



**Agricultural  
Institute of Canada**

**aic**

**Institut  
agricole du Canada**

**Brief to the House of Commons Standing  
Committee on Agriculture and Agri-Food**

**May 2018**



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## About AIC

Founded in 1920, the Agricultural Institute of Canada (AIC) is a unifying voice for cross-sectoral research and innovation in Canada.

Our mandate is to advocate on behalf of agricultural research. This includes disseminating information, promoting careers in our sector and creating international linkages.

For nearly 100 years, AIC has responded to the needs of its members in service to the agricultural community, playing a central role as a source of credible information and comment for the Canadian agriculture and agri-food sector.

We are one of Canada's foremost advocates for agricultural research and innovation as well as an important tool to facilitate the dissemination of agricultural research and innovation to industry stakeholders.

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## Recommendations

1. For Canada's agricultural exports to meet their full potential, a strong and inclusive, demand-driven innovation system is key. In order to succeed, it must be supported by science-based policies and an enabling regulatory framework.
2. Identify potential areas for growth in specific international markets, invest strategically and align research and funding programs accordingly.
3. Greater collaboration, a whole-of-government approach to agricultural research and innovation.
  - a. This includes removing duplication and needless administrative burden – red tape.
4. More cross-sectoral support for emerging innovations and technologies that are in their infancy.
  - a. Incentivize early adoption by producers.
  - b. Expand broadband rural internet services.

## Economic Impact of Agricultural Research

Agricultural research and innovation has the potential to be a key engine of economic growth, job creation and productivity, ultimately strengthening Canada's position internationally. In 2016, this was recognized by the federal government's Advisory Council of Economic Growth, in what is now known as the Barton Report. This report singled out the agricultural sector, noting that it has the potential for sustainable growth. His report set a lofty goal: that Canada rise from the 5<sup>th</sup> largest exporter of agricultural products to the 2<sup>nd</sup>.

This is no small feat. Currently, Canada accounts for 3.5% of the total value of world agricultural exports, if we are to surpass the United States (accounting for 11.7% of total exports), steps need to be taken today.

Canada can rise to meet this challenge, head on, if strategic investments are made in the agricultural research and innovation sectors. But it requires the government giving researchers, industry and producers the tools they need to succeed. It also requires the government better recognizing the importance of the sector by making it a priority – in budgetary discussions, policy making, public recognition.

The government could further jump start growth by identifying strategic areas of the agricultural sector that have high potential for growth, then making strategic investments and aligning funding programs accordingly. Supporting growth in its infancy will ensure that the maximum impact is felt further down the line.



## Examples of Agricultural Research and Innovation

Agricultural research innovations have the potential to change the way we cultivate and produce agricultural and agri-food products across the country. Researchers across Canada are developing ways to improve efficiency and output, mitigate the effects of climate change, and more. Below are just a few examples of this work.

- Cattle/Livestock (including dairy):
  - Research and innovation has seen improvements in animal health, reproductive efficiency, animal genetics, etc.
  - This has resulted in lower GHG emissions (per kg of beef) and reduced the environmental footprint (including water and land use).
- Greenhouse horticulture:
  - Using robotics and automated technology, this indoor environment produces as much as 7 times higher yields, with greater consistency.
  - This relatively young sector is now worth \$2.5 billion, and exports nearly 70%.
- Precision agriculture:
  - Uses technology (including GPS, satellites, UAVs, etc) to monitor crops in a variety of ways, and allow the farmer to respond accordingly (i.e. apply the right kind of fertilizer only where needed).
  - This makes farming more efficient, resulting in higher crop yields, while using less resources.
- Canola:
  - Perhaps the most well-known agricultural innovation. Developed by agricultural scientists in the 1970s, canola has grown to be one of the world's most important oilseed crop and the most profitable commodity for Canadian farmers.

## International Trade and Agricultural Research & Innovation

A rapidly-growing world population, rising income in developing countries and favourable global market trends are expected to raise demand for agricultural products worldwide, contributing to an estimated annual growth of 2% in Canada's agricultural trade by 2025.

Agricultural innovation will lead to greater competitiveness as well as opportunities to meet food security and sustainability goals in Canada and around the world.

These same innovations have contributed enormously to the transformation of Canada's agricultural sector over the last 50 years, which has strengthened our competitive position world-wide. However, we are seeing that budgetary expenditures earmarked for agricultural innovation represents just 0.046% of Canada's GDP, and has been steadily decreasing over the past 3 decades.



High benefit cost ratios from agricultural research, ranging from 10:1 to 20:1, confirm that productivity gains from investments in agricultural research and development are worth many times the value of expenditures. Despite this, investment has continued to slide from its peak, nearly 20 years ago.

We cannot ignore the entrepreneurial spirit throughout our agricultural research sector. Private companies – such as Vineland Research and Innovation Centre, Ag West Bio, etc – are making great strides. Greater collaboration between government, private corporations, academia, and removing needless administrative burdens would go a long way to ensuring that the full impact of these innovations are felt.

The crucial role of academia needs to be recognized. Not only do academic institutions train the future generations that will continue to help Canada remain a leader in agricultural research and innovation but they do most of the research in Canada. It is important for the Canadian government to recognize that fact and support them adequately.

## Knowledge Dissemination and Application

Nearly half of all Canadian farms have adopted agricultural innovations. This can range from automation of certain tasks (i.e. milking a cow), to more complex systems such as using GPS satellite monitor and tend to crops (i.e. precision agriculture).

Cost is sometimes an issue and being an early adopter of a technology is always more expensive. Other obstacles, such as the lack of access to broadband and high-speed internet in rural regions, are also present. Government incentives – both for the lab to develop, and the producer to adopt – have the potential to greatly improve the quality and quantity of our agricultural products.



## AIC – Canada Foundation for Innovation

In collaboration with the Canada Foundation for Innovation, AIC released a report about Canada's Agricultural Innovation System. In broad terms, the report notes that unless we capitalize on our strong innovation potential, Canada's agricultural production will be unable to meet the world's growing demand and sustain momentum in today's changing global trade environment.

Recommendations and Key Findings of this report are below.

An Overview of the Canadian Agricultural Innovation System

### RECOMMENDATIONS

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Unless we capitalize on our strong innovative potential, Canada's agricultural production will be unable to meet the world market's growing demand and sustain momentum in today's changing global trade environment.

Meeting Canada's long-term challenges of a competitive global economy and enhance job growth requires:

- An inclusive demand-driven innovation system supported by a science-based policy framework, an enabling regulatory environment, and governance structures that promote continuous technological progress while encouraging the adoption of innovations at the farm level.
- A combination of funding mechanisms, including matching investment strategies, to suit the particular needs and characteristics of our sector and to ensure all types of research are adequately supported.
- An attractive climate for private investment in agriculture to increase the number of innovative companies willing to capitalize on our research capacity, stimulating Canada's competitiveness and enhancing job growth.
- Participatory research approaches that engage all stakeholders in research projects and knowledge transfer activities, ensuring that new knowledge and technologies respond effectively to end-users' needs.
- Guidance and career counselling information, investments in education through grants, scholarships and infrastructure, and Canada-wide strategies to raise the profile of agricultural innovation to help address human resource challenges in the sector.

## KEY FINDINGS

**Agricultural innovation has the potential to be a key engine of economic growth and job creation, strengthening Canada's competitive position internationally.**

- Canada's agriculture and agri-food system plays a critical role in an economy increasingly dominated by manufacturing and service industries, generating \$113.8 billion – 6.6 % of Canada's GDP.
- Canada's agricultural sector provides one in eight jobs in Canada, employing over 2.3 million people.
- Our agricultural sector reports a compound annual growth greater than that of the healthcare and life-science sector.
- Canada is now the fifth-largest global exporter of agri-food products generating export sales of \$55 billion.
- A rapidly-growing world population, rising income in developing countries and favourable global market trends are expected to raise demand for agricultural products worldwide.
- Growth in the sector relies on agricultural innovation to drive productivity gains and provide a basis for building a more globally competitive and sustainable economy.

### Funding

- Very large marginal benefit-cost ratios reflect substantial and continued underinvestment in R&D.
- The public sector continues to be the largest source of funding for Canada's agriculture R&D.
- Budgetary expenditures financing the Canadian agricultural innovation system represented 0.046% of Canada's total GDP in 2015, steadily declining over the past three decades.
- The private sector appears to either under-invest or decrease their investments in agriculture R&D due to low short-term returns on investment or insufficient incentives.

### Knowledge Creation, Dissemination and Adoption of Innovation

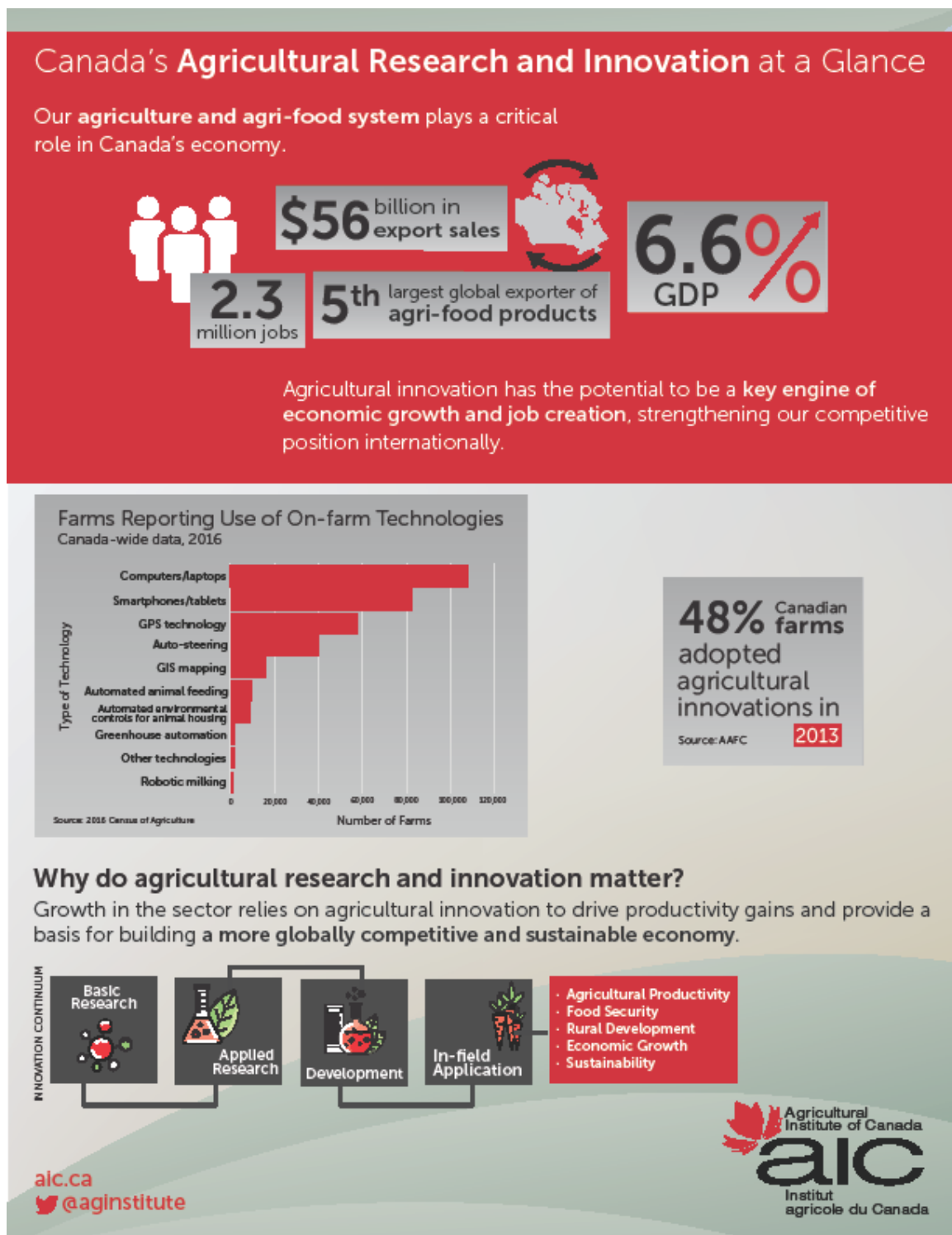
- Despite ranking 8th worldwide in scientific production of agricultural research, Canada's number of patents has progressively dropped over the last decade.
- Food processing companies are less innovative than other types of manufacturing enterprises.
- The lack of a common analytics platform and rural broadband often prevents farmers and producers from realizing the full potential of large-scale research.
- Industry groups have increasingly taken the leading role in extension activities.
- Canadian farmers still rely on their own experience and experimentation rather than third-party advice to implement a new technology or process.

### Human Capital

- Skilled labour shortages in agriculture are potentially undermining Canada's research capacity.
- The sector counted 26,400 unfilled jobs that reflected a cost to the sector of \$1.5 billion in lost revenues.
- The number of post-secondary agriculture graduates has grown consistently. These rates, however, remain insufficient to meet the future demand for skilled labour.



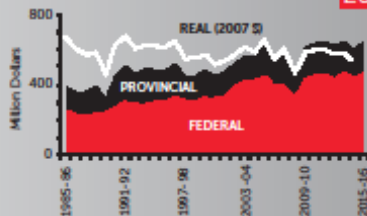
## Canada's Agricultural Research and Innovation at a Glance



# Canada's Agricultural Research at a Glance

## Public Agriculture R&D Spending Provincial & Federal (AAFC Estimates) Primary Agriculture & Food Processing

**\$649 million**  
2015-16



## Private Agriculture R&D Spending Primary Agriculture

**\$73<sup>1</sup> million**  
2015



Investment

## Scientific Production

**6,878**  
academic  
papers  
published  
2014

**8<sup>th</sup>** place in  
scientific  
production of  
agricultural  
research  
worldwide

Sources: Science-Metrix, Statistic Canada  
<sup>1</sup> Includes Agronomy, Agricultural Engineering, Irrigation, Weed and Pest Control, Agroforestry, Agricultural Economics & Policy, Plant Sciences, and Land Resource & Soil Science

Area of Research

VETERINARY MEDICINE	5.0%
AGRICULTURAL SCIENCE <sup>1</sup>	4.7%
FOOD SCIENCE	4.4%
RENEWABLE BIORESOURCES	4.2%

Canada's share at the World Level (%)

**29,937** students enrolled  
in agricultural programs  
2014-15

## Actors



## Farm-Level Adoption

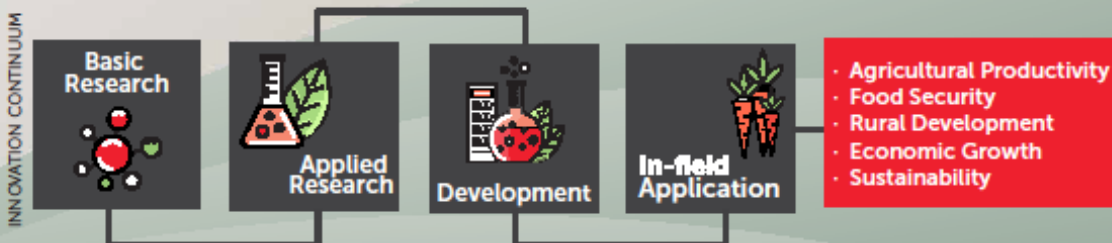
Speed of adoption

6%	7%	Early adopters
23%	32%	Wait until at least a few others have tried it first
35%	44%	Wait until it has been well tested
29%	17%	Late adopters
Crop	Livestock	Producers

Agricultural innovations are more likely to be adopted by **large farms** with revenues of over one million dollars.

Source: AAFC

## Why does agricultural research matter?



## Funding Trends in Agriculture R&D

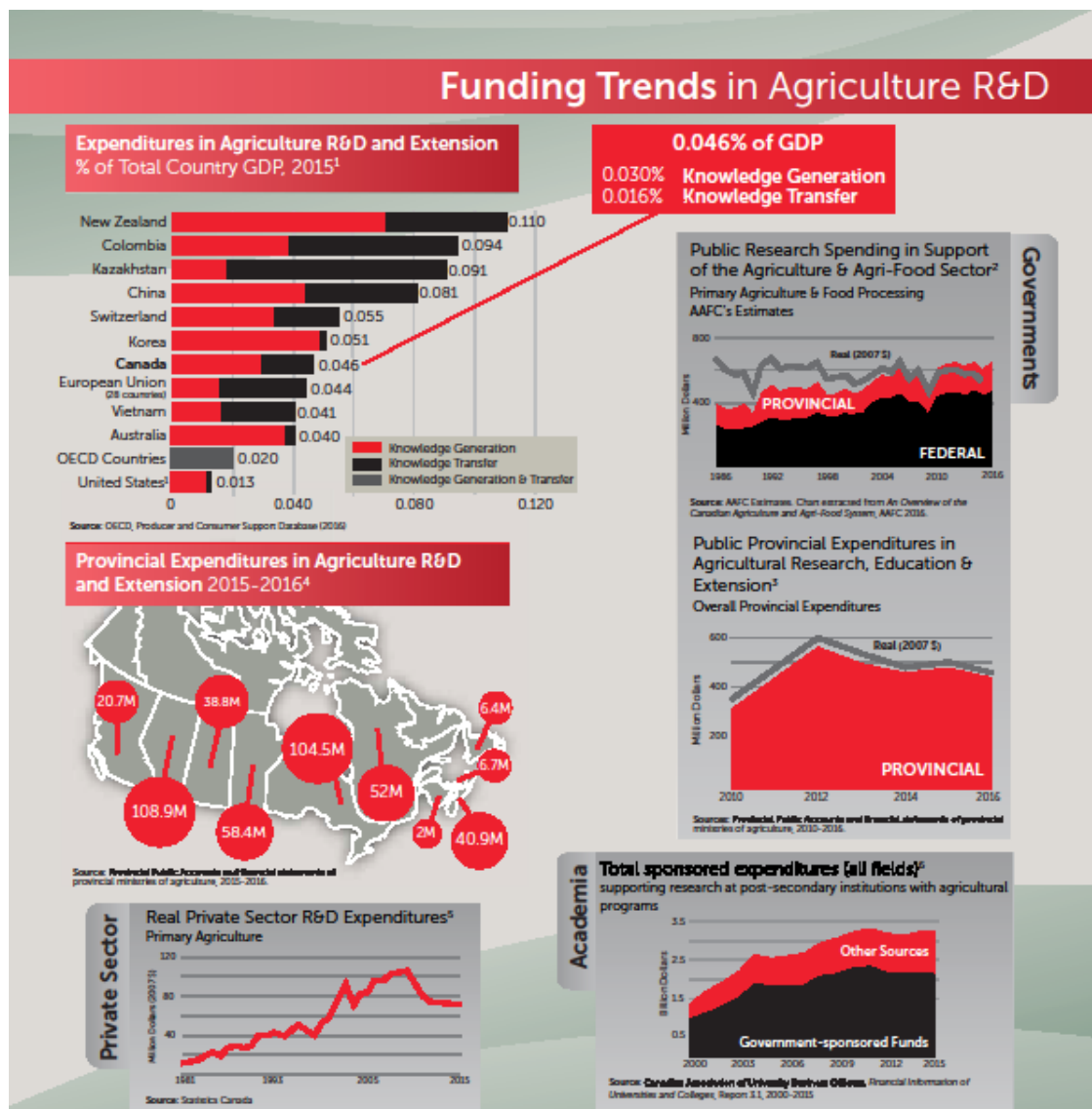


Image B.4. Funding Trends in Agriculture R&D

1 Agricultural knowledge generation includes budgetary expenditure to finance agricultural research (institutes, grants) and gene banks. Agricultural knowledge transfer includes agricultural education and generic training and extension services provided to farmers. The U.S.A. ranked 18<sup>th</sup> among 33 countries and the European Union.

2 AAFC Estimates. Federal research values correspond to operating, capital and program expenditures.

3 AIC Estimates. Sources for provincial expenditures: Provincial Public Accounts and financial statements of provincial ministries of agriculture, 2010-2016. Real values (2007 \$) based on StatCan Price Indexes.

4 For a more detailed description of the data and sources used in this map, see the References section at the end of this report.

5 Data includes all R&D expenditures (intramural) made by private industry regardless of whether the sources of funds were self-financing but does not include investments from the agricultural input sector.

6 Post-secondary institutions with agricultural programs included in this chart are members of the Canadian Faculties of Agriculture and Veterinary Medicine. Government-sponsored funds include federal, provincial, municipal, intra-provincial and foreign governments. Other sources of funding include donations, non-government grants and contracts, investment, sale of services and products, and miscellaneous. None of the listed institutions allocated resources from tuition and other fees towards research.

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