



Transforming Canada's cereals sector through value creation

Stakeholder engagement



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Canada

Purpose

This presentation will:

- Outline the objectives for the ongoing consultations on value creation in cereals
- Provide background and context on the competitiveness and sustainability challenges facing Canada's cereals sector
- Give an overview of the two models recommended by the Grains Roundtable for further consideration
- Outline key considerations and questions for discussion

Objective and desired outcomes

Objective

To ensure the continued profitability and competitiveness of Canada's cereals sector

Desired Outcomes*

- Stakeholders are informed of and engaged in the ongoing discussion about the future of Canada's cereals sector
- Stakeholders have opportunities to share their views of the models recommended by the Grains Roundtable

**No decision has been made on implementing a new model. Input received throughout this stakeholder engagement process will inform next steps related to a model for Canada along with subsequent phases of engagement.*

How we got here

- A working group established by the Grains Roundtable – a sector-specific group that brings together stakeholders from across the value chain – led a consultation process throughout 2016-2017 where a number of options were explored for funding cereals research and variety development (see Annex 2 for an overview of participants)
- Following this industry-led stakeholder engagement process, the Grains Roundtable requested that the government consult on two models:
 - End point royalties (EPRs) collected on harvested grain
 - Royalty collection on farm-saved seed (FSS) use enabled by contracts between variety developers and producers

Next steps: multi-stage pre-consultation process is now underway

- Five in-person stakeholder engagement sessions - Winnipeg (Nov 16), Ottawa (Nov 30), Saskatoon (Dec 4), Edmonton (Dec 6) and Charlottetown (Jan 18)
- Online consultations - Feb/March 2019
- Additional sessions and re-cap/what we heard session - March/April 2019
- Next steps to be assessed

Cereals play a major role in Canada's economy

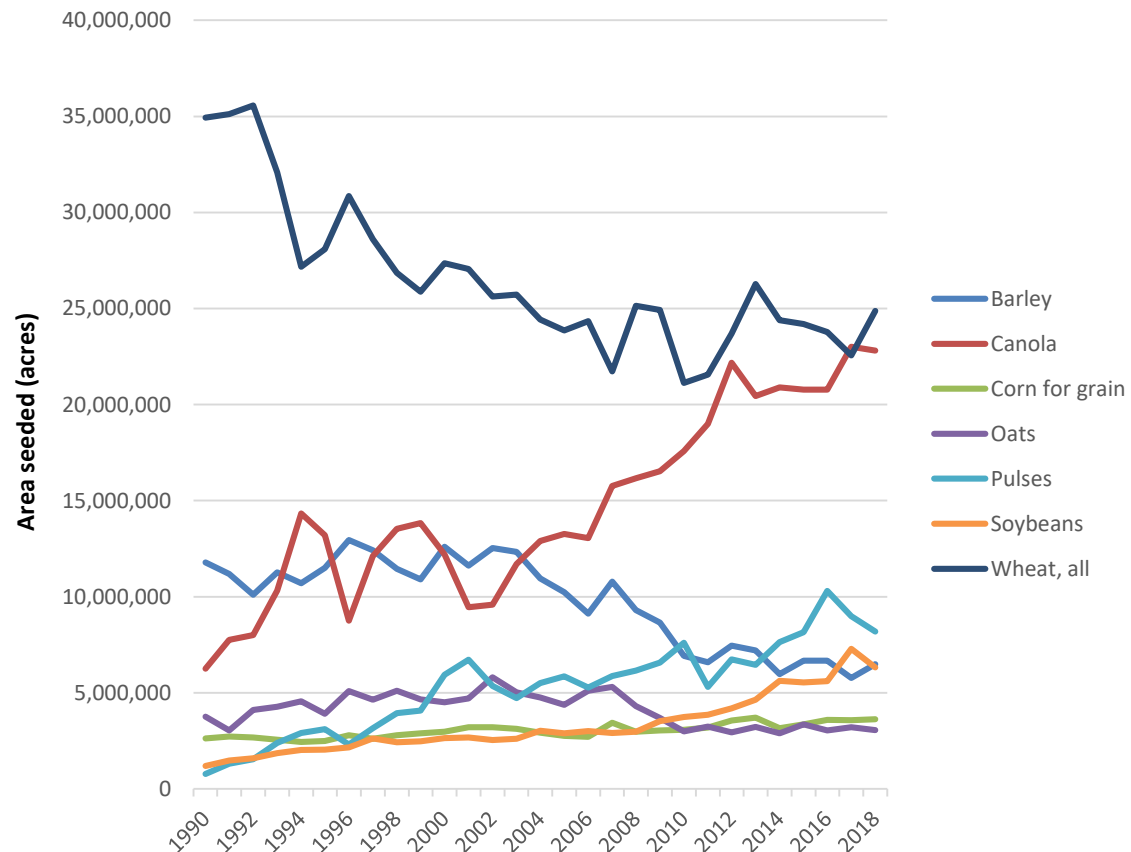
Cereals, and wheat in particular, are important to Canada's agricultural sector

- Wheat contributes \$9 billion annually to the Canadian economy
- Cereals are needed in crop rotations to prevent pest and disease pressures from emerging

However, acreage for wheat and barley has been declining in favour of more profitable crops

- There is an investment gap between wheat and other crops (e.g., canola, soybeans and corn) while annual productivity growth for wheat is slowing

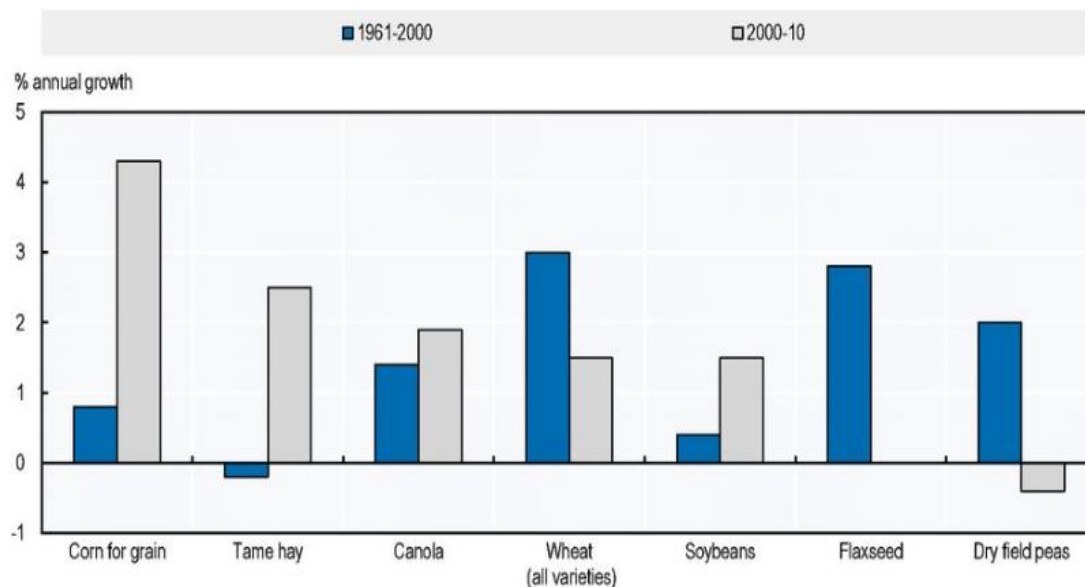
Area Seeded to Selected Major Field Crops, Canada (1990-2018)



Additional investment needed to address declining productivity growth

- Annual North American rate of yield growth for wheat went from 2.23% between 1961-1990 to 0.01% between 1990-2007
- Trend also apparent in Canada where rate of wheat yield growth declined over the past 10-20 years
- Annual yield growth for wheat declined from 2000-2010; this is compared with yields for corn, canola and soybeans, which grew more between 2000-2010 than they did from 1961-2000

Average yield growth for principle field crops in Canada, 1961-2000 and 2000-10



Source: OECD (2015). *Innovation for Agricultural Productivity and Sustainability: Review of Canadian Policies*, OECD Publishing, Paris.

Investments in cereals R&D create significant benefits for Canada

Independent studies provide evidence that investments in agricultural R&D have led to high rates of return and provided significant benefits, globally and in Canada

Over a 40-year period, value of productivity gains in high-income countries has exceeded cost of public investments in agriculture by a factor of seven, with countries investing more in R&D generally getting greater productivity growth (United States Department of Agriculture Economic Research Services, 2018)

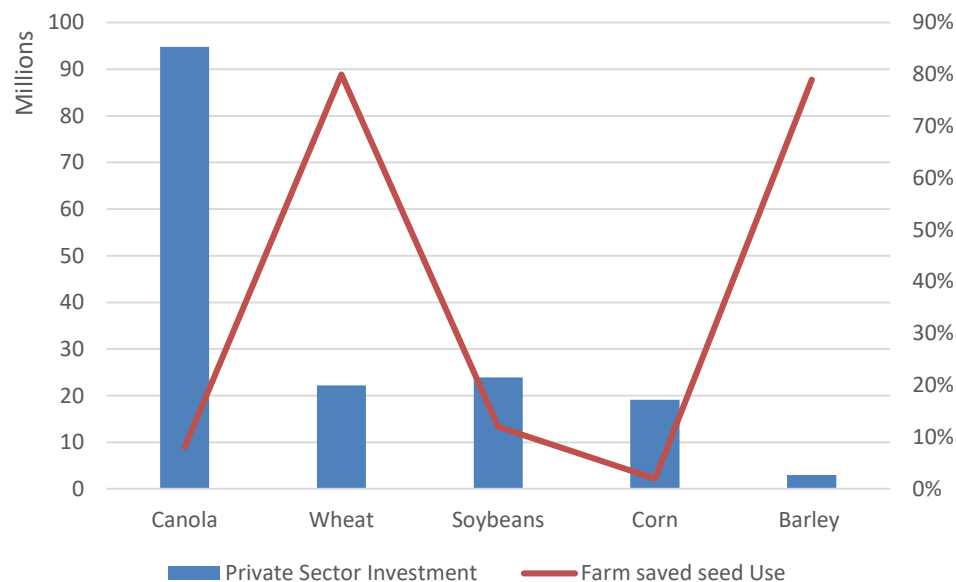
Estimates of the rate of return for investments in wheat and cereals in Canada range from 7.1% to 40%, with benefit-to-cost ratios ranging from 2.5 to as high as 77.6 (see Annex 2)

Canadian farms were producing 27.9% more wheat on 23.8% less land in 2016 compared to 1981 production levels

Even with high rates of return, investment incentives lacking

Canada has made significant investments in plant breeding for major cereal crops (i.e. wheat, barley), which are funded primarily through tax payer dollars

- However, private sector activity in cereals research and variety development (8% of total private sector investment in 2012; 14% in 2017) has been minimal due to high rates of farm-saved seed
- Canola, corn, and soybeans receive 77% of private sector research investment
- Despite the history of significant returns on investments for funding of cereals R&D in Canada, both government expenditures (in dollars) and as a share of agricultural GDP, have declined over time



Soybeans, canola and corn benefit from hybrid and/or genetically engineered varieties, which places limits on farmers' ability to save and replant seed

Value creation could help enhance Canada's cereals sector

Overall investment grows

- Royalty revenue helps support public and large/small private breeding programs and partnerships/collaborations; producer economic returns also grow along with investment

Public sector maintains prominent role

- Private sector invests to help drive further and potential transformative change

Producers have choice

- A range of high-performing varieties would be available once a new model is in place, some eligible for end-point royalties/farm saved seed royalties and others not

Transition over time

- Royalty rates for eligible varieties priced to compete with varieties currently available (certified seed royalties avg. \$3.00/acre for wheat); transition to end-point royalty or farm saved seed contract model over time as newer varieties (post 2015) adopted

Wheat becomes not just a much-needed rotational crop, but a crop of choice; other crops (e.g., other cereals, pulses, flax, etc.) also grow their potential further, expanding producer choice.

Opportunities exist despite investment challenges

Wheat consumption expected to increase in the medium term; will largely be used for human consumption

- Food use is expected to expand in Asia where there is increasing demand for non-staple food products (e.g., pastries and noodles)

Economic growth in developing countries and a growing global population will drive demand

- Gains will vary by commodity and be more than in previous decades*

Wheat prices are projected to grow moderately (2.5%) in the medium term

- In the near term, prices are forecast to stay at 2017-18 levels*

Wheat production on typical Saskatoon or Red River Valley farm is more profitable than typical farm in Kansas, Indiana

- However, these farms are still less profitable than typical farms in Russia and the Ukraine (Purdy and Langemeier, 2018)

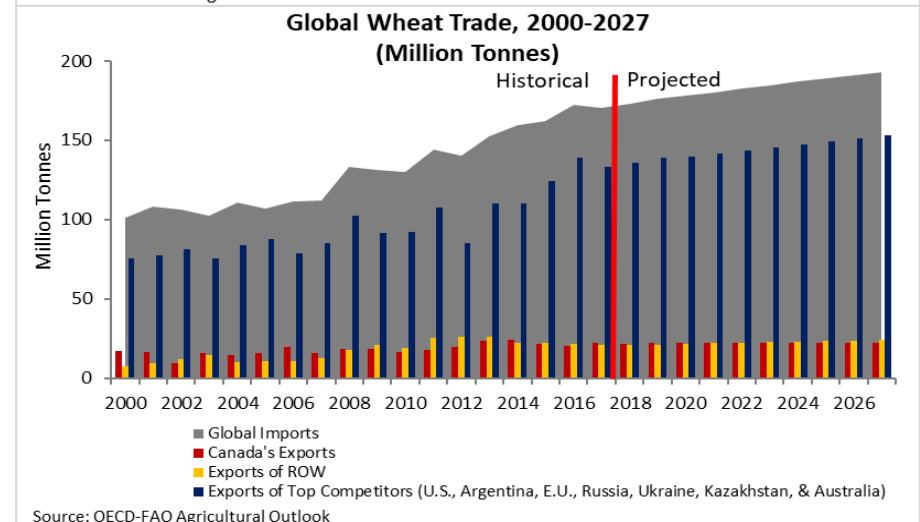
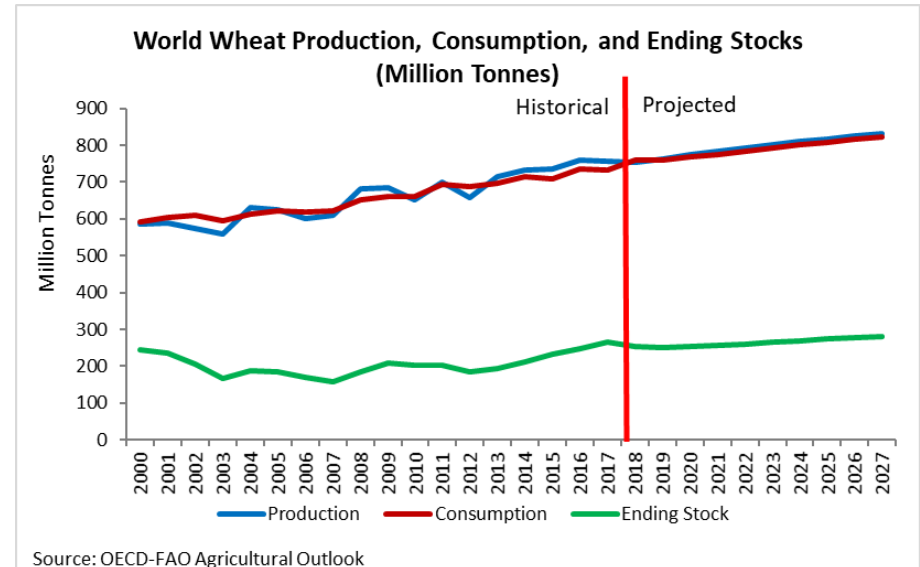
Wheat exports growing as global production/consumption increases

Wheat production and consumption both increasing steadily

- India, the EU and Russia key to expanding global production
- Consumption growth largely driven by rising world population and incomes

Global wheat exports expected to increase by approximately 13% between 2017 and 2027

- Top 8 wheat exporting countries (Argentina, Australia, Canada, EU, Kazakhstan, Russia, Ukraine and the U.S.) accounted for 92% of global wheat exports in 2017 - projected to be similar in 2027



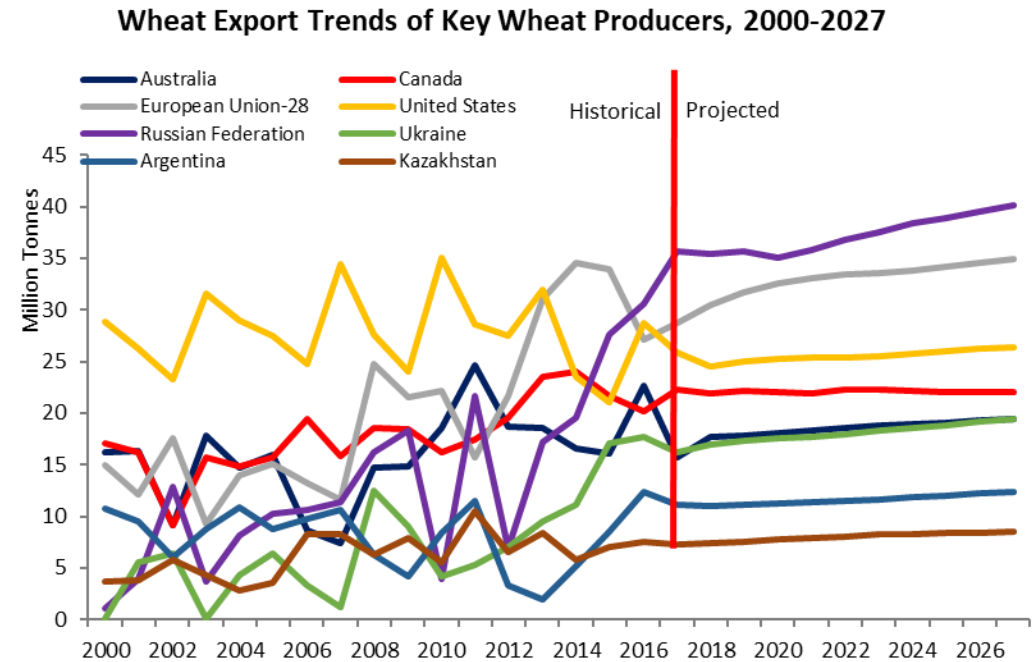
Growth in global wheat trade largely being captured by Black Sea region

Exporter shares in global wheat trade are shifting

- Emergence of new low-cost producers/exporters reducing U.S. share of wheat exports; competition from Russia, Ukraine and Argentina also weighing down on other exporters
- U.S. producers shifting to other commodities (soybeans, corn); other wheat exporters capitalizing on opportunity created by U.S. declining wheat output and exports

In 2016, Russia overtook EU as world's largest wheat exporter

- In 2017, Canada was fourth largest exporter of wheat, representing 14% of global exports



Source: OECD-FAO Agricultural Outlook

Russia's wheat exports grew at annual average rate of 46% between 2012 and 2017; annual average growth rate is projected to slow to 1.2% between 2018 and 2027

Strengthened Plant Breeders' Rights set the stage for a new approach

Canada first enacted its *Plant Breeders' Rights Act* (PBRA) in 1990

Based on UPOV 78 international convention; worked well to enhance protection for some crops (e.g., horticulture, potatoes and ornamentals), but weak IP protection for others (e.g., wheat) due to lack of restrictions on farm saved seed



In 2015, Canada amended the PBRA to include provisions that bring it into line with current UPOV 91 convention

Regulation making authority was included in these amendments that allows for new value creation models which place conditions on the use of farm-saved seed

Only varieties released after the PBRA was amended in February 2015 would be eligible for royalty collection under a new funding model.

Drivers for change

- A few multinational companies (e.g., Bayer, Limagrain/Canterra) have made modest investments to enhance breeding capacity in Western Canada following the 2015 amendments to the *Plant Breeders' Rights Act*
- Canada's capacity to attract further investment limited in the absence of an improved funding mechanism for research and variety development
- Additional investment in variety development could improve the competitiveness of cereals production through higher yields and increased resilience to the effects of weather, pests and disease
- Increased investment will also help Canada remain competitive with countries where models are in place (e.g., Australia, France) or are currently being developed (e.g., Ukraine, South Africa); to date, the U.S. has not implemented a value creation model

Investments in plant breeding have generated significant benefits for Canadian producers.

For example, from 1991 to 2015, the estimated prairie wide benefit-to-cost ratio for investments made in Saskatchewan Crop Development Centre (CDC) plant breeding is 11.5; meaning each dollar of plant breeding expenditure provided \$11.50 of benefit across the three prairie provinces.

Over this same time period, CDC-developed varieties increased producer profitability by \$3.8 billion (CDC, 2016)

An overview of proposed 'made in Canada' value creation models

End Point Royalties

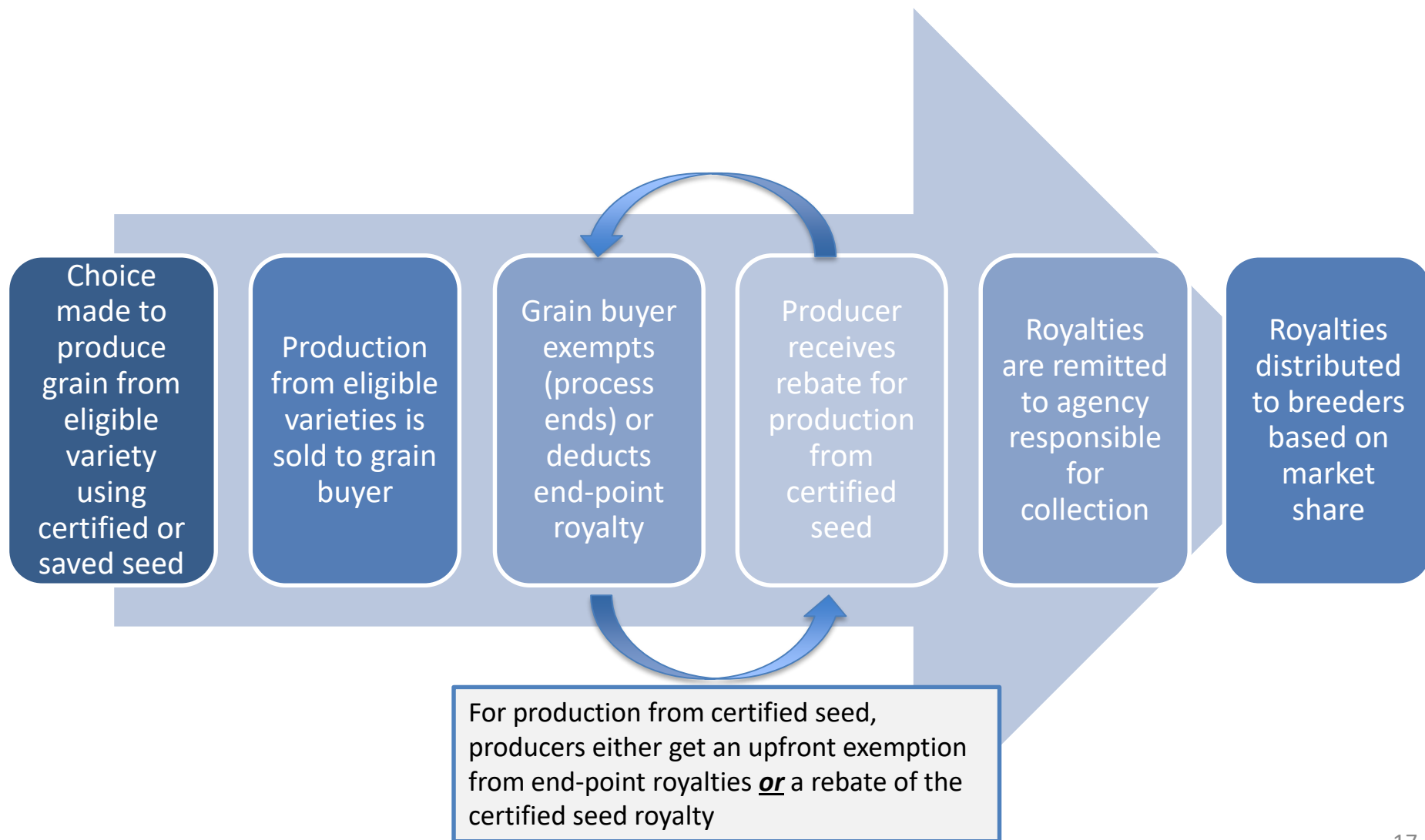
- A *Plant Breeders' Rights Act*-underpinned national non-refundable royalty payable on all harvested material (i.e., grain)
- Royalty collected at point of sale
- Royalties to be distributed to breeders based on their respective market share

Royalty Collection Enabled Via Contracts

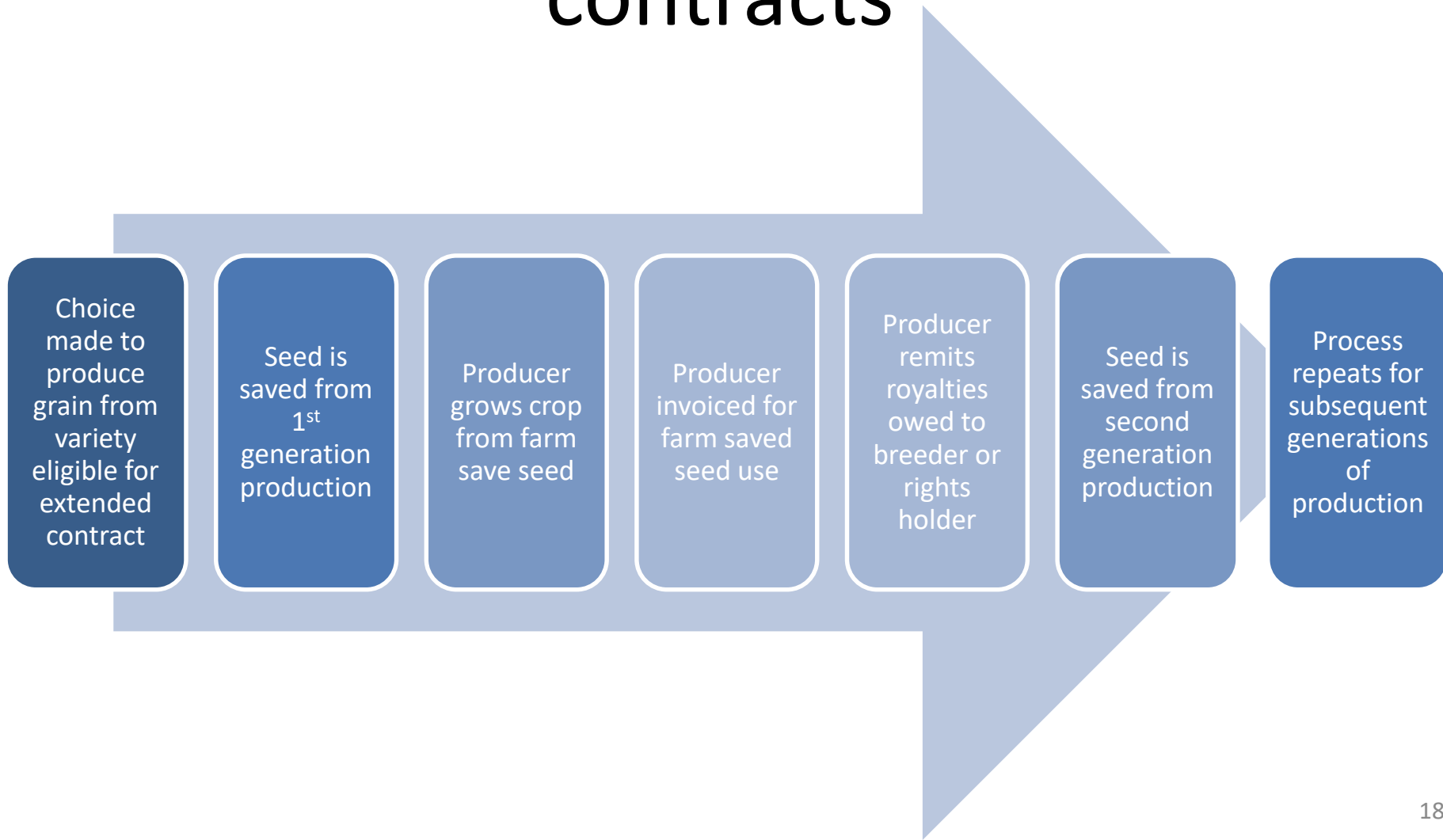
- A *Plant Breeders' Rights Act*-underpinned mechanism allowing for contracts where producers agree to farm saved seed conditions
- Purchasers of certified seed for eligible varieties agree to extended contract on farm saved seed use (e.g., agreeing to a 'trailing' royalty on farm saved seed)
- Participating producers report on their annual use of farm-saved seed as part of their contractual obligation

The *Plant Breeders' Rights Act* provides authority for regulatory amendments that would allow breeders and producers to enter into contracts where royalties are paid on farm saved seed use or to allow for endpoint royalties to be collected on harvested grain

An overview of proposed 'made in Canada' models: end-point royalties



An overview of proposed 'made in Canada' models: farm-saved seed contracts



Key policy and implementation questions for consideration*

<u>Royalty type</u>	<u>Collection and administration of revenue</u>	<u>Transparency and performance</u>
<ul style="list-style-type: none"> ➤ What type of royalty collection method should be chosen and what varieties should be eligible? 	<ul style="list-style-type: none"> ➤ How should collection, management and distribution of royalty revenue be managed? 	<p>What measures should be put in place to ensure transparency?</p>
<ul style="list-style-type: none"> ➤ What kind of royalty rate is appropriate (uniform or variable) and how should the rate be determined? 	<ul style="list-style-type: none"> ➤ How should royalty rebates/exemptions be handled? 	<p>How can we measure the performance post-implementation of a new model?</p>

*Implementation options are outlined in Annex 3

Approaches of other jurisdictions offer insight

France

- Royalties collected on harvested grain through national levy charged on sale of wheat upon delivery to buyer
- Royalty rate is limited by EU legislation
- System is efficient; low, uniform royalty rate creates adoption incentives

UK

- Farmers required to declare farm seed use; royalties collected via contractual agreements
- Royalty rate limited by EU legislation
- While efficient, high admin costs

Australia

- Rates are set by breeders, royalties collected at the point of delivery; most royalties automatically deducted by grain buyer
- There is now significant private sector investment; availability of older varieties kept royalty rates low for 10-15 years

Case study: Impact of end-point royalties in Australia

- Prior to 2000, annual investment was approximately \$18 million.
 - By 2015, increased to \$45 million
- Australia Grain Technologies, Australia's largest wheat breeding company, operates over 250,000 yield plots annually
 - By comparison, Canada has approximately 80,000 yields plots annually
- Gray et al. (2017) found that over a 40 year period, implementation of Australia's system in Canada would generate an estimated \$4.8 billion in net benefits compared to the status quo approach

Annual estimated royalty payments for representative farms in Canada*

	\$1.00 per tonne/\$1.30 per acre	\$2.00 per tonne/\$2.60 per acre	\$3.00 per tonne/\$3.90 per acre
Small Farm (1,000 acres with 330 acres of wheat planted)			
25% UPOV91 Varieties	\$107.25	\$214.50	\$321.75
50% UPOV91 Varieties	\$214.50	\$429.00	\$643.50
100% UPOV91 Varieties	\$429.00	\$858.00	\$1,287.00
Medium Farm (3,500 acres with 1200 acres of wheat planted)			
25% UPOV91 Varieties	\$390.00	\$780.00	\$1,170.00
50% UPOV91 Varieties	\$780.00	\$1,560.00	\$2,340.00
100% UPOV91 Varieties	\$1,560.00	\$3,120.00	\$4,680.00
Large Farm (10,000 acres with 3,300 acres of wheat planted)			
25% UPOV91 Varieties	\$1,072.50	\$2,145.00	\$3,217.50
50% UPOV91 Varieties	\$2,145.00	\$4,290.00	\$6,435.00
100% UPOV91 Varieties	\$4,290.00	\$8,580.00	\$12,870.00

Costs in the initial period following implementation are expected to be lower given that in 2017, the share of acres seeded with UPOV varieties was an estimated 19.2% for oats, 1.5% for barley, 7.2% for durum and 8.9% for wheat (based on seed industry estimates)


*for these calculations, it is assumed that 1 tonne is equal to 1.3 acres; royalties could be calculated per acre seeded with farm saved seed or per lb of farm saved seed used

Key takeaways

- Costs would likely range from \$1-3/tonne or acre on applicable varieties
- Royalty revenue generated from certified seed covers approx. 10-20% of costs of developing new varieties
- Regulation making authority under the *Plant Breeders' Rights Act* is very flexible
- Investments in research and variety development yield significant benefits
 - Yield growth
 - Varieties that help the sector overcome crop production challenges (e.g., evolving disease/pest pressures, climate change)
 - End-user functionality
 - Increased producer profitability

Further advice?

Overarching goal is to enhance sector competitiveness, profitability and innovation; with this in mind.....



Do you have any further comments or advice on the models or the process?

For any follow up questions or comments, please contact:

Carla St. Croix, Director Innovation and Growth Policy Division, Strategic Policy Branch, Agriculture and Agri-Food Canada

- Carla.StCroix@Canada.ca or 613-773-1221

Anthony Parker, Commissioner Plant Breeders' Rights Office, Canadian Food Inspection Agency

- Anthony.Parker@Canada.ca or 613-773-7188

Annex 1 – Recent studies on rates of return to investments in ag R&D

Study	Commodity	Benefits to Costs Ratio	Internal Rate of Return (%)	Summary
Gray and Malla 2000	Wheat	n/a	40%	The average estimated rate of return for investments in Canadian wheat research is 40% annually; high rates of return can be attributed in part to the large area of wheat grown and there is no indication that rates of return are decreasing.
Scott, Guzel, Furton & Gray, 2005	Wheat Barley	Wheat - 4.6 Barley - 13.1	Wheat - 24.4% Barley - 36.8%	The study found significant returns to the WGRF check-off investments for both wheat and barley. The benefit/cost (B/C) ratio for producers for the wheat check-off is estimated at 4.4. to 1, meaning that every dollar of check-off invested generates \$4.40 of increased producer surplus for Western Canadian wheat growers.
Groenewegen, Thompson & Gray, 2016	Wheat Durum Barley Oats	Spring Wheat - 6.8 Winter Wheat - 2.1 Durum - 1.8 Barley - 8.7 Oats - 2.5	Spring Wheat - 14.5% Winter Wheat - 7.1% Durum - 7.5% Barley - 15.5% Oats - 10.1%	When all CDC costs since 1971 are considered with benefits measured over the 1991-2015 period, the IRR was found to be 14.5% and 7.1% respectively for spring and winter wheat; 7.5% for durum, 15.5% for barley and 10.1% for oats. The benefit cost ratio is 6.8 and 2.1 respectively for spring and winter wheat; 1.8 for durum; 8.7 for barley; and 2.5 for oats.

Annex 2 – Participants in GRT-led engagement process

- AAFC
- CFIA
- AWC/ABC
- SWDC
- MWBGA
- GFO
- Producteurs de Grains de Quebec
- Atlantic Grains Council
- CFA
- CDC
- CSGA
- CSTA
- CPTA
- SeCan
- FP Genetics
- CANTERRA SEEDS
- Syngenta
- Bayer CropScience

Annex 3: Implementation options

Options for expressing royalties and rates

A) Market forces (i.e., set by individual breeders)

B) Prescribe royalty rate in regulations under the *Plant Breeders' Rights Act* that is (i) uniform or (ii) one that applies to specific varieties*

- ❑ Australia's end-point royalties range from \$1-4 per tonne for wheat; France's national levy is priced at 0.70 Euros per tonne
- ❑ As per EU law, UK farm-saved seed royalties are priced 'sensibly lower' than certified seed (i.e., 52.5% of the weighted average royalty rate on certified seed grown the previous year)

* Under either model, rates could be uniform across all eligible varieties; vary by specific class; or vary by individual variety; rates can be expressed in \$/tonne, as a percentage of gross sales, or on a per acre basis;

Annex 3: Implementation options (cont.)

Options for royalty collection and distribution

EPR

A) Producer commission via existing check-off system

B) A newly-established organization;

C) Individual breeders

Production Contract

A) Farmer declarations are dealt with by individual breeders

B) Coordination among breeders on royalty collection/administration

Stipulations in the *Plant Breeders' Rights Act* prevent breeders from collecting a certified seed royalty and end-point royalty on the same seed production cycle

Options for dealing with EPR rebates/exemptions

A) Upfront exemptions based on certified seed use

B) Rebate with demonstrated purchase of certified seed

Annex 3: Implementation options (cont.)

Options for measuring performance/ensuring transparency

A) Use existing data (e.g., from Canadian Seed Trade Association) to determine performance of system on ad-hoc basis

B) Use *Plant Breeders' Rights Act* regulations to require (i) regular reporting on the performance in Plant Varieties Journal or (ii) to require annual reporting on the performance of the system to Parliament

Possible indicators: levels of investment, the time it takes from first cross to commercial variety release, the rate of variety release, the uptake of new varieties, resources invested in plant breeding (e.g., breeders, technicians, support staff)

Significant latitude through the *Plant Breeders' Rights Act* to publish information on the performance of a new funding model on a regular basis

Value chain (producers, breeders, seed growers, etc.) involved in oversight and decision making via Plant Breeders' Rights Advisory Committee