Canadian Grain Commission | Commission canadienne des grains

SCIENCE STRATEGY

Canada

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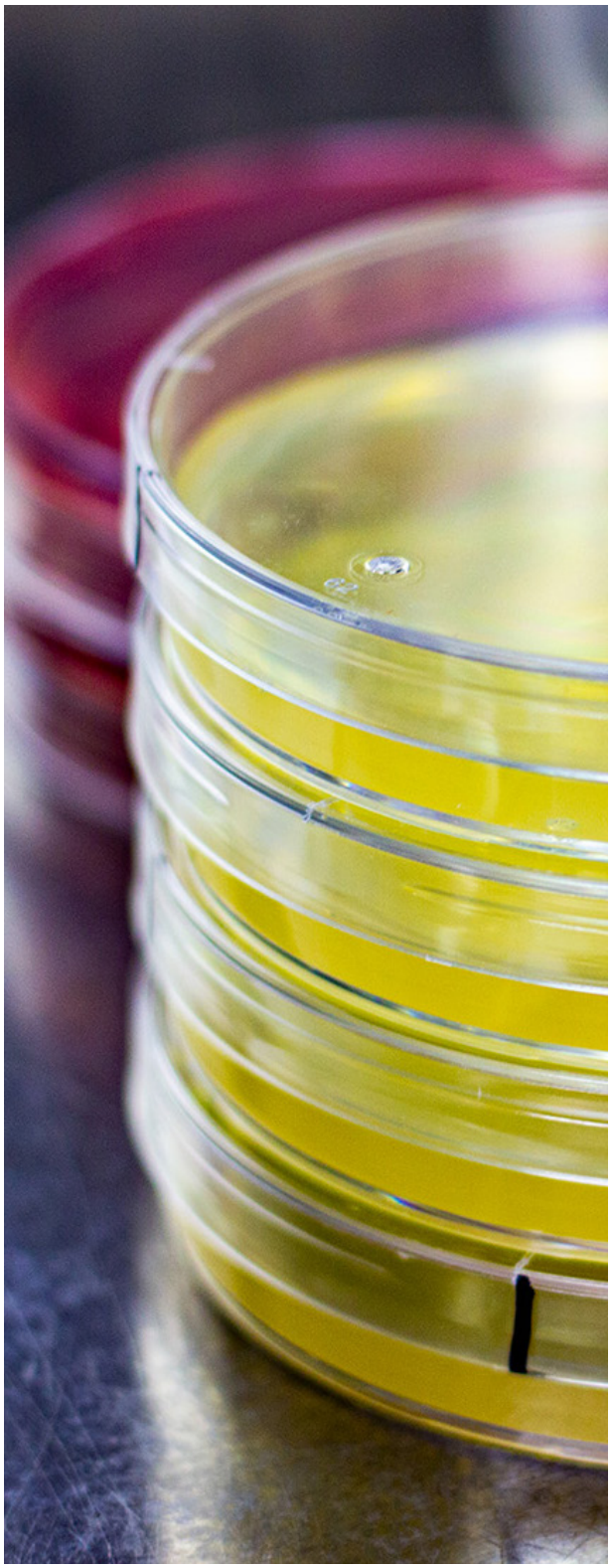
INTRODUCTION



Science and research are essential for the Canadian Grain Commission to support the integrity and marketability of Canadian grain for domestic and international markets. For more than a century, we have worked to increase our understanding of grain and grain products, and our scientists and research staff have established a reputation for excellence and innovation.

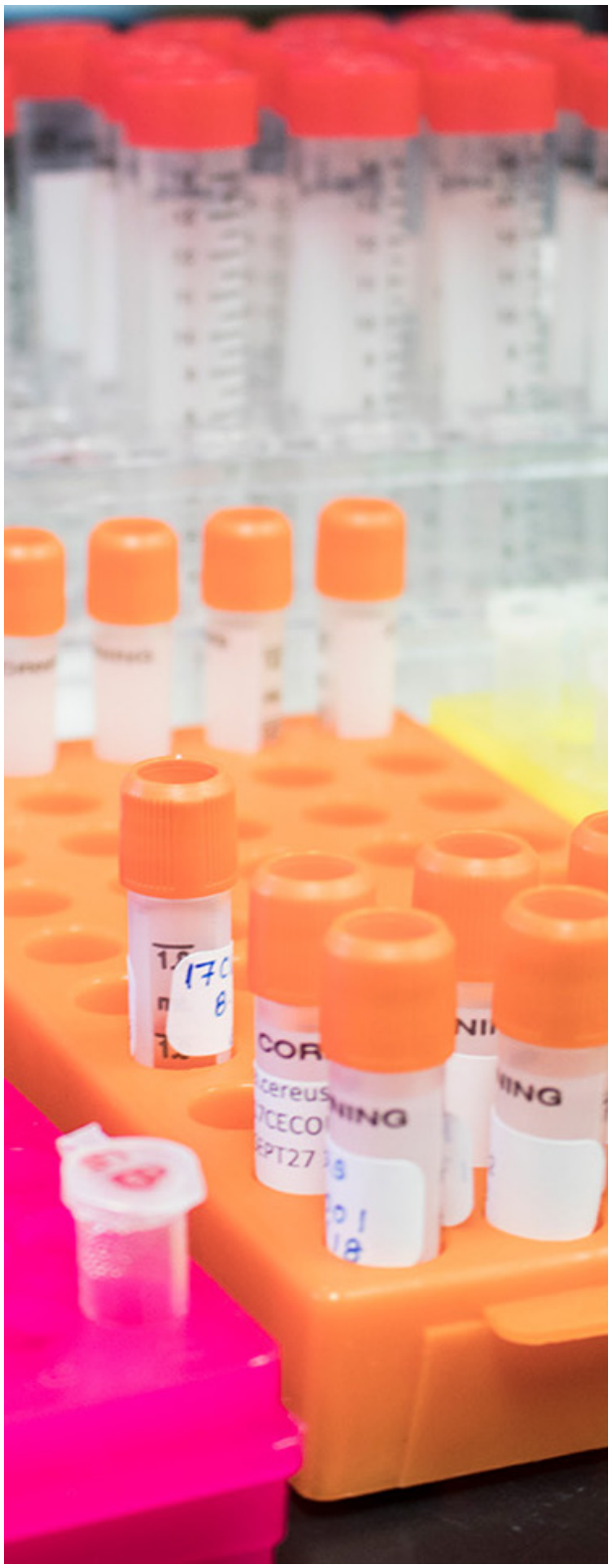
Over the years, our work has evolved in response to changes in the grain sector and we have continued to be the leader in grain science in Canada by being adaptable and innovative. To ensure that science and research continue to underpin Canada's grain quality assurance system, we held a consultation in early 2022 to identify challenges and emerging trends in the grain sector. We asked producer and industry organizations, end users, and researchers in government and academia to give us feedback on the science and research activities currently being carried out at the Canadian Grain Commission and to identify any gaps or needed changes in these activities.

From this consultation process, we identified 5 drivers that will help shape the future of grain science and research at the Canadian Grain Commission:

- global trends and emerging market issues
- advances in technology
- evolving end uses
- climate change and extreme weather
- food safety and nutrition

Our Science Strategy is a response to these drivers and is organized into two main parts. The first part outlines our desired goals and outcomes for grain science within the context of each driver into the next decade. The second part describes how we will support the implementation our goals and outcomes with four operational pillars: excellence in science and innovation; a skilled, adaptable and productive workforce; communication of results; and state-of-the-art infrastructure and technology.

GUIDING PRINCIPLES



Guided by our mandate, mission, vision, and values, the Canadian Grain Commission works in the interests of grain producers.

Mandate

The Canadian Grain Commission's mandate as set out in the Canada Grain Act is to, "in the interests of the grain producers, establish and maintain standards of quality for Canadian grain and regulate grain handling in Canada, to ensure a dependable commodity for domestic and export markets".

Mission

To ensure the integrity and marketability of Canadian grain for the domestic and international grain trade, from producer to global consumer.

Vision

To be a world class, science-based quality assurance provider.

Values

We put our values of excellence, integrity, respect and accountability into action every day.

DRIVERS
OF CANADIAN GRAIN COMMISSION SCIENCE

Food safety and nutrition

Global trends and emerging market issues

Climate change and extreme weather

Advances in technology

Evolving end uses

Global trends and emerging market issues

International buyers and regulators of grain are becoming more demanding in relation to the presence of genetically modified events, maximum residue limits for pesticides, maximum limits for mycotoxins and trace elements, and other potential risks. Expanding grain quality and safety monitoring programs will support export certification and assurances that enhance customer perceptions of Canadian grain. Monitoring information also supports the ability of Canadian grain exports to meet international regulatory and market requirements and to resolve market access situations and quality or safety complaints.

What we will do

- Expand cargo monitoring to include other conveyances, such as container shipments, in addition to bulk cargo shipments for better representation of grain exports.
- Expand the Harvest Sample Program to include more minor and emerging crops.
- Develop and promote best practices for methods of sampling and analyzing grain to increase global harmonization.
- Increase intelligence gathering and collaboration with government and industry partners to identify emerging market access issues in their early stages to facilitate responsive research.

Advances in technology

Maintaining and ensuring grain quality and safety requires ongoing attention to the development of reliable and efficient quality assessment methods for all stages of the supply chain. Increasing the development and validation of rapid, economical methods and technologies will support management of increasingly diverse grain types and classes in the handling system. It will also enable rapid evaluation of quality factors that matter to customers, and increase the objectivity of the grading system so that producers are fairly compensated for the grain they deliver.

What we will do

- Develop new and innovative methods for the objective assessment of grain quality and safety attributes for use across the supply chain from plant breeders to end users.
- Evaluate new technologies for objective grading based on rapid and reliable technologies, including digital imaging and spectroscopy.
- Develop and employ an intellectual property policy and framework to facilitate collaboration with innovative technology companies the development of new instrumental methods of analysis.

Evolving end uses

Demand for plant-based foods is increasing globally along with growth in domestic value-added processing capacity for production of novel protein ingredients from plants. Increased understanding of the factors that affect quality traits in grains, especially pulses, to better predict end-use functionality will support traditional as well as new or emerging end uses.

What we will do

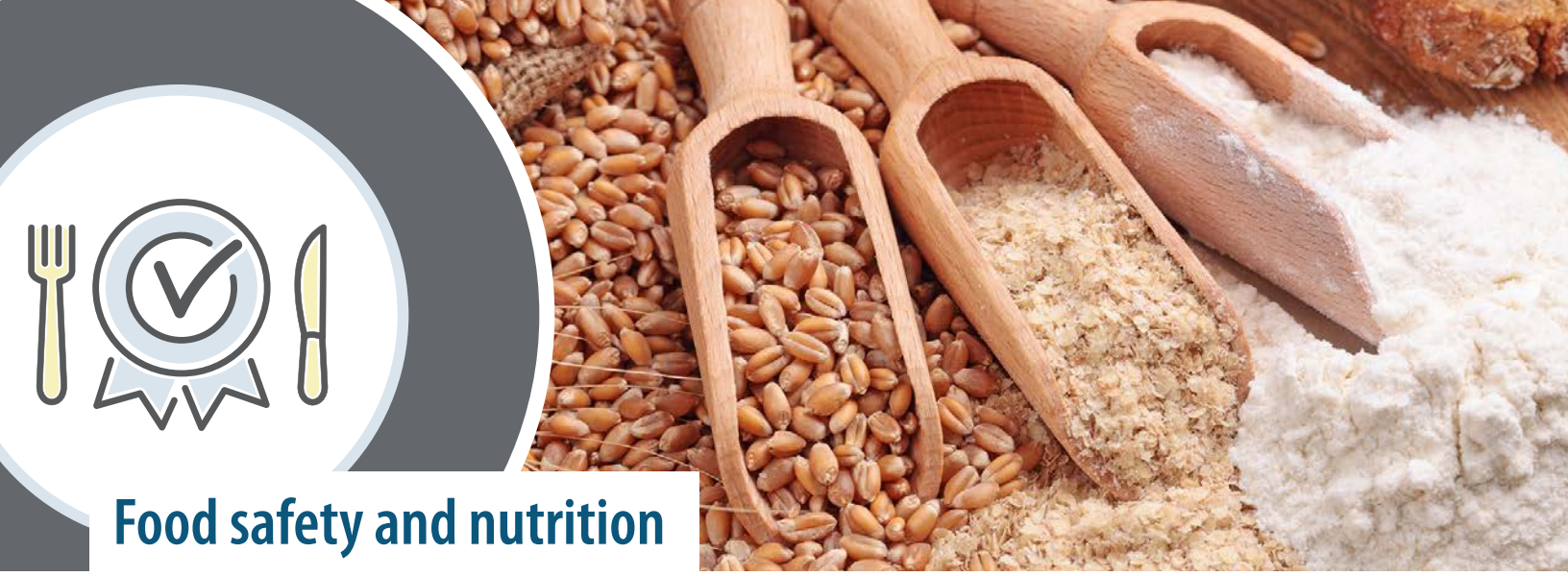
- Develop new and improved methods for assessing evolving quality requirements of grains.
- Investigate how genetic, environmental and processing factors affect end use quality of pulses for production of novel protein ingredients.
- Expand research and monitoring activities to include better representation of diverse pulse crop types, varieties and geographic regions.

Climate change and extreme weather

Agricultural systems are vulnerable to current and projected changes in the global climate. Collectively, the impacts and responses associated with these environmental stresses have the potential to impact grain quality and safety. Research collaborations with plant breeders and agronomists will lead to improved understanding of how climate factors affect the quality and safety of Canadian grain.

What we will do

- Investigate the impact of genetic and environmental effects and their interactions on grain composition, functionality and safety characteristics.
- Investigate the impact of evolving agronomic practices on grain quality and end use functionality.
- Leverage monitoring data using statistical modeling, artificial intelligence and machine learning to better understand the impact of environment and weather patterns on grain quality and safety parameters.



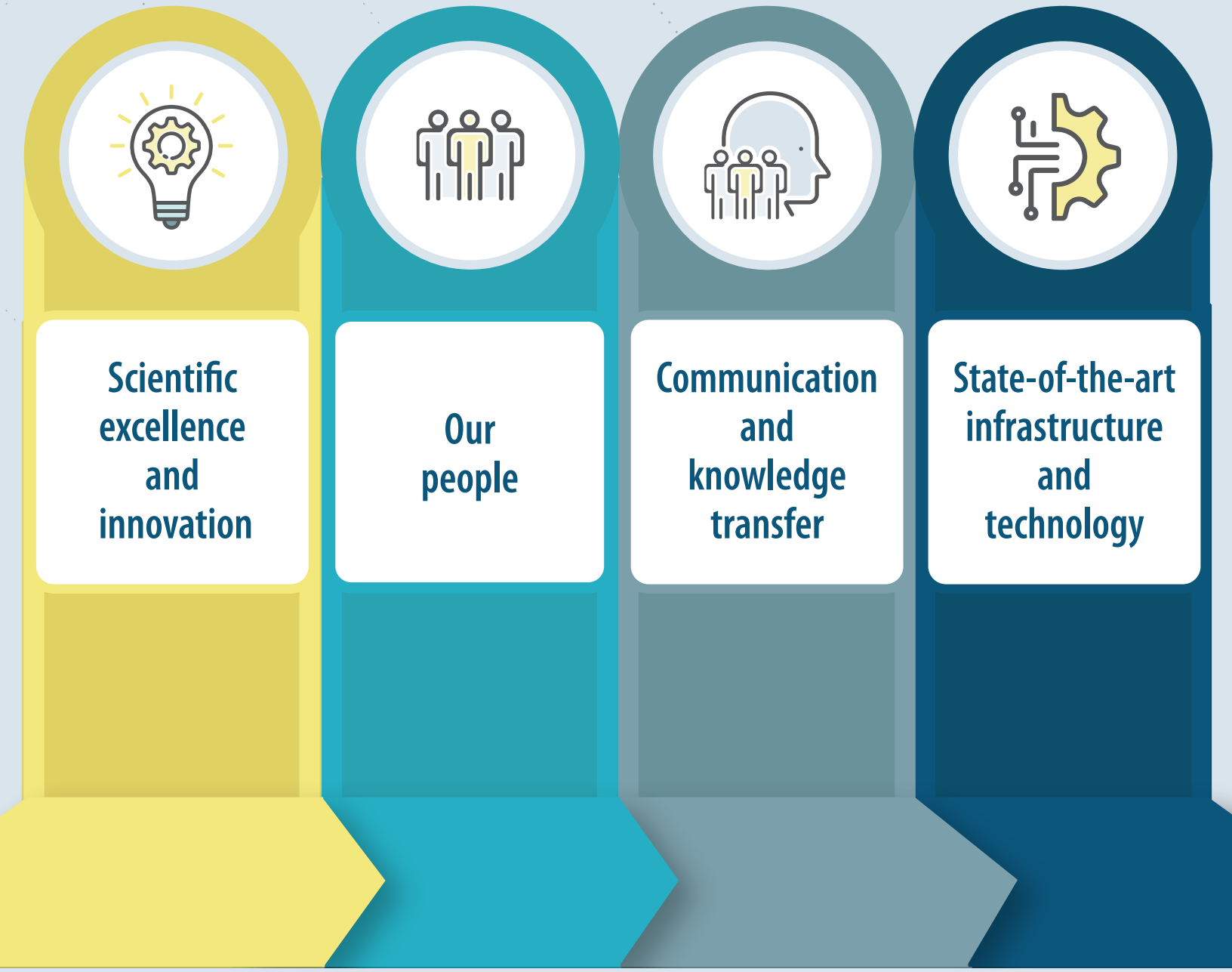
Food safety and nutrition

Grains are staple foods and constitute a major source of nutrition for the world's population with per capita consumption increasing especially in developing countries. Perception of food quality is increasingly driven by consumer desire for healthier and more nutritious products. While grain-based foods generally present a low risk to food safety, some potential hazards exist. Global trends in relation to food safety and sustainability of production are driving greater demand for quality-assured products and traceability.

What we will do

- Investigate the factors affecting the nutrient content of grains for human and animal needs such as dietary fibre, vitamins, and bio-actives.
- Investigate the effects of value-added processing on nutrient content and the fate of microbes, natural toxins and pesticide residues in grain-based end products.
- Develop accurate methods for the detection of allergens, contaminants, genetically modified events and varietal composition to ensure purity and integrity of grain shipments.

HOW IT WILL HAPPEN
OPERATIONAL PILLARS



Scientific excellence and innovation

Taking an innovative approach to science is key to ensuring the Canadian Grain Commission's ability to advance knowledge on grain and respond effectively to emerging issues facing the grain sector. The Canadian Grain Commission is committed to pursuing scientific excellence by using and adhering to internationally recognized standards, methods and processes.

- Increase the capacity of crop and technology programs to incorporate new functions that expand program delivery and create space for innovation.
- Promote and uphold a culture of scientific integrity to support our researchers and scientists in maintaining high standards of excellence.
- Continue to support and implement comprehensive Quality Management Systems (QMS) and International Organization for Standardization (ISO) accreditation to ensure the quality of our science activities.

Our people

People are the foundation of the Canadian Grain Commission's science. Through focused human resources planning the Canadian Grain Commission will attract and retain a workforce that is adaptable, engaged, innovative and productive. These plans will support the Canadian Grain Commission's commitment to a workplace that values integrity, respect, accountability, adaptability and collaboration.

- Develop succession plans for key scientific, professional and technical staff.
- Maintain a work environment that is diverse and inclusive to retain and recruit skilled staff.
- Foster a work environment that supports training and career development.

Communication and knowledge transfer

The Canadian Grain Commission will continue to communicate, both nationally and internationally, the results of its science activities, and share our expertise on Canadian grain quality and safety.

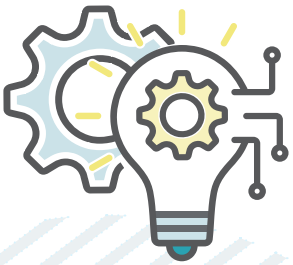
- Efficiently disseminate our knowledge and data on grain, including the continued publication of research results in peer-reviewed journals, attendance at scientific conferences and meetings with stakeholders.
- Enhance collaboration and engagement with academia and the grain sector to accelerate innovation and advancement of knowledge on grain.
- Adapt current methods of communication and reporting to better inform and support the grain sector.
- Expand data sharing and accessibility with an Open Data Strategy and self-service analytical and data visualization tools.

State-of-the-art infrastructure and technology

To maintain the quality of science activities and meet the future demands of expanded research and monitoring, the Canadian Grain Commission will continue to invest in infrastructure, equipment and technology.

- Make strategic investments in infrastructure and technology to support innovative programs and services.
- Identify and address short-term and medium-term lab deficiencies in infrastructure, equipment and technology.
- Implement a Laboratory Information Management System.

THE WAY FORWARD



To fully implement the Science Strategy, we will develop detailed annual work plans as part of the annual departmental planning cycle. These plans will outline program level activities and set clear timelines and indicators to measure our progress. As new priorities emerge in the grain sector, we will adapt our implementation plans so that we continue to be at the forefront of grain science in Canada.