

Leading in Sustainability

An Agricultural Research, Innovation and Development Policy for the Future

“We, the G20 Agriculture Ministers, are committed to meeting the challenge of global food security and nutrition for an expected world population of nine billion by 2050. We stress that intensifying pressures on natural resources and biodiversity and the impacts of climate change mean that we should raise productivity while moving towards food systems that are more sustainable in all their dimensions – economic and social as well as environmental...” (Final communique, G20 Agriculture Ministers Meeting, Istanbul, May 8, 2015)

Feeding a world population that will grow to 9 billion by the year 2050, against the backdrop of the intensifying pressures of climate change, food safety issues and other factors needs to be met with a strong scientific base.

Agricultural research will be the primary source of innovation and productivity enhancements needed to meet these future challenges. It will also play a role in developing new and alternative sources for clean energy, thereby reducing our reliance on fossil fuels.

Canada can play a leading role in meeting these challenges and opportunities by renewing and enhancing our efforts in agricultural research across a variety of disciplines over the next twenty years.

This requires a shared vision and commitment from governments, producers and industry.

Diverse stakeholders need to be recognized for the role they play to ensure our agriculture and agri-food sector is ecologically and economically sustainable and advances human health.

Our renewed efforts in agricultural research begin with a modern agricultural research policy that leads innovation and sustainability.

As a living document that will be reviewed annually, the following pillars will ensure that current and future recommendations for inclusion in this agricultural research policy meet the foundational principles:

- **Sets national goals:** An effective agricultural research strategy needs to set medium and long-term research priority areas that support innovation and improve productivity. There must also be a focus on environmental sustainability and the advancement of human health.
- **Makes our diversity work to our advantage:** Our agricultural sector has a diversity of stakeholders that play critical roles in guiding research. When establishing our priorities we need to take these differences into consideration and examine the scope at a large scale. This includes academic researchers, governments, producers, consumers, industry and many more.

- **Recognizes Canada's global responsibilities:** We must acknowledge Canada's partnership role in international efforts to meet future food security and climate change challenges.
- **Transfers knowledge:** We need to recognize the importance of knowledge transfer to producers and industry and the dissemination of research to all stakeholders, including the public.
- **Promotes financial stability:** We need to acknowledge the necessity for stable, predictable financial support for both fundamental and applied research.

Within the framework of these pillars, this national research policy (2015) addresses five policy areas:

- A. Setting Research Priority Areas**
- B. Promoting Interdisciplinary and Cross-Sectoral Research**
- C. Bringing Greater Balance to Research Funding**
- D. Supporting Innovation and the Adoption of New Technologies**
- E. Building Strong Networks for Research Dissemination**

A. Setting Research Priority Areas

A.1. Create a national body to develop medium and long-term agricultural research priorities and strategies.

The absence of a national body to advance the coordination of medium and long-term agricultural research has impacted the ability to set and monitor national research priorities and strategies. In 2014, the federal government's Science, Technology and Innovation Council (STIC) did identify the environment and agriculture together as a priority research area for federal investment. However, STIC lacks the mandate to be a coordinating body to bring multiple stakeholders together to develop the needed medium and long-term research strategies.

Creating a national body to coordinate agricultural research, with a mandate to develop medium and long-term agricultural research priorities, will help us to create a roadmap to meet our future food security and environmental challenges and become a global leader in agricultural innovation and sustainability.

We must find mechanisms to set research priority areas so that funding is efficiently allocated and research outcomes can be measured against identified priority areas. Some degree of coordination that brings together a diverse range of stakeholders to get their collective advice on research priority areas is needed; and only a national body would have that capacity.

A.2. Coordinate research priorities with stakeholders that take into account a variety of objectives.

Canada needs to build its capacity to coordinate research with stakeholders that advances a robust agricultural research agenda for the future. A national coordinating body would be dedicated to engaging multiple stakeholders in this task, taking into account national, provincial, regional, and international objectives.

The diversity of agricultural stakeholders goes beyond governments, funders, academia, and producers. Today's consumers of Canadian agricultural exports are educated and demanding. Their views on human health, plant and animal health, and the health of ecosystems and the environment will continue to impact the sector in ways that were not imaginable fifty years ago.

A successful national coordinating body would recognize the reality that today, agriculture and agricultural research relies on the public's trust for success. The coordinating body would cultivate our social license by actively engaging diverse stakeholders to identify and monitor social concerns and expectations regarding agriculture, and search for way to meet these concerns and expectations through basic research and development of new technology.

A.3. *Expand public investment in research clusters.*

Within an overarching coordinating framework, research clusters should be further supported financially.

B. Promoting Interdisciplinary and Cross-sectoral Research

B.1. *Give greater priority to interdisciplinary and cross-sectoral agricultural research that meet medium and long-term research objectives.*

Interdisciplinary research, which brings together a variety of scientific disciplines to mutually plan and execute a collaborative research effort, and cross-sectoral research, which brings together different sectors to plan and execute research efforts are essential to creating more environmentally-sustainable food systems that promote human health.

Both research methods should be given a higher priority if we are to meet medium and long-term agricultural research objectives. The ongoing development of biofuels and precision agriculture are just two examples of research areas in which a broad interdisciplinary and cross-sectoral approach is required.

B.2. *Ensure longer-term, stable funding.*

Stable funding over the long term, from a diverse range of sources including governments, industry and producers, as well as co-funding from other research disciplines, is necessary to ensure the greatest success and return on investment for partners.

B.3. *Engage non-funding stakeholders to promote support for public investment in agricultural research.*

Successful partnerships are mutually beneficial not only to funding partners, but also non-funding stakeholders such as farmers and consumers. A strong program of interdisciplinary and cross-sectoral partnerships must engage non-funding stakeholders to promote crucial public support for public investment in agricultural research. Similarly, international research partnerships must have a place for input by non-funding stakeholders like local farmers and indigenous peoples.

B.4. *Promote greater collaboration.*

Interdisciplinary and cross-sectoral research recognizes that technology and innovation play an important role in the entire agriculture supply chain. There is a strong correlation between foundational/pure research and the advancement of technology and innovation that benefits the sector as a whole. A strong program of interdisciplinary and cross-sectoral partnerships must promote greater collaboration between pure and applied researchers and between researchers, farmers and industry.

C. Bringing Greater Balance to Research Funding

C.1. *Improve funding models that foster a balanced investment in research.*

Basic (foundation/pure) research is the fuel for innovation and commercial application. A research strategy that promotes medium and long-term priorities and supports greater interdisciplinary and cross-sectoral research initiatives requires a balance between the funding of basic research and applied research.

Agriculture research in Canada is funded through public, corporate and producer-led industry sources and as a result, meets a variety of interests. Governments have been viewed as the primary investors in basic research for agriculture in areas traditionally underserved by the private sector, in particular areas that do not generate short-term commercial results.

In order to address our long-term challenges, agricultural research will require more stable and predictable government support - both at the federal and provincial levels. At the same time, a stronger strategy to coordinate research priorities and strategies will reduce risk of duplication and produce efficiencies. This will result in a better return on investment of government support.

Concrete mechanisms to improve funding models for basic research should be examined by stakeholders with an aim to produce predictable, stable, and long-term funding mechanisms for identified basic research priorities.

C.2. *Provide incentives to convert unused public research facilities into centres of agricultural research excellence.*

Canada's publicly-supported experimental farms and agricultural research centres have been at the forefront of scientific discovery. In recent years, some government-supported agricultural research stations have been closed and facilities either mothballed or sold.

Governments should consider financial incentives directly to agricultural stakeholders to retrofit and convert, where feasible, the unused spaces into specialized centres of agricultural research excellence.

C.3. *Address Canada's declining research capacity with a targeted plan to attract and retain agricultural researchers.*

The Canada First Research Excellence Fund, announced in the 2014 federal budget may help address some of the issues facing Canada's ability to attract agricultural researchers. However, research programs need to be funded over longer periods of time not only to attract, but also to retain scientists, technicians and research assistants.

Additionally, Canada faces critical succession planning due to the looming retirement of senior scientists not only in government research facilities, but also in post-secondary institutions.

A labour market study geared specifically to the Canadian agricultural research sector, both public and private, should be conducted to identify the extent of the sector's human resource challenges over the next fifteen years. A targeted action plan to attract and retain researchers to the sector should be developed.

D. Supporting Innovation and the Adoption of New Technologies

D.1. *Create opportunities for greater collaboration between pure and applied researchers.*

A sustainable agriculture model requires investment in new technologies to improve our ability to adapt to the effects of climate change. From improved water and pest management, to more effective farm management through precision agriculture information management systems, collaboration between pure and applied researchers is required to fuel innovation in this area.

Canada's post-secondary institutions can lead the way. Universities and colleges must work together to develop efficient structures that foster greater and on-going collaboration between pure and applied researchers.

D.2. *Support dissemination of 'best-practices' analysis in public-private partnerships.*

Public-private and public-private-producer partnerships are prevalent in agricultural research. Each partnership is unique and has its own set of risks. Yet every partnership encounters similar challenges, including but not limited to:

- Securing funding
- Setting up administrative accountability and transparency mechanisms
- Ensuring clarity on intellectual property issues
- Communicating results

While every partnership is unique, all could benefit from an analysis of best practices that is shared widely across the sector. This will help create greater efficiencies in partnership start-ups, as well as encourage the development of new partnerships.

D.3. *Streamline administrative accountability processes.*

The need to ensure that maximum funding in a partnership is earmarked for the research must be balanced by respect for accountability to funding partners. Partners should work together to streamline reporting requirements that both meet the obligations, yet do not overburden the administration of the partnership.

Duplication and complexity of reporting reduces the financial resources devoted to conducting the actual research. Governments can lead the way with federal and provincial officials working together to standardize government reporting requirements. This includes reducing the complexity of reports that may discourage partnerships from forming, and to eliminate duplication. Similarly, universities involved in partnerships should also take steps to streamline their reporting mechanisms.

E. Building Strong Networks for Research Dissemination

E.1. *Create efficient and accessible mechanisms to disseminate research being conducted and research results.*

Canada must develop efficient ways to disseminate agricultural research that is being undertaken and research results. Currently, our sector is isolated, with different research being communicated to different audiences. For example, producer groups send information to their stakeholders, scientific journals publish their research for their networks to see and research conferences bring together people to share information. Opportunities for broader research partnerships are missed and the risks of duplication are high.

Consultations about how we can more efficiently and effectively disseminate information to broader agricultural stakeholders should be undertaken.

E.2. *Collect data and best practices on the adoption of agricultural innovation and technology developments.*

There is no clear path of progression from agricultural research to knowledge transfer to use of new technology. Until recently, agricultural extension programs helped transfer innovation knowledge directly to the producer.

Understanding why a technology is or is not being used is key to improving rates of adoption and return on research investment. Working with producers and industry, a systemic and ongoing collection of data on the adoption of agricultural innovation and technology should be undertaken by government.

A more coordinated approach to identify best practices on the adoption of agricultural innovation and technology should be developed with appropriate stakeholders.

SUMMARY OF POLICY RECOMMENDATIONS

A. SETTING RESEARCH PRIORITY AREAS

A.1. *Create a national body to develop medium and long-term agricultural research priorities and strategies.*

Mechanisms are needed to set research priority areas so that funding is efficiently allocated and research outcomes can be measured against identified priority areas. Only a national coordinating body would have the capacity to bring together a diverse range of stakeholders to get their collective advice on research priority areas.

A.2. *Coordinate research priorities with stakeholders that take into account a variety of objectives.*

A national coordinating body would be dedicated to engaging multiple stakeholders to build capacity to coordinate research, taking into account national, provincial, regional, and international objectives.

A.3. *Expand public investment in research clusters.*

Within an overarching coordinating framework, research clusters should have more financial support.

B. PROMOTING INTERDISCIPLINARY AND CROSS-SECTORAL RESEARCH

B.1. *Give greater priority to interdisciplinary and cross-sectoral agricultural research that meet medium and long-term research objectives.*

Interdisciplinary and cross-sectoral research are essential to creating more environmentally-sustainable food systems that promote human health. Both should be given a higher priority.

B.2. *Ensure longer-term, stable funding.*

Stable funding over the long term, from a diverse range of sources including governments, industry and producers, as well as co-funding from other research disciplines, is necessary to ensure the greatest success and return on investment for partners.

B.3. *Engage non-funding stakeholders to promote support for public investment in agricultural research.*

A strong program of interdisciplinary and cross-sectoral partnerships must engage non-funding stakeholders to promote crucial public support for public investment in agricultural research. Similarly, international research partnerships must have a place for input by non-funding stakeholders like local farmers and indigenous peoples.

B.4. *Promote greater collaboration.*

A strong program of interdisciplinary and cross-sectoral partnerships must promote greater collaboration between pure and applied researchers and between researchers, farmers and industry.

C. BRINGING GREATER BALANCE TO RESEARCH FUNDING

C.1. *Improve funding models that foster a balanced investment in research.*

In order to address our long-term challenges, agricultural research will require more stable and predictable government support - both at the federal and provincial levels.

Concrete mechanisms to improve funding models for basic research should be examined by stakeholders with an aim to produce predictable, stable, and long-term funding mechanisms for identified basic research priorities.

C.2. *Provide incentives to convert unused public research facilities into centres of agricultural research excellence.*

Governments should consider financial incentives directly to agricultural stakeholders to retrofit and convert, where feasible, closed agricultural research stations into specialized centres of agricultural research excellence.

C.3. *Address Canada's declining research capacity with a targeted plan to attract and retain agricultural researchers.*

A labour market study geared specifically to the Canadian agricultural research sector, both public and private, should be conducted to identify the extent of the sector's human resources challenges over the next fifteen years. A targeted action plan to attract and retain researchers to the sector should be developed.

D. SUPPORTING INNOVATION AND THE ADOPTION OF NEW TECHNOLOGIES

D.1. ***Create opportunities for greater collaboration between pure and applied researchers.***

A sustainable agriculture model requires investment in new technologies to improve our ability to adapt to the effects of climate change. Collaboration between pure and applied researchers is required to fuel innovation in this area. Universities and colleges must work together to develop efficient structures that foster greater and on-going collaboration between pure and applied researchers.

D.2. ***Support dissemination of 'best-practices' analysis in public-private partnerships.***

Public-private and public-private-producer partnerships are unique, yet have similar challenges. An analysis of best practices in public-private partnerships, shared widely across the agricultural sector will help create greater efficiencies in partnership start-ups, as well as encourage the development of new partnerships.

D.3. ***Streamline administrative accountability processes.***

Funding partners should work together to streamline reporting requirements that both meet the accountability obligations of funders, yet do not overburden the administration of the partnership.

Federal and provincial officials should work together to standardize government funding reporting requirements to eliminate duplication and to reduce the complexity of reports that may be discouraging partnerships from forming.

E. BUILDING STRONG NETWORKS FOR RESEARCH DISSEMINATION

E.1. ***Create efficient and accessible mechanisms to disseminate research being conducted and research results.***

Consultations about how Canada can more efficiently and effectively disseminate research initiatives and outcomes to broader agricultural stakeholders should be undertaken.

E.2. ***Collect data and best practices on the adoption of agricultural innovation and technology developments.***

Understanding why a technology is or is not being used is key to improving rates of adoption and return on research investment. Working with producers and industry, a systemic and ongoing collection of data on the adoption of agricultural innovation and technology should be undertaken by government.

A more coordinated approach to identify best practices on the adoption of agricultural innovation and technology should be developed with appropriate stakeholders.