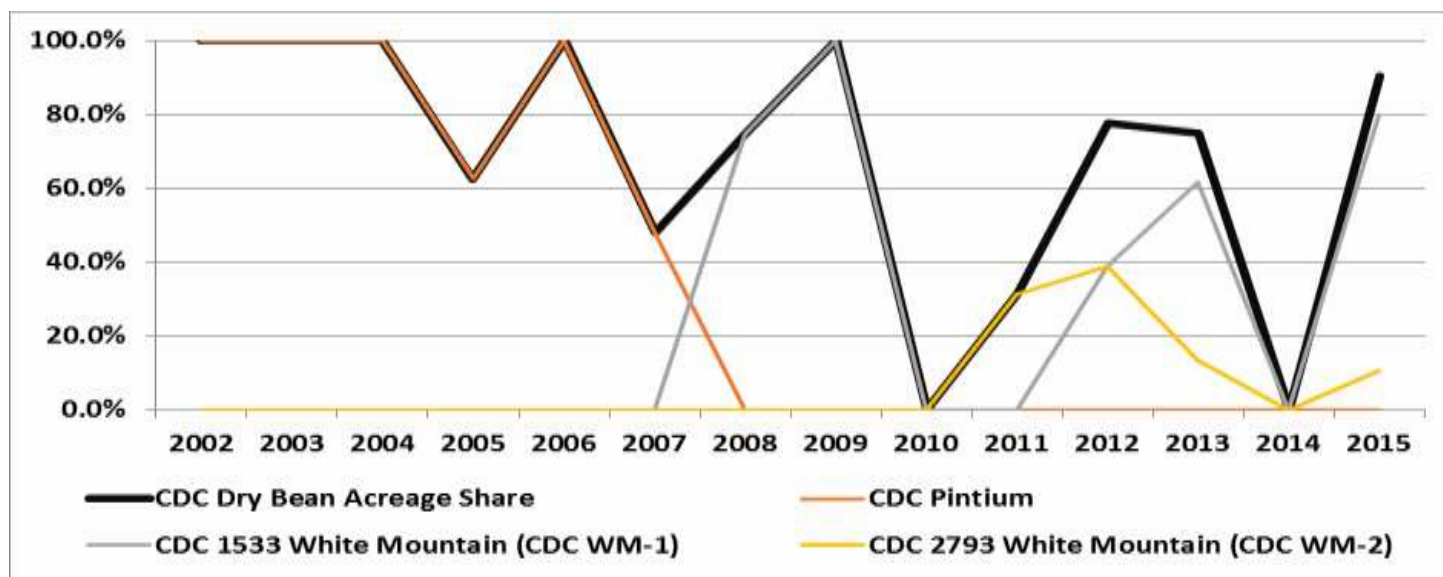
The first CDC pea variety was released in 1986 (CDC Bellvue), which captured 2.5% acreage share in 1992. CDC's acreage share in Saskatchewan increased substantially from less than 1% in 2000 to 95% by 2015, as shown in Figure 2.8. This advance was led by CDC Mozart (released in 1999) and CDC Golden (released in 2003) with 40% of Saskatchewan acreage in 2009 and 2010, and CDC Meadow (released in 2006) with a 50% market share in 2015. Saskatchewan is also the world's largest exporter of dry peas with 2.5 to 3.0 million acres in production.





## Acreage Shares of CDC Dry Bean Varieties, Saskatchewan, 1991 to 2015






The CDC released its first dry bean variety in 1995, which was CDC Espresso and CDC Nighthawk. In 2002, when crop insurance data is first available for dry beans, CDC Pintium (released in 1999) accounted for all of the known dry bean varieties planted in Saskatchewan. In some years all acreage was to known varieties, with the CDC 2002 to 2015 average at 54%, with 2010 the exception where none of the varieties were reported on the insured acreage. CDC WM-1 (released in 2009) accounted for the majority of acreage in 2013 and in 2015. Production occurs on 5,000 to 15,000 acres each year in the province. The other two provinces produce more dry beans.





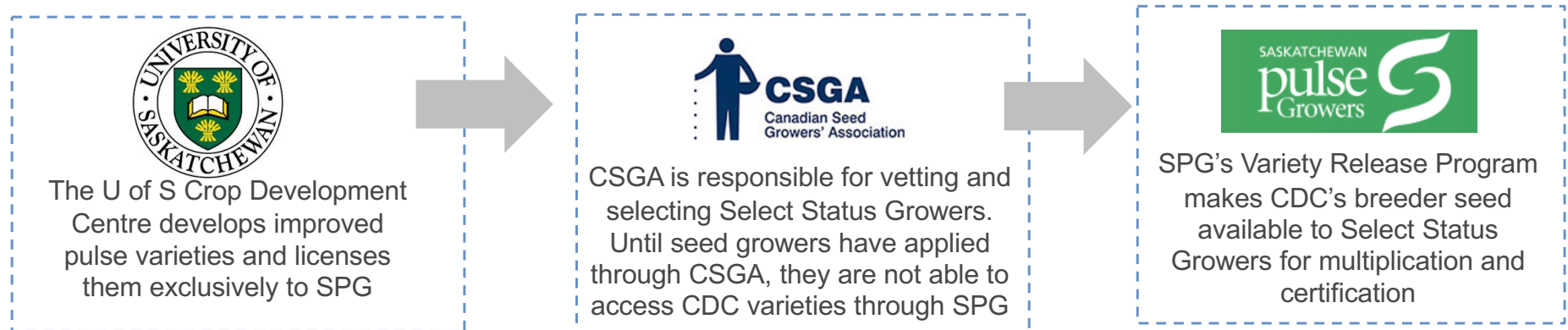
# Demand Planning and Operations

# Early Generation Seed Deployment Model

	Pre-Breeder Seed	Breeder Seed	Select Seed	Foundation Seed	Registered Seed	Certified Seed
Who	Crop Development Center (CDC) University of Saskatchewan	CDC Breeder Seed Unit University of Saskatchewan	Breeder Seed is Sold by SPG to Independent Select Seed Growers in Saskatchewan			
Sector	Public 	Public 	Private 	Private 	Private 	Private 
Input	Seed from Field Trials	100 kg of Pre-Breeder Seed	1 lb. of Breeder Seed from SPG	15 lb. of Select Seed	225 lb. of Foundation Seed	3,375 lb. of Registered Seed
Output	<b>100 kg of Pre-Breeder Seed</b> 	<b>1 lb. of Breeder Seed</b> 	<b>15 lb. of Select Seed</b> 	<b>225 lb. Foundation Seed</b> 	<b>3,375 lb. Registered Seed</b> 	<b>50,625 lb. Certified Seed</b> 
Capital Sources	<ul style="list-style-type: none"> <li>Saskatchewan Pulse Growers</li> <li>Research Grants</li> <li>Provincial Government Support</li> </ul>	<ul style="list-style-type: none"> <li>Saskatchewan Pulse Growers fund the production of breeder seed through the CDC's Breeder Seed Unit</li> </ul>	<ul style="list-style-type: none"> <li>Certified seed sales</li> <li>NOTE: Certified seed is planted on ~20% of acres in Saskatchewan. Some growers fund seed production by selling seed at stages prior to certification (i.e. one select seed grower sells foundation seed to another select seed grower for increase on their own farm). Growers may also choose to demote seed, which allows them to sell select, foundation, or registered seed as certified seed.</li> </ul>			

## Select Seed Growers are the Only Growers Able to Purchase Breeder Seed of SPG-Licensed Varieties

**“Through Saskatchewan Pulse Growers (SPG) Variety Release Program (VRP), breeder seed varieties developed by the Crop Development Centre (CDC) are made available to eligible Select Status seed growers in Saskatchewan royalty-free.” -SPG**

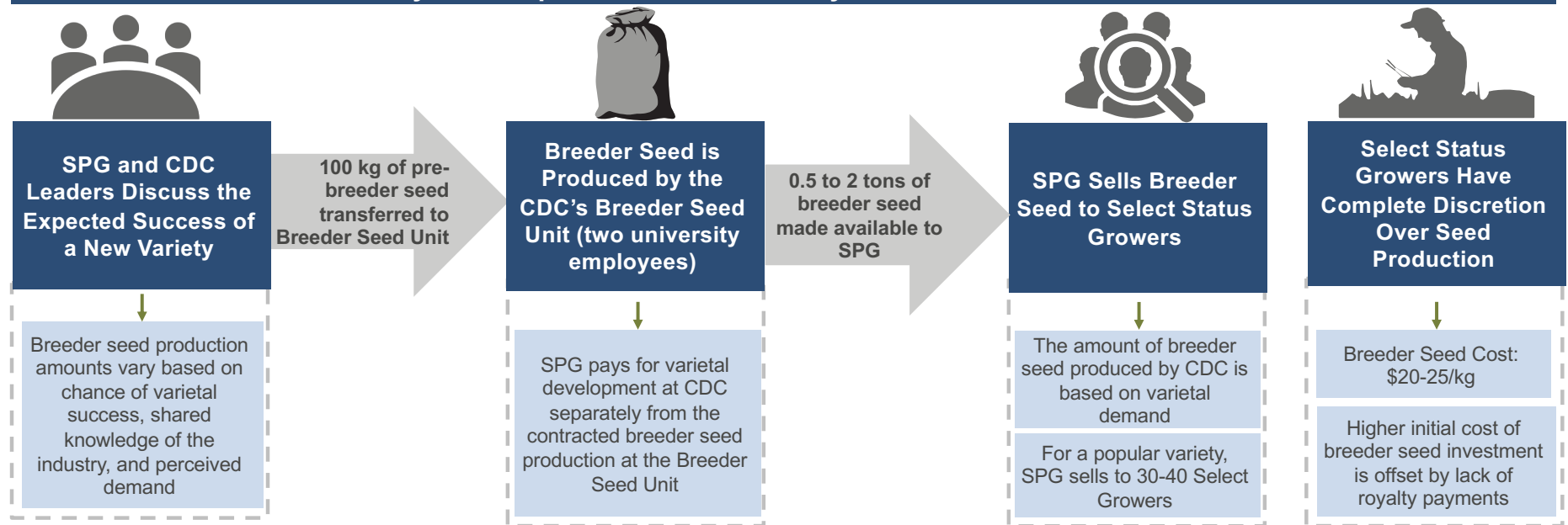


Seed growers outside of Saskatchewan can obtain breeder seed and produce select and foundation seed of CDC varieties through SPG's Variety Release Program as long as they are Select Status seed growers, verified through CSGA, and as long as their provincial pulse grower organization has an existing agreement with SPG

These growers pay a royalty fee on any varieties grown from CDC, as they do not participate in the Saskatchewan pulse levy system

# CDC and SPG Collaborate In Demand & Supply Planning- A Practice Unchanged for 20 Years

CDC and SPG Plan for Breeder Seed Production Through a Series of Meetings Regarding the Expected Success of a New Variety & it's Implications on Previously-Released Varieties' Market Shares



For all pulse classes (except peas) CDC is the **only breeding program** releasing improved varieties, providing captive demand for CDC varieties, but not premiums on the varieties. Other pea breeding programs have criticized the CDC for releasing pea varieties without royalty requirements, stating that the lower prices of CDC breeder seed (due to lack of royalty) create unfair market advantage. However, Saskatchewan growers pay comparatively higher breeder seed costs than other growers and contribute to a pulse levy that enables the CDC to make improved varieties available royalty-free.



## Breeder Seed Demotion Allows Growers Autonomy in Seed Production

Breeder Seed Can Be Demoted And Sold as Foundation, Registered, or Certified Class Seed With Varietal Purity Inspection and Certificate

A significant number of growers choose to demote seed in this production system to realize the returns on selling certified seed sooner than the 5-stage process allows

Growers typically will not demote seed until the Foundation stage in order to have enough production from multiplication to realize the greatest gains on their sale of seed

Growers that choose to demote seed are still required to complete all steps of a typical seed certification

CSGA ACPS	Canadian Seed Growers' Association Association canadienne des producteurs de semences
<b>Demotion of Breeder Seed Application</b>	
Breeder class seed can not be demoted and sold as Foundation, Registered or Certified class seed in Canada unless the seed lot is subject to official varietal purity verification testing and a crop certificate of the demoted class has been issued by the CSGA ( <i>Circular 6</i> , Section 1.11.2).	
To obtain a crop certificate of the demoted class, send this Application, a representative seed sample* and \$80.00 plus GST/HST (# 1068666292) to the CSGA office.	
* Minimum sample size required for cereals, corn, beans and other large-seeded crop kinds, is 500 gram (1 lb). For most small-seeded crop kinds, submit at least a 100 gram (4 oz.) sample. For more information on sample size required for other crop kinds, see column 4 (POV) of Appendix III at: <a href="http://www.inspection.gc.ca/english/plaveg/seesem/man/swi132be.shtml">http://www.inspection.gc.ca/english/plaveg/seesem/man/swi132be.shtml</a>	
Name of Applicant: _____	
Address: _____	
Telephone number: _____	
Email address: _____	
Name of Breeder authorizing demotion: _____	
Breeder's CSGA grower number: _____	
Variety: _____	
Kind: _____	
CSGA sequence number of the crop inspection report: _____	
CSGA crop certificate number issued for the Breeder plot: _____	
Demoted quantity of seed (in kilograms): _____	
Request for seed to be demoted to the following class (please circle one):	
<b>Foundation or Registered or Certified</b>	
Applicant's signature _____	Breeder's signature _____
Date _____	Date _____
<b>**Please make cheque or money order payable to the Canadian Seed Growers' Association</b>	
<b>SEND TO: CANADIAN SEED GROWERS' ASSOCIATION</b>	
Box 8455, Ottawa, Ontario, K1G 3T1	
Telephone: (613) 236-0497, Fax: (613) 563-7855	
Email: <a href="mailto:seeds@seedgrowers.ca">seeds@seedgrowers.ca</a>	
<b>Office Use Only</b>	

# The Canadian Seed Value Circle Shows the Interconnectedness of the Agricultural Industry







# Financial Sustainability

# A Levy is Assessed on Saskatchewan-Grown Pulses at their Point of Sale

## Who pays the levy?

Buyers	Processors	Brokers
Assemblers	Exporters	Marketers

## How much is the levy?

**0.67%**  
of the gross  
value of sale

The levy was previously set at 1% of the gross value of sale, but due to an increase in pulse acres and market demand, SPG reduced the pulse levy for the 2017 season<sup>1</sup>. This reduction is held in place, by SPG member vote, for the 2018 season

## What does the levy fund?



Research and breeder seed production by the Crop Development Centre



Access to improved seed for Saskatchewan Select Status seed growers



Research funding, marketing, operations, and administration

## PULSE LEVY SURVEY RESULTS

After consulting broadly with pulse producers, Saskatchewan Pulse Growers has decided to maintain a non-refundable pulse levy.

Here is what a survey of growers told us:

**90%**

of growers rate the value they received for levy contributed as **fair to excellent**

**50%**

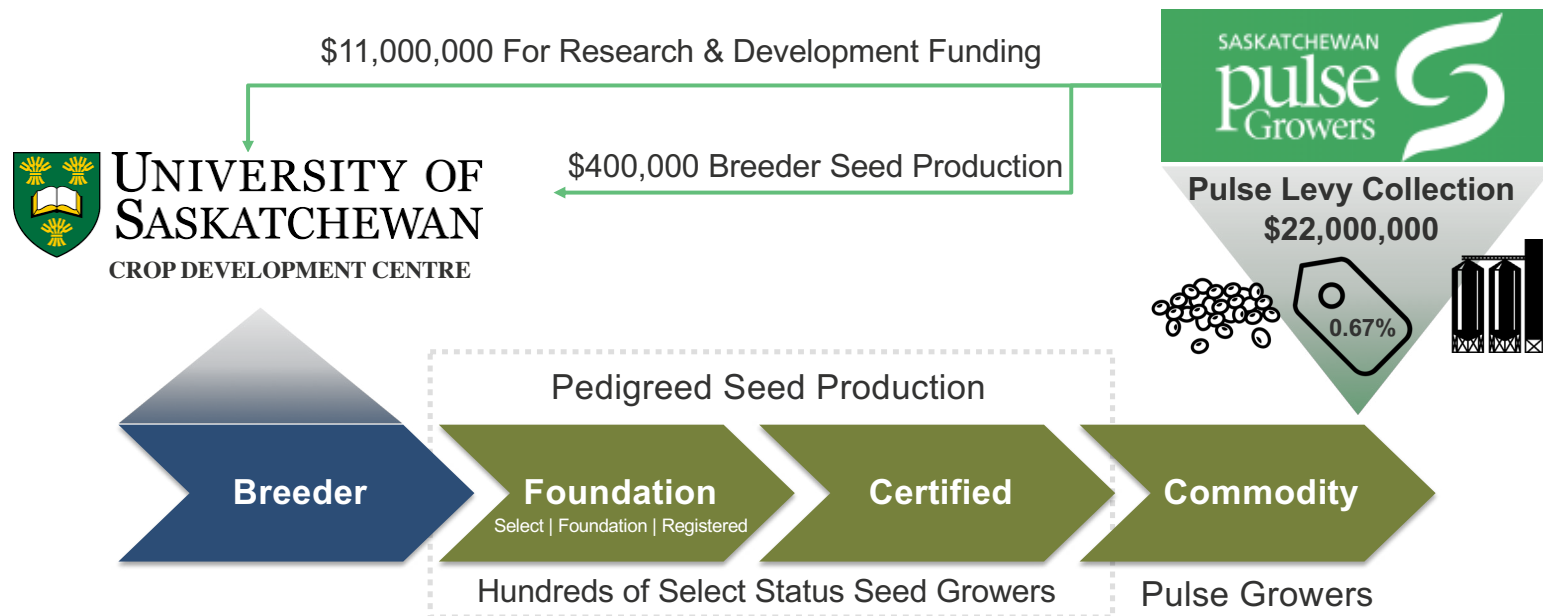
of growers support a **non-refundable levy**

**46%**

of growers say they would **request a refund** if the levy was made refundable

Results reflect a telephone survey of growers conducted by Insightrix Research. Results have a margin of error of +/- 3.33 percentage points at a confidence level of 95%.

## A Majority of the Saskatchewan Pulse Levy is Used to Fund Research & Development at CDC



## Economic Impact of Plant Breeding at the Crop Development Centre

### ECONOMIC IMPACT ASSESSMENT



In 2016, the CDC commissioned JRG Consulting Group and SJT Solutions to assess the economic impact of its plant breeding activities.

The final report, entitled *Economic Impact of Plant Breeding at the Crop Development Centre Final Report, November 2016* is available here:

[https://agbio.usask.ca/documents/centres-and-facilities/CDC\\_FINAL\\_REPORT\\_November2016.pdf](https://agbio.usask.ca/documents/centres-and-facilities/CDC_FINAL_REPORT_November2016.pdf)

### SELECTED TAKEAWAYS

**On-Farm Value Creation:** CDC's Annual Expenditures are ~\$20 million, but provide \$230 million in benefits to producers

**Opportunity Cost:** For every \$1 million not invested in the CDC, the production sector foregoes \$11.5 million in future benefits

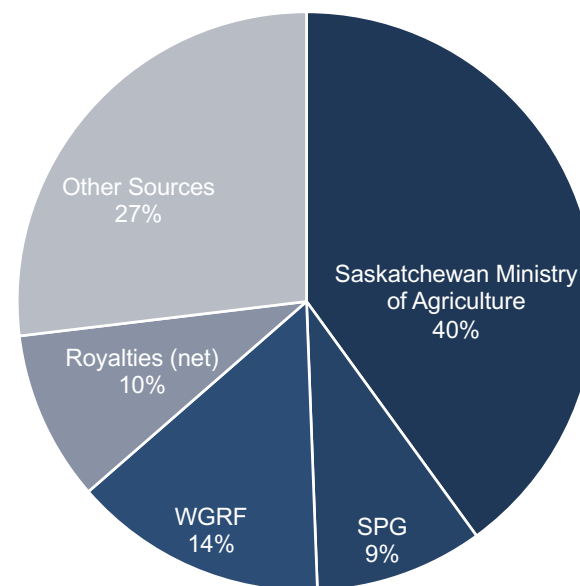
**Economic Impact:** Funding of CDC's activities have increased farm productivity, leading to the creation of 5,900 new jobs and \$1.5 billion in additional economic activity

# Crop Development Centre at the University of Saskatchewan Funding (All Crops)

CDC is funded by a combination of public and private sector funding sources, which highlights its status as a Public Private Partnership

<b>Saskatchewan Ministry of Agriculture</b>	<ul style="list-style-type: none"> <li>Provincial funding is geared toward: Strategic Research Programs, CDC Program Budgets, special project funding, capital contributions for infrastructure</li> <li>Province provided more than \$100 million in funding in past 30 years</li> </ul>
<b>Saskatchewan Pulse Growers (SPG)</b>	<ul style="list-style-type: none"> <li>Funding from growers and industry</li> <li>A 15-year agreement increased funding every five years since 2005</li> </ul>
<b>Western Grain Research Foundation (WGRF)</b>	<ul style="list-style-type: none"> <li>Industry funding for wheat and barley research through check off programs</li> <li>Has contributed \$2 million annually for the past 10 years (2006-2016)</li> </ul>
<b>Royalties on CDC Varieties Sold Outside of Saskatchewan</b>	<ul style="list-style-type: none"> <li>Funding from growers and industry outside of Saskatchewan</li> <li>Royalty income has progressively increased over the last 5 years from \$1.7 million to \$2.9 million annually (2011-2016)</li> </ul>
<b>Other Sources</b>	<ul style="list-style-type: none"> <li>Includes private sector sponsored research from Quaker Oats, Viterro, FP Genetics, SeCan</li> </ul>

Between 2006 and 2015, CDC's funding averaged \$13.9 million, with the following allocation by source:



SOURCE: *Economic Impact of Plant Breeding at the Crop Development Centre Final Report, November 2016*

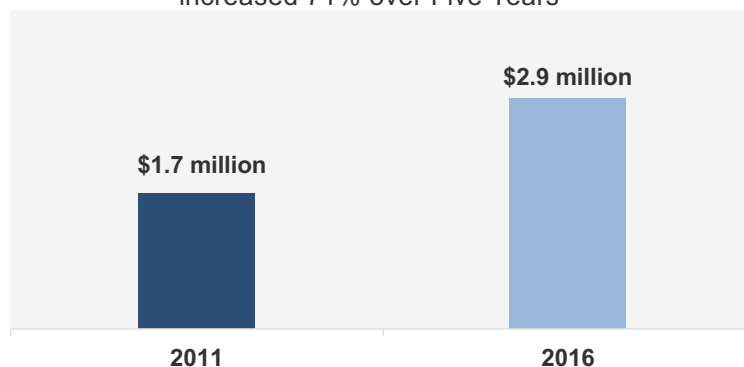
# Saskatchewan Pulse Growers Collects Royalties on Breeder Seed Sold Outside of Saskatchewan

**New agreements** between Saskatchewan Pulse Growers (SPG) and provincial pulse grower associations in 2016 resulted in the establishment of the **breeder seed royalty system**

Through this system SPG collects these royalties, through SeCan and SeedNet, and **retains them for SPG use**

However, the **amount of royalties that CDC receives** has increased in recent years, even without receiving the royalties from outside seed sales

Royalty Income that Funds CDC Breeding Activities has increased 71% over Five Years<sup>2</sup>



(2) SOURCE: [https://agbio.usask.ca/documents/centres-and-facilities/CDC\\_FINAL\\_REPORT\\_November2016.pdf](https://agbio.usask.ca/documents/centres-and-facilities/CDC_FINAL_REPORT_November2016.pdf)  
 (3) SOURCE <http://www.seedalberta.ca/new-model-launched-access-cdc-pulse-varieties/>

## New Model Launched for Access to CDC Pulse Varieties

**Pulse licensing system gives Alberta growers access to CDC new varieties, but will raise seed costs for farmers.**

In early 2016, the Alberta Pulse Growers pulled its research funding from the University of Saskatchewan's Crop Development Centre (CDC). Since then, members of the Alberta Seed Growers (ASG) have been concerned about access to new varieties of pulses, as there was only a limited amount of seed released to Alberta each year.

"When the research funding was pulled, many seed growers were left at a disadvantage for access to new varieties," notes ASG national board member Ron Markert.

Things have changed, and the seed growers in Alberta have formal access to CDC varieties once again. Saskatchewan Pulse Growers (SPG) has licensed the distribution rights for select CDC pulse varieties in provinces outside of Saskatchewan to SeCan and SeedNet for a 10-year period.

"This is a significant development for Alberta seed growers and farmers," says Markert.

Here are the basic implications of the deal, which takes effect for the 2018 growing season.

***It involves a royalty system and seed growers must be members of SeedNet or SeCan to access the seed.***

By licensing the distribution of select varieties for sale in provinces outside of Saskatchewan, SPG is ensuring that growers in other provinces also pay for access to CDC varieties through a seed-royalty system. Licensing the distribution rights will not impact Saskatchewan growers' ability to access these varieties royalty-free.

For seed growers outside Saskatchewan that are interested in accessing the varieties that have been licensed for distribution outside Saskatchewan, they can contact SeCan and SeedNet for more information.

Seed growers who are not a part of SeCan and SeedNet and have not previously purchased seed of the licensed varieties may contact each company regarding the potential to join and have the opportunity to access these varieties.

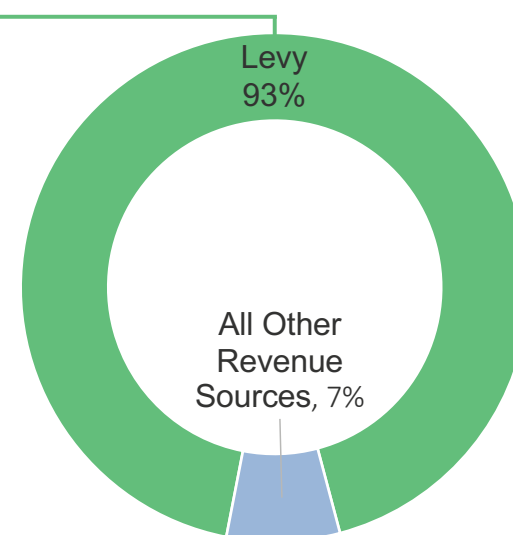
Seed growers in Saskatchewan are not permitted to sell seed of CDC-developed varieties to seed growers or commercial producers outside of Saskatchewan without an agreement in place with either SeCan or SeedNet.

## Commodity Levy Funds Saskatchewan Pulse Growers' Operations

### SPG Revenue

Industry Revenue	2016 Actual	% of Total
Levy	\$22,099,540	93%
Industry partnerships	\$125,481	1%
Variety commercialization	\$530,701	2%
Advertising	\$93,248	0%
Sponsorships	\$51,650	0%
	<b>\$22,900,620</b>	
<b>Government Funding</b>		
Agriculture and Agri-Food Canada – Cluster	\$254,800	1%
Government of Saskatchewan	\$51,125	0%
	<b>\$305,925</b>	
<b>Interest and Dividends</b>	\$530,947	2%
<b>Unrealized Gains (Losses)</b>	\$63,303	0%
<b>Other Revenue</b>	\$12,174	0%
	<b>\$23,812,969</b>	<b>100%</b>

Farmer Legislated Levy Contributed 93% of SPG's Funding in 2016



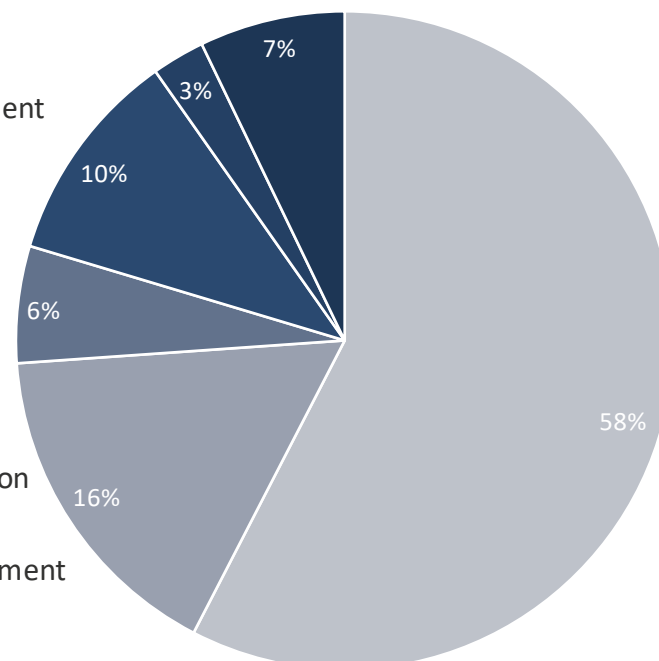


## Over 60% of SPG's Budget Was Used to Fund Pulse Research and Varietal Commercialization in 2016

### SPG Expenses

Research and Development	2016 Actual	% of Total
Pulse Breeding	\$5,553,990	27%
Agronomy and Sustainability	\$1,433,806	7%
Genetic Improvement	\$1,449,289	7%
Processing	\$1,165,593	6%
Health Outcomes	\$1,090,939	5%
Strategy Development and Support	\$994,296	5%
	<b>\$11,687,913</b>	<b>58%</b>
<b>Market Promotion</b>		
Canadian Lentil Awareness	\$2,465,996	12%
International Market Promotion	\$38,120	0%
Product Utilization, Feed, and Other Promotion	\$801,460	4%
	<b>\$3,305,576</b>	<b>16%</b>
<b>Communications</b>		
Grower Communications	\$805,345	4%
Industry and External Communications and Support	\$359,560	2%
	<b>\$1,164,905</b>	<b>6%</b>
<b>Pulse Canada</b>		
Strategic Initiatives	\$1,385,433	7%
International Year of Pulses	\$765,500	4%
	<b>\$2,150,933</b>	<b>11%</b>
<b>Variety Commercialization</b>		
Breeder Seed	\$422,179	2%
Extension Activities and Support	\$106,350	1%
	<b>\$528,529</b>	<b>3%</b>
<b>Leadership and Management</b>		
Board of Directors	\$291,426	1%
Management and Administration	\$1,161,667	6%
	<b>\$1,453,093</b>	<b>7%</b>
	<b>\$20,290,949</b>	<b>100%</b>

- Research and Development
- Market Promotion
- Communications
- Pulse Canada
- Variety Commercialization
- Leadership and Management



## SPG Contracts the CDC to Produce Breeder Seed of its Licensed Varieties, Which it Sells to Select Status Seed Growers At or Around Its Cost of Production

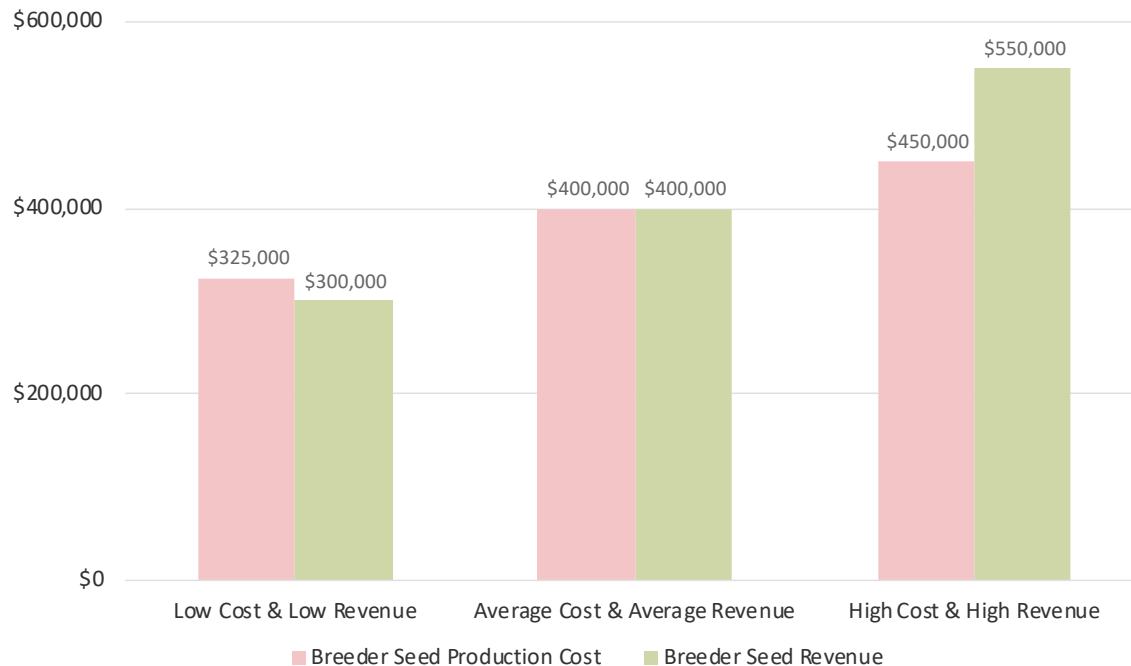


SPG Produces Breeder Seed at a Cost Recovery Basis



SPG Sells Breeder Seed to Hundreds of Growers- Average Revenue from Breeder Seed Sales is \$400,000

Breeder Seed Production Costs & Revenues Under Varying Scenarios



## A \$40M Certified Seed Industry Enables a Multi-Billion Dollar Pulse Market in Saskatchewan

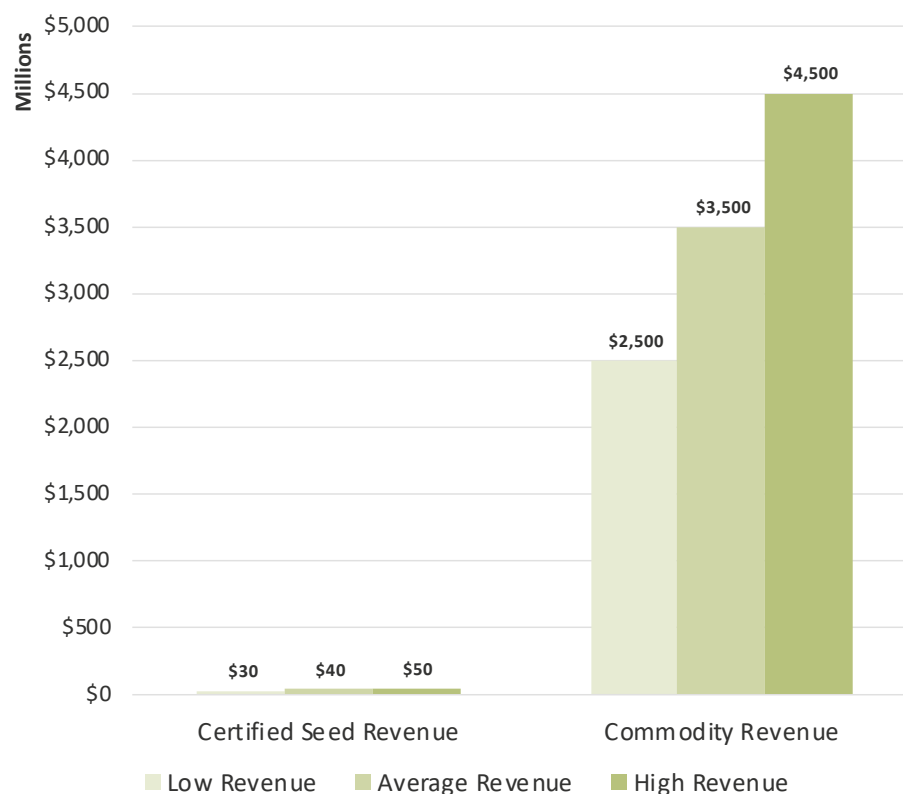


The Dry, Cool Agroecological Environment of Saskatchewan Enables Growers to Save Seed Which Reduces the Size of the Certified Seed Market



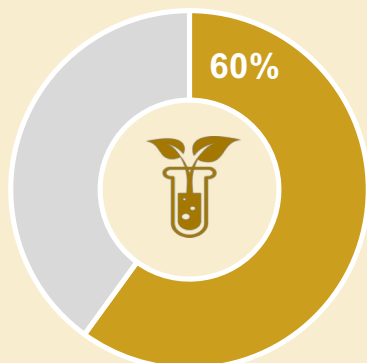
Certified Seed Producers are often Large Pulse Growers Themselves

Estimated Annual Certified Seed & Farm-Level Commodity Revenue Under Three Scenarios



## Financial Sustainability by EGS Value-Chain Step

### Varietal Development & Breeder Seed Production



**Public sector funding** from the Saskatchewan Ministry of Agriculture accounts for 40% of the Crop Development Centre budget; **Private sector funding** from industry groups and royalties accounts for the remaining 60%

### Pedigreed Seed Production



**Managed by Private Sector**  
**100% Financially Self-Sustaining**

### Certified Seed Production



**Managed by Private Sector**  
**100% Financially Self-Sustaining**

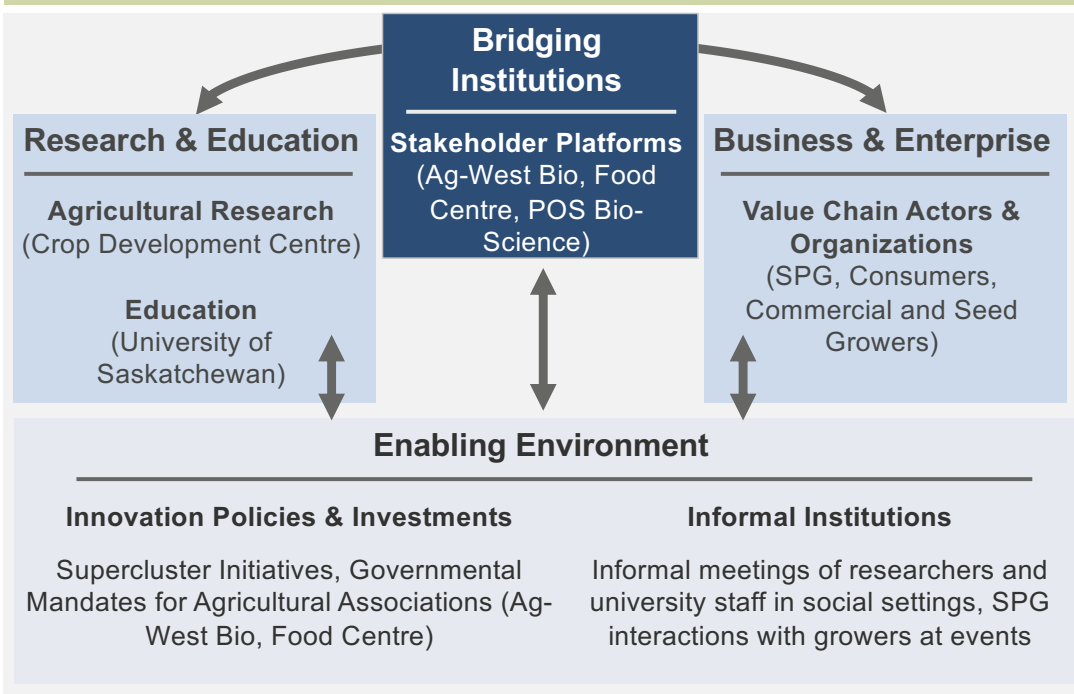


# Enabling Environment

# The Saskatchewan Pulse EGS Deployment Model is Supported by a High-Functioning Agricultural Innovation System

## Agricultural Innovation System (AIS):

“A complex network of actors (individuals and organizations) and supporting institutions and policies that generate and bring existing or new agricultural innovations (technologies, practices, and processes) into social and economic use”<sup>1</sup>



Rather than a **LINEAR PUSH OF RESEARCH** to users, AIS incorporates **FEEDBACK LOOPS** between key actors to inform the development of new technologies

AIS states that for successful innovation, stakeholders need **TECHNICAL** and **FUNCTIONAL** capacities:

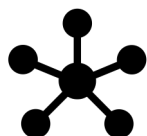
**TECHNICAL:**  
Skills needed for successful performance in a given discipline (soils science, horticulture, economics, etc.)

**FUNCTIONAL:**  
Skills needed for partnerships to function (collaboration, reflect and learn, etc.)

## Close Collaboration Among Stakeholders Exemplifies the Potential of a Successful Agricultural Innovation System



Public Private Partnerships span both **long-term, informal relationships** between the public and private sector (Ag-West Bio's industry coordination function) and **clear, formal agreements** (15-year CDC funding agreement with SPG)



Employees working within the larger AIS system enjoy the ability to move between jobs, supporting an **easy transfer of knowledge** between actors and **stronger networks**. Employees may experience improved job satisfaction and motivation as a result of the job security and opportunities available within the system



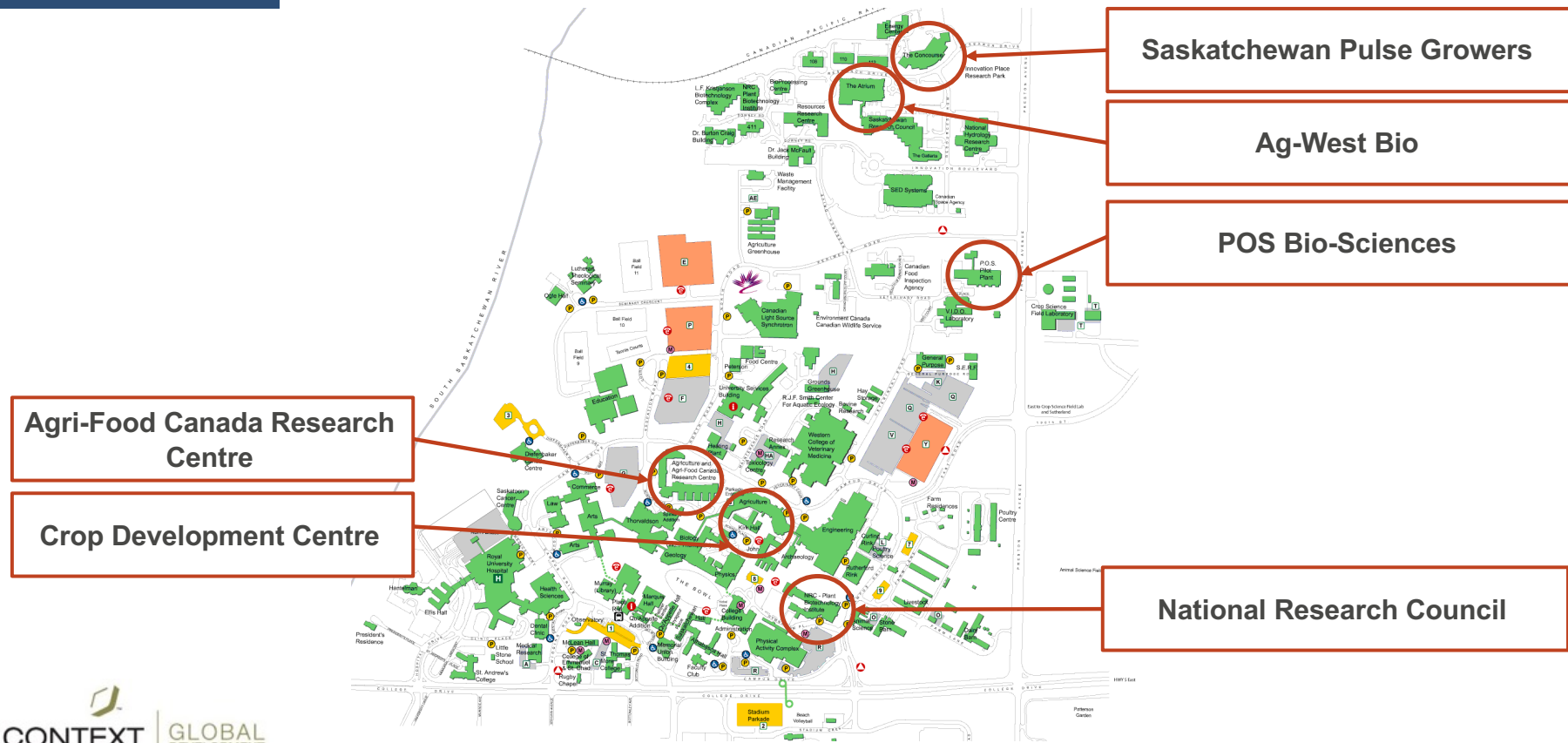
Stakeholders **understand the need** for all of the other stakeholders in their agricultural space, and they understand how other organizations **benefited them**. Credit for achievements are **shared between actors** and battles for turf are not obvious



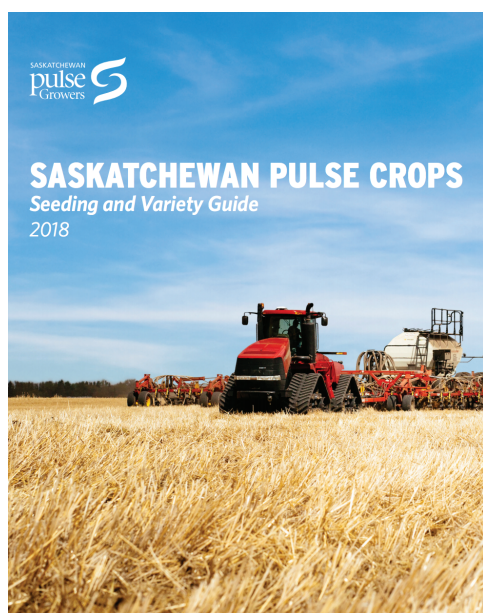
The public organizations involved in the PPP **evolved over time**, based on their sources of funding, roles/responsibilities, and **ability to be profitable after initial public investments** (e.g. Food Centre started with subsidies and is now a sustainable non-profit; POS Bio-Sciences was a public organization and now it is private)



## The Close Proximity of System Actors Promotes Communication and Collaboration



# SPG Releases a Yearly Grower Guide to Assist Pulse Growers in Choosing Effective Varieties



## Cultivar Trial Results & Seeding Recommendations

## Planting Recommendations

### LENTIL VARIETIES

Lentil types are classified by seed size and colour. Some varieties have been developed with tolerance to imidazolinone herbicides called Clearfield® and are designated as CL.

#### Red Lentils

Small red lentils are the most popular class grown in Saskatchewan. CDC Maxim and CDC Dazil were the top varieties in 2017, of which both are Clearfield® (CL) varieties. Newer high-yielding varieties gaining in acreage include Clearfield® varieties CDC Impulse and CDC Proclaim. Small red lentils varieties such as CDC Charlie and CDC Scarlet, and the extra small red variety CDC Roxy are newer non-Clearfield® varieties. CDC Redmoon is the newest small red variety with further improved yield potential. Seed of CDC Redmoon will be available in 2018.

Large red lentils have red cotyledons with a much larger seed size compared to small red lentils. CDC KR-1 (not imidazolinone tolerant) and CDC KR-2 (CL) are higher yielding than CDC Maxim in lentil growing areas and are grown exclusively under contract with AGT Food and Ingredients, through Saskatchewan Pulse Growers' Tender Release Program.

#### Green Lentils

Green lentils are classified by seed size. They have green seed coats with a yellow cotyledon. The large green types represent the highest share of green lentil acres, with CDC Greenland and CDC Impower as the most widely grown varieties. CDC Invinible and CDC Viceroy are the most widely grown small green lentils.

CDC Kermil (small green), CDC Greenstar (large green), and CDC Astrix (extra-small green) are the newest green lentil varieties. They have high yield potential and are not imidazolinone tolerant.

CDC Invinible (small green), CDC Impower (medium green), and CDC Impower (large green) are the newest greens with the Clearfield® trait, which offers herbicide tolerance to imidazolinone herbicides.

#### Specialty Lentils

French green lentils have a green marbled seed coat with yellow cotyledons. Seed size is small, most similar to small red lentils. French green lentils retain their shape better than small reds or greens upon cooking. CDC Peridot is the only Clearfield® variety available, which is imidazolinone tolerant, but it is a lower yielding variety than conventional variety of CDC Marble. CDC Marble is the newest variety in the French green lentil class.



### Long-Term Lentil Averages for Saskatchewan 2018

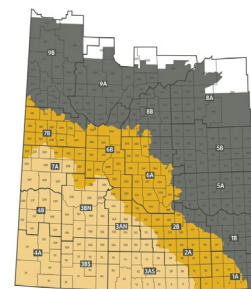
Main Characteristics of Varieties

MARKET CLASS	VARIETY	HERBICIDE TOLERANCE	YEARS TESTED	YIELD % CDC MAXIM		HEIGHT (cm)	DAYS TO FLOWER	MATURITY	RESISTANCE (%)		SEED COAT COLOUR	COTYLEDON COLOUR	SEED WEIGHT (g/1000)
				AREA 1 & 2	AREA 3 & 4				ASCOCHYTE BLIGHT	APHIDIDAE RACE 1			
Small red	CDC Maxim	CL	11	100	100	34	51	E/M	M/R	M/R	grey	red	40
	CDC Dazil		5	90	106	32	51	E/M	M/R	1	grey	red	39
	CDC Dazil	CL	6	97	93	33	53	E/M	M/R	1	grey	red	35
	CDC Impact	CL	6	92	78	35	51	E/M	M/R	1	grey	red	45
	CDC Impact	CL	6	80	76	30	47	E	M/R	M/S	grey	red	34
	CDC Impulse		8	108	95	37	52	E/M	M/R	M/R	grey	red	44
	CDC Proclaim	CL	7	105	102	34	51	E/M	M/R	M/R	grey	red	40
	CDC RedStar		6	95	85	34	52	E/M	M/R	1	grey	red	45
	CDC Redberry		6	97	99	34	50	E/M	M/R	M/R	grey	red	42
	CDC RedStar		7	107	103	35	51	E/M	M/R	1	grey	red	38
Extra small red	CDC RedStar		6	105	93	33	50	E/M	M/R	M/R	grey	red	39
	CDC Redmoon		7	114	106	31	52	E/M	M/R	M/R	grey	red	41
	CDC Scarlet		5	104	104	35	53	E/M	M/R	1	grey	red	36
	CDC Impulse	CL	7	80	90	30	51	E	M/R	M/R	grey	red	31
	CDC Imperial	CL	6	84	79	30	49	E	M/R	M/R	grey	red	30
Large red	CDC RedStar		6	102	99	30	49	E	M/R	M/R	grey	red	32
	CDC RedStar		6	100	99	30	50	E	M/R	M/R	tan	red	31
	CDC RedStar		7	92	90	31	52	E/M	M/R	M/R	grey	red	30
	CDC Roxy		7	102	98	34	53	E/M	M/R	M/R	grey	red	32
	CDC KR-1		10	110	92	37	52	M	M/R	M/R	grey	red	56
Small green	CDC KR-2	CL	7	102	90	37	52	M	M/R	M/R	grey	red	55
	CDC Viceroy		8	102	80	35	49	E	M/R	M/R	green	yellow	34
	CDC Viceroy		8	104	99	35	49	E/M	M/R	M/R	green	yellow	34
Extra small green	CDC Kermil		6	97	98	34	49	E	M/R	M/R	green	yellow	33
	CDC Astrix		9	96	93	30	48	E	M/R	1	green	yellow	26
Medium green	CDC Impress	CL	7	78	71	44	50	M	M/R	5	green	yellow	57
	CDC Impress	CL	6	87	71	34	50	M	M/R	M/S	green	yellow	52
	CDC Meadow		6	102	89	34	50	M	M/R	5	green	yellow	51
	CDC Richia		6	93	80	35	50	M	5	5	green	yellow	51

### PULSE CROP ADAPTATION IN SASKATCHEWAN

Choosing the right pulse crop for your area and appropriate seeding dates

When choosing the right pulse crop for your area, consider the soil and climatic zone where the crop will be planted, and local growing conditions. Use suitability maps as a guide, such as Saskatchewan Crop Insurance Corporation maps and varietal information.



**Field Peas**  
Field peas can be grown across Saskatchewan, but do not like excess moisture or salt-affected soils. Choose fields that drain well. Peas and lentils are more susceptible to Ascochyta root rot compared to faba beans, chickpeas, and soybeans.

**Lentils**  
Lentils are better adapted to the southern and west central part of the province in the Brown and Dark Brown soil zones. The introduction of new market classes and breeding for more determinate varieties (red and small green), has extended lentil production into the Thin Black and Black soil zones. In the moist Black and Grey soil zones, it is often too wet for consistent production of high quality lentils. Excess moisture aggravates disease problems and delays maturity.

**Chickpeas**  
Chickpeas are best adapted to the southern and west central part of the province in the Brown and Dark Brown soil zones in Saskatchewan. They are not well adapted to saline soils, high-moisture areas, soils with high clay content, or soils that are slow to warm in the spring. Chickpeas grow best on well-drained soils with about 15 to 25 centimetres of seasonal rainfall. The long growing season and moderate growth habit of Kabuli chickpeas limits production in other areas of the province. Desi chickpea varieties have a shorter growing season and mature earlier than Kabuli varieties. They are extended into the moist Dark Brown soil zones if grown on stable or lighter textured soils. Chickpeas are deep rooted and can access water from a greater depth than other pulse crops. Disease resistance, specifically to Ascochyta blight, is an important factor in variety selection.

SOURCE: [http://saskpulse.com/files/general/2018\\_Variety\\_book\\_for\\_web.pdf](http://saskpulse.com/files/general/2018_Variety_book_for_web.pdf)

ENABLING  
ENVIRONMENT

# Ag-West Bio is a Key Bridging Organization Between University Research and Industry Leaders



**Governmental Mandate:** “To provide leadership, as a catalyst, to link existing capabilities and resources in order to strengthen the bio economy industry in Saskatchewan”<sup>1</sup>

## Supporting business

Ag-West Bio has been helping businesses grow for over 25 years.

Combining expertise and experience, we provide personalized input and a suite of services tailored to your company's unique commercialization needs.

We provide a centralized hub for linking private business with market knowledge, advisory input, mentoring and guidance. And we provide linkages to research and market networks.

We can help you develop a business plan based on opportunity and feasibility, which you can use to gain investors and strategic partnerships.

## Commercialization Fund

Ag-West Bio can provide early stage capital and help secure matching funds for qualified start-ups, or for expanding bioscience companies.

Financing takes the form of flexible and patient risk capital, and supports promising technologies at the early stages of development, when risk is too great for traditional capital sources.

Funding is targeted to initiatives where a clear pathway to commercialization can be established, with suitable return on investment and significant benefit to Saskatchewan.



## Creating connections

Keeping information moving is an important aspect of business development. In the bioscience sector, information must flow along many lines – from researchers to entrepreneurs, investors and consumers.

With good communication networks, entrepreneurs can discover potential partnerships and learn from others with more business experience. People who have already navigated the path to commercialization are usually happy to share their knowledge.

Ag-West Bio's website hosts blogs, videos and information about Saskatchewan's bioscience organizations and activities.

## Developing new opportunities

Growing the bioeconomy requires continuous and strategic evolution.

By staying up-to-date with research, commercialization activity, and market trends in the bioscience sector, we are able to recognize opportunities when they arise. Ag-West Bio then acts as a catalyst, making connections and encouraging collaboration so the province can benefit from those opportunities.

The research and development cluster based in Saskatoon, Saskatchewan continues to grow. Exciting new technologies are emerging from this cluster, such as digital agriculture, imaging, biologicals, and the development of a 'protein highway' to harness the growth of the pulse industry in the province.

(1) SOURCE: [http://www.agwest.sk.ca/about/what\\_we\\_do.html](http://www.agwest.sk.ca/about/what_we_do.html)  
(2) SOURCE: [http://www.agwest.sk.ca/ckfinder/userfiles/files/AWBHandshaket-2ndEdition-2017-web\(4\).pdf](http://www.agwest.sk.ca/ckfinder/userfiles/files/AWBHandshaket-2ndEdition-2017-web(4).pdf)

## Pulse Industry Bridging Organizations Further Enabled by Value-Added Industry Initiative



- For-profit company that provides pilot testing-scaled services to food entrepreneurs, including process development for new product ideas, custom processing services, and data and analytical services
- POS is open to any entrepreneur looking to produce value-added products, but will provide feedback on the perceived profitability of the product and advise the entrepreneur on their decision to enter the market
- Will reach out to university or industry partners if POS detects a market opportunity
- Current pulse projects include extraction of pea protein, reduction of water usage in wet processing, development of machinery for wet processing of pulses
- Began as a governmental mandate, but now acts as a sustainable non-profit



Saskatchewan Food Industry  
Development Centre Inc.

- Not-for-profit organization that acts as an interim processor for value-added food developers on a fee-for-service basis
- Has capacity to assist entrepreneurs in product development, manufacturing, and packaging for all types of food products
- Goal is to reduce capital risk for companies entering the value-added space and to “graduate” them once companies are ready to launch the products
- Began as a governmental mandate, but now acts as a sustainable non-profit

Saskatchewan’s **Ministry of Agriculture** set a goal to increase Saskatchewan’s total revenue from the **value-added sector to \$6 billion annually by 2020<sup>1</sup>**

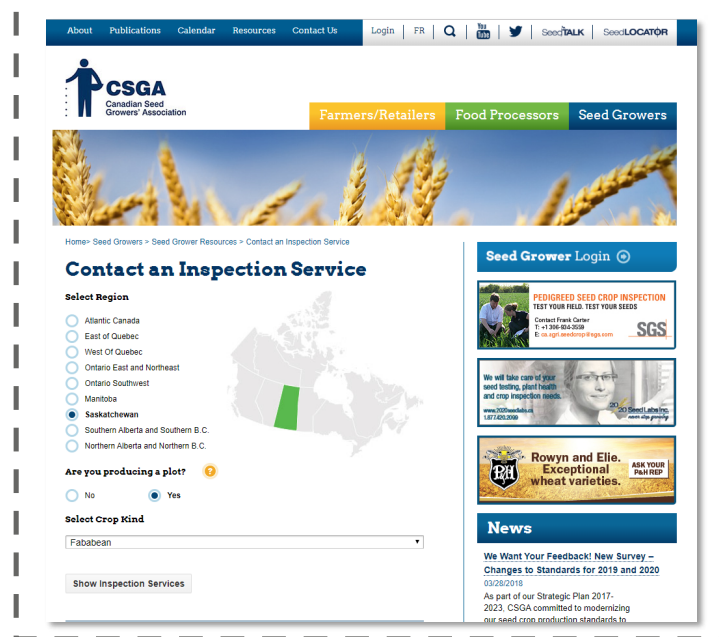
# Growers Turn to CSGA for Information on Certified Seed Production

Online Tools, Available Through the [CSGA Website](#), Allow Growers Access to All Documents Necessary for Starting and Continuing with Successful Certified Seed Production

**New seed growers** can learn about certified seed production through the CSGA step-by-step guide

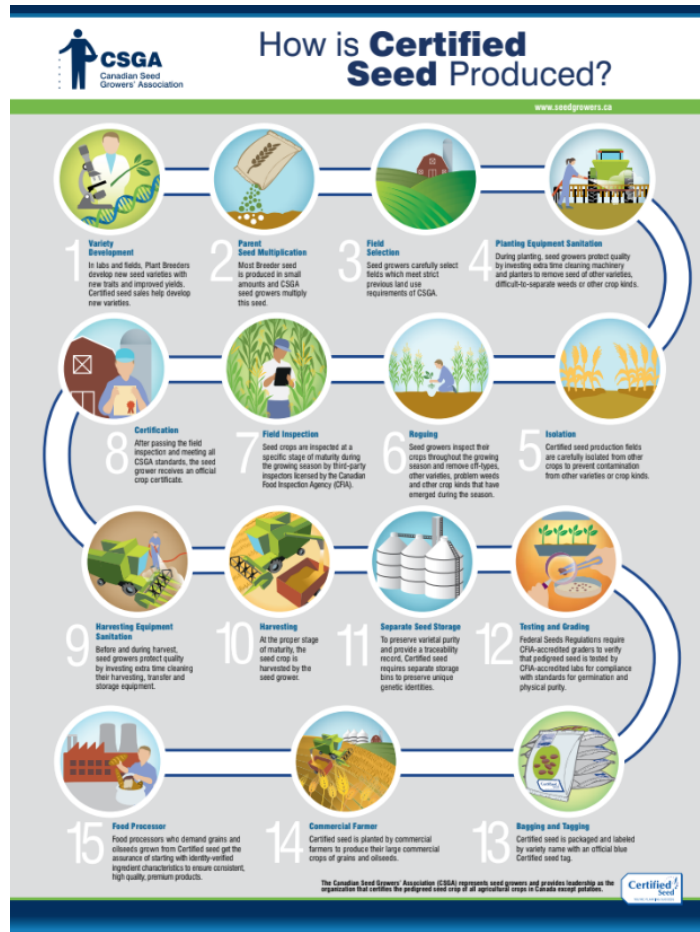


**Active certified seed growers** can quickly access the database of approved seed inspectors that service their area





## ENABLING ENVIRONMENT



## CSGA Seed Certification Steps

1. Variety Development
2. Parent Seed Multiplication
3. Field Selection
4. Planting Equipment Sanitation
5. Isolation
6. Rouging
7. Field Inspection
8. Certification
9. Harvesting Equipment Sanitation
10. Harvesting
11. Separate Seed Storage
12. Testing and Grading
13. Bagging and Tagging
14. Commercial Farmer
15. Food Processor

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# CSGA's Seed Locator Provides Access to Canadian Pedigreed Seed



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TODAY

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GROWN WITH  
SY ROWYN  
ALLIANCE

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## Welcome to the CSGA Pedigreed Seed Locator

The Canadian Seed Growers' Association (CSGA), which represents 3,700 seed growers, provides leadership as the only Canadian organization to monitor and certify pedigreed seed for all agricultural crops in Canada except potatoes. Use the Pedigreed Seed Locator to find Canadian pedigreed seed. Use the search menu below to find seed by province, crop kind and variety. Click on the "Mobile Version" link in the top navigation menu to view this site in a format optimized for your tablet or smart phone, and access the same information while on the go. You can also find advertising and listing information in that menu.



Use the Pedigreed Seed Locator to find Canadian pedigreed seed.

Search by province, crop kind and variety  
name to find exactly what you are looking for.  
Looking for Certified seed, we've got you covered.

**Certified seed - you're planting success.**

### How to navigate the Seed Locator:

To find pedigreed seed anywhere in Canada,  
simply use the dropdown boxes below to select your search criteria.

Seed Produced In:

Crop Kind:

Variety:

**SEARCH**

SOURCE: <https://www.seedlocator.net/>

Faba Bean : SNOWBIRD : Seed Produced In Saskatchewan

Listings 1 - 6 of 6

Premier Listings



Crop Kind: Faba Bean  
Variety: SNOWBIRD  
Class: Select  
Class: Certified  
[Trawin Farms Ltd.](#)  
Box 267, Melfort, Saskatchewan  
RM of Star City NW 11-45-18W2  
Melfort, SK S0E 1A0  
Phone: 306-752-4060  
Fax: 306-752-9070

Our mission is to be the most respected pedigree seed supplier, by providing consistent excellence in quality - purity, vigour, and germination - of Foundation, Registered, and Certified seed sold ... [More >](#)

Basic Listings

Crop Kind: Faba Bean  
Variety: SNOWBIRD  
Class: Registered  
[Berscheid, K.N. & B.E.K. & S. & C. & Y.](#)  
BOX 197  
Lake Lenore, SK S0K 2J0  
Phone: 306-368-2602

Crop Kind: Faba Bean  
Variety: SNOWBIRD  
Class: Certified  
[Cay, Randy D.](#)  
BOX 672  
Kinistino, SK S0J 1H0  
Phone: 306-864-3696

Crop Kind: Faba Bean  
Variety: SNOWBIRD  
Class: Certified  
[Crosson, Lorne & Will & Lee & Glen](#)  
BOX 84  
Welwyn, SK S0A 4L0  
Phone: 306-645-3337

Crop Kind: Faba Bean  
Variety: SNOWBIRD  
Class: Certified  
[Lung, Seeds Ltd.](#)  
IVAN LUNG, BOX 179  
Lake Lenore, SK S0K 2J0  
Phone: 306-368-2414

Crop Kind: Faba Bean  
Variety: SNOWBIRD  
Class: Certified  
[Mayerle, Erwin D.](#)  
BOX 1180  
Tisdale, SK S0E 1T0  
Phone: 306-873-4261

Listings 1 - 6 of 6



## Tax Credits Exist for Saskatchewan Farmers Who Pay the Pulse Levy

Growers who contribute **pulse levy dollars** to Saskatchewan Pulse Growers (SPG) are eligible to earn a **federal investment tax credit** through the Scientific Research and Experimental Development (SR&ED) program:

The tax credit is based on the **amount of levy funds spent on research and development** (R&D) that meet specific criteria set out by the Canada Revenue Agency (CRA).

For the 2017 tax year, **62% of the Saskatchewan pulse levy** qualifies for the federal SR&ED tax credit

All levy investment tax credit applied against taxes payable or refunded must be **reported by the grower as income in the subsequent year**

**30% of a grower's total levy contribution** is eligible to earn an investment tax credit:

15%

This resulting levy amount is eligible to earn an investment tax credit up to a maximum of 15% for individuals

35%

Corporations that are considered Canadian controlled private corporations are eligible for a maximum of 35%

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## Pulse Canada is the Commodity Association that Connects All Pulse Growing Regions in the Country

### Mission:

“To contribute to the profitability of the Canadian pulse industry through programs designed to deliver innovative solutions that improve efficiencies and increase value.” –[Pulse Canada](#)

### Strategy:



“In 2017, Pulse Canada established a target of creating **new demand in new use categories for 25% of the industry’s productive capacity by the year 2025**. To achieve “25 by 25”, Pulse Canada focuses resources on **two areas of activity**:

Creating efficiencies within the transportation and marketing of pulses by eliminating barriers to trade and ensuring the industry has the necessary transportation capacity and service

Creating sustainable demand for Canadian pulses by marketing the health, nutrition and environmental benefits of pulses to end users; accelerating research that removes barriers and creates incentives for pulse consumption; and collaborating with key private and public sector stakeholders to create food systems that prioritize health and sustainability” –[Pulse Canada](#)

### Pulse Canada’s Funding Organizations:



Canada



### The Canadian Pulse Brand:



The Pulse Brand was created during the International Year of Pulses in 2016. Companies and organizations that are members of the Pulse Brand Program can use the P Brand logo on any of their communications materials, including websites, social media, and handouts to increase awareness of pulses and their nutritional benefits



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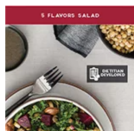
# SPG's Sub-Brand Focuses on Lentil Promotion



“In the area of market promotion, Saskatchewan Pulse Growers (SPG) is striving to **increase consumer demand for lentils** through showcasing the versatility and health attributes of lentils, focusing on protein and fibre, through **SPG's sub-brand Lentils.Org**” -SPG



Batch Cooking & Healthy Food Swaps with Lentils Fact Sheet



Retail/Supermarket RD Recipe Cards



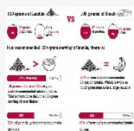
Cooking Made Easy with Lentils Cookbook



Get Started with Lentils - General Info Sheet (English)



Get Started with Lentils - General Info Sheet (French)



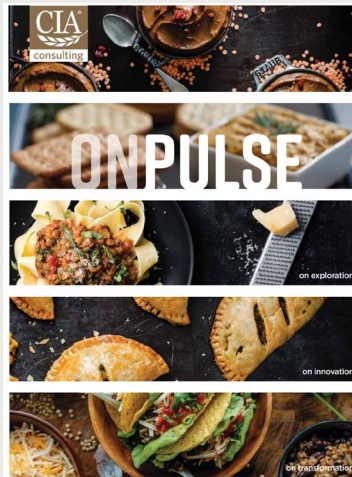
Lentils Health & Nutrition Infographic



French Recipe Cards



Big Book of Little Lentils



## How to Cook Lentils

Lentils are not complicated – cooking them is as easy as 1, 2, 3! Similar to beans and grains, lentils can be cooked in a variety of ways, but the prep work is always simple!

[Read More](#)



Rinse



Simmer

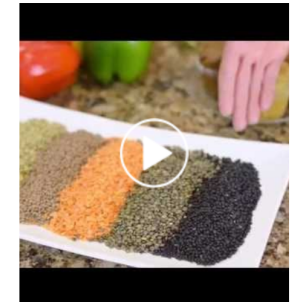


Serve!

## Helpful Lentil Resources



How to Cook Lentils



Lentil Varieties

## Twitter Feed

[Follow Us](#)

{New Recipes} Explore the spicy, smoky, and zesty flavours of Tex Mex cuisine in our latest recipe collection. You'...  
<https://t.co/ON1imS9aeR>

RT @TriadtoWellness: If you are searching for the perfect party dip, let us introduce you to our Turmeric Red Lentil Dip! With the delic... <https://t.co/8FUQ9NNlvz>

Traditional Chilaquiles - lentils and tortillas simmered in salsa verde and topped with all of your fave nacho topp...  
<https://t.co/ZFOyF9edgH>

15 High-Protein Lentil Burgers  
<https://t.co/RO89znpC5W>  
<https://t.co/NdnJgSrD1a>

SOURCE: [www.lentils.org](http://www.lentils.org)

## SPG Makes Strides in Transportation Improvements in Canada

“In partnership with pulse grower organizations across the country and with processors and exporters of pulses and special crops, **SPG recognized the need for improved transportation system** performance in 2006 and took action by **making significant investments** in transportation work at Pulse Canada.

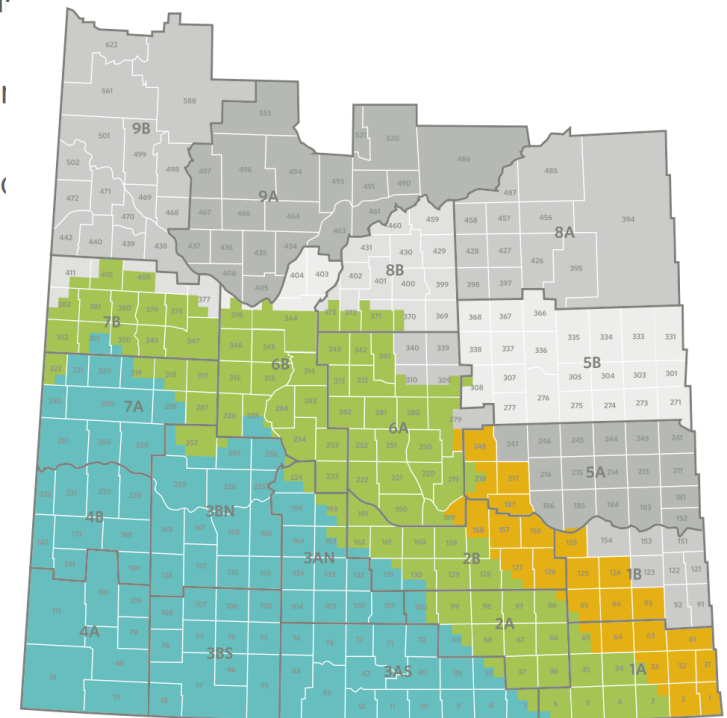
Today, the pulse industry is viewed as a national leader in this area and has been successful in getting shippers of other products such as forestry, automotive, and mining working together to deal with transportation issues our industry cannot tackle alone. **We are confident that the only way we can have impact at the national level is to work together with the pulse industry across the country as well as with grain and other rail shippers in Canada.**

**One advancement** made in transportation as a result of SPG’s investments is establishing the **right to service level agreements in legislation**. Pulse Canada was the only shipper group in Canada to package industry recommendations and promote them in the form of a service level agreement to the Rail Freight Service Review Panel. This resulted in the **introduction of legislation** giving shippers a **right to service level agreements** and a **process to establish one** if commercial negotiations fail.”

## Saskatchewan Crop Insurance Corporation (SCIC) Offers Crop Insurance for All Pulse Crops in the Province

“For most crops, customers may select coverage at 50, 60, 70 or 80 per cent of their average yield. The premium for this coverage is cost-shared at 60 per cent by governments, 40 per cent by producers. Coverage is only available up to 70 per cent for the following crops: alfalfa seed, caraway, chickpeas, coriander, dry beans, khorasan wheat, potatoes, timothy hay, honey, soybeans, hemp, camelina, grain corn and wild rice.”

— Saskatchewan Crop Insurance Corporation



Chickpea Insurable Area

■ Risk Zone 1 ■ Risk Zone 2 ■ Risk Zone 3

What is the  
prevalence  
of third party  
inspectors in  
Pulses?

# Privatization of Seed Crop Inspection

## Canada's Seed System – A Summary Description

Developed as part of the Seed Synergy Collaboration Project January 2017

### Privatization of Seed Crop Inspection

Historically, the inspector has been an employee of the official seed certifying agency (e.g., the CFIA in Canada) but beginning in the mid-90s some jurisdictions began experimenting with private inspection under official supervision. In Canada, some hybrid seed corn inspections were permitted under a “first party” model (inspection by employees of the seed production company) in the late 90s followed by hybrid seed canola inspections under a “third party” model.

In total, these amounted to about 5 per cent of the acres/fields in certification. In 2012, the Canadian government decided that seed crop inspection should be largely privatized. Alternative service delivery (ASD) of seed crop inspection was one of 33 CFIA Deficit Reduction Action Plan (DRAP) projects. It was intended to save \$1.8 million annually with a reduction of 20 full time equivalents (FTEs) beginning in 2014. As a result, the CFIA and the seed sector (as represented by the CSGA, the CSTA and the CSI) worked together to develop and implement ASD of seed crop inspection based on a third party model with 9 seed crop inspection regions across Canada. Authorized seed crop inspection services (ASCIS) employing licensed seed crop inspectors (LSCI) conducted 89 percent of the seed crop inspections in 2014, rising to 94 percent in 2015, and 96 percent in 2016.

## Canadian Plant Breeder's Rights Aligned With UPOV 1991 in Feb. 2015, Aligning Canada With Other Countries

Plant Breeder's Rights	Farmer Privileges	Seed Cleaner Responsibilities
<p>Authorization from the breeder is required to produce, reproduce, sell, clean/condition, stock, import or export seed of PBR-protected varieties</p> <hr/> <p>If seed was obtained and used illegally or without the authorization of the breeder, the breeder can choose to seek compensation, including for lost royalty revenue; lost markets; and for court costs; on delivered grain produced from that seed</p>	<p>The "Farmers' Privilege" is entrenched in legislation and allows farmers to produce PBR 91-protected varieties for use as seed on their farms</p> <hr/> <p>Farmers are allowed to clean grain from PBR-protected varieties for use as seed on their farm, market and advertise seed they have produced from PBR 91 seed, and exchange PBR 91 seed with other farmers</p>	<p>Expanded breeders' rights mean that cleaners may be liable for breaches of the breeder's right</p> <hr/> <p>Seed cleaners should take precautions to ensure the seed they are cleaning was obtained legally, and that farm-saved seed that they clean will only be used on the farm of the farmer who has brought it in for cleaning</p>



# The United Nations Declared 2016 “The International Year of Pulses”

In 2015, the global pulse industry set a target of **increasing pulse consumption and production by 10% by 2020** and the U.N. and Pulse Canada stepped in to help the industry reach that goal



## Events Held and Initiatives Undertaken for the 2016 International Year of Pulses

- Pulse Feasts and Global Pulse Days in 36 countries
- North American Consumer Campaign
- Partnerships with Canadian Influencers
- Canadian School Programs
- Travelling Exhibit
- Food Literacy Program Support
- Launch of Global Pulse Nutrition Database
- Food as Medicine Initiative
- Sustainability Literature Review
- Canadian Governmental Advocacy Visits
- Development of the Pulse Brand
- Ingredient Workshops and Product Showcases

## 2016 IYP Results

- Transitioned the initial IYP market access coalition into a global, multicommodity and self-sustaining coalition that will continue Codex-related advocacy work into the future
- Messages about pulses being a healthy, sustainable and affordable food option reached billions of people including consumers, researchers and political leaders
- In a survey of consumers who have taken the Pulse Pledge, 75% indicated that they are eating more pulses and 99% said they plan to continue eating pulses
- IYP enabled the pulse industry to engage with food industry, researchers, media, healthcare organizations, NGOs, universities, governments, and many other players that are integral components of the food value chain

**Pulse Canada has now set a new goal for the Canadian pulse industry to create new demand in new use categories for 25% of its productive capacity by the year 2025**

## ACKNOWLEDGEMENTS

Thank you for your time and support in the development of this Saskatchewan Pulses EGS profile !

## Stakeholders Consulted

Name	Position	Organization
<b>Cara Spence</b>	International Research Specialist	Office of the Vice President of Research, University of Saskatchewan
<b>Dr. Tom Warkentin</b>	Strategic Research Program Chair, Pulse Breeder	Crop Development Centre
<b>Carl Potts</b>	Executive Director	Saskatchewan Pulse Growers
<b>Dr. Karen Chad</b>	Vice President Research	University of Saskatchewan
<b>Dr. Darcy Marciniuk</b>	Associate Vice President Research	University of Saskatchewan
<b>Dr. Shannon Hood-Neifer</b>	Vice President Innovation and Technology	Saskatchewan Food Industry Development Centre
<b>Dan Prefontaine</b>	President	Saskatchewan Food Industry Development Centre
<b>Dr. Wilf Keller, Mike Cey, Bev Stangeland</b>	---	Ag-West Bio
<b>Dr. Tim Sharbel, Dr. Dave Schneider, Dr. Leon Kochian</b>	Research Chairs	Global Institute for Food Security
<b>Dr. Diane Martz</b>	Director, International Research & Partnerships Office	University of Saskatchewan
<b>Dr. Mary Buhr, Dr. Bob Tyler, Dr. Fran Walley</b>	Dean, Associate Deans, College of Agriculture & Biosciences	University of Saskatchewan

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## Stakeholders Consulted Cont.

Name	Position	Organization
<b>Dale Kelly, Justin White, Dr. Rick Green, Luke Driedger-Enns</b>	---	POS-Biosciences
<b>Murad Al-Katib</b>	President and CEO	AGT Food and Ingredients Inc.
<b>Dr. Stuart Smyth</b>	Research Chair, Assistant Professor, Department of Food and Resource Economics	University of Saskatchewan
<b>Dr. Albert Vandenberg</b>	Research Chair, Pulse & Special Crops Breeder	University of Saskatchewan
<b>Gina Feist</b>	Research Program Manager	Western Grains Research Foundation
<b>Dr. Ron Ponterollo</b>	President & CEO	Genome Prairie
<b>Dr. Johannes Dyring</b>	Managing Director	Innovation Enterprises

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thank you



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