



AIC2017

Agricultural Innovation in a Changing Environment

CONFERENCE REPORT



April 24-26, 2017 • Delta Hotel, Winnipeg, MB



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EXECUTIVE SUMMARY

Researchers, government officials, industry representatives, agri-entrepreneurs and other agricultural research stakeholders came together on April 24-26 in Winnipeg at AIC 2017 *Agricultural Innovation in a Changing Environment*. The conference fostered important discussions about agriculture's impact on the environment in a changing climate. Over two days, conference participants and speakers shared their views and expertise around the following themes:

- 1. Transforming Challenges into Opportunities** How can innovation minimize agriculture's contribution to climate change?
- 2. Building the Future on our Strengths:** What support is available to advance Canada's agricultural clean technologies?
- 3. Shaping a Path Forward:** How can we ensure the adoption of environmentally sustainable innovations?

Several overarching themes and points of consensus emerged during discussion:

Agricultural and environmental public policy must establish a common and inclusive innovation agenda that minimizes agriculture and food's contribution to climate change. This agenda should be proactive, precise, system-oriented, adaptable, goal-based, climate-resilient and producer-focused.

Strong targeted incentives and lower investment risks for innovative producers, agri-entrepreneurs and agri-businesses are needed to support the development and deployment of green technologies. Early-adopters at the farm-level should enjoy a broader range of tax benefits and direct aids to encourage the adoption of innovation, whereas business ventures should benefit from a greater availability of patient capital funds, capital investment from outside the agriculture sector, risk-sharing mechanisms, and increased risk tolerance. Innovation initiatives by start-up businesses should be subsidized; with the provision of seed capital for SMEs and facilitation of new networks between investors and start-ups in the sector.

The agriculture sector as a whole could benefit from a new, efficient, and competitive regulatory environment to reduce the existing administrative and financial burden on agricultural innovators. An agricultural intellectual property strategy would boost the profitability of investments by reducing barriers of entry to markets and increasing competition.

Enhanced public and non-profit extension initiatives, such as on-farm research, with producers working alongside extension specialists and researchers, allows for a better understanding of the use, impact and benefits of new sustainable technologies on the farm. As identified at AIC's 2016 Conference, more opportunities for farmers to participate in pilot and research projects could encourage increased adoption as well as knowledge translation and transfer (KTT) in its various forms.

Additionally, stronger national and international networks that include the private sector and other industries could open up opportunities for further collaboration with commodity groups and academia. Agricultural start-ups should also participate in industry-led value chain roundtables to ensure high-impact investments.

Participants called for:

- Reinvestment of tax revenue from carbon pricing into green innovations for the sector that promote the development of a circular economy through the introduction of new sources of energy and incentives for biofuel production.
- Stronger social license for agricultural research and innovation to encourage social engagement and acceptance of new knowledge and technologies.
- Proper infrastructure – research facilities, broadband access, and new agricultural transformative infrastructure – to fully realize the opportunities derived from innovative agricultural R&D.
- A gap analysis and studies on project evaluation and monitoring standards to identify the main barriers and responses to business-led innovation.
- New mechanisms to share multipurpose aggregate agricultural data between the private and public sectors to enable conditions for a systemic-oriented approach to agricultural innovation.



BACKGROUND



AIC2017

Agricultural Innovation in a Changing Environment

April 24-26, 2017
Delta Hotel, Winnipeg, MB

Agriculture and the environment are intricately linked within a complex ecosystem; with agriculture both depending on and impacting critical natural resources.

Significant increases in production of all major crops, livestock and fisheries required to meet global needs for food, feed, fibre and fuel rely on producers' ability to sustainably manage natural resources and ecosystem services within an increasingly challenging global economic environment.

The Canadian agricultural sector is an important steward of the environment and has a major role to play in meeting today's global sustainability goals that call for an even more efficient and climate-smart agriculture. This approach demands continuous research and development that must be strongly supported by strategic agricultural R&D and investment policies coupled with effective coordination of research efforts.

This report summarizes the conference panel presentations that explored how green grown in the sector can build on a strong scientific, evidence-based foundation and showcased world-class innovative research taking place across Canada. It also summarizes the feedback provided by Conference delegates in discussion sessions that took place at AIC 2017.



"The growth of the sector relies on research"

– Hon. Blaine Pedersen

Hon. Blaine Pedersen, Minister of Infrastructure and MLA of Midland, Government of Manitoba (left) and Dr. Wilf Keller, AIC Chair (right).



CONFERENCE PRESENTATIONS

We would like to acknowledge and thank our conference panelists whose valuable contributions helped set the stage for the important discussions that took place at the conference.



Transforming Challenges into Opportunities

How can innovation minimize agriculture's contribution to climate change?

Discovery Talks

Dr. Steven Frey, Senior Scientist, Aquanty Inc. & Lead Scientist, Assiniboine River Basin Research Project

Dr. Brian McConkey, Senior Research Scientist, Agriculture and Agri-Food Canada – Swift Current Research & Development Centre

Dr. Karin Wittenberg, Dean, Faculty of Agricultural and Food Sciences, University of Manitoba

Panels & Forum

Dr. Mario Tenuta, Professor, Applied Soil Ecology, University of Manitoba

Dr. Hank Venema, Planning Director, Prairie Climate Centre, International Institute for Sustainable Development

John Wilkinson, Senior Vice President, Sustainability, GreenField Specialty Alcohols, Inc.



Building the Future on our Strengths

What support is available to advance Canada's agricultural clean technologies?

Discovery Talks

Ian Affleck, Executive Director, Plant Biotechnology, CropLife Canada

Dr. Simon Potter, Director of Operations, Genome Prairie

Dr. Donald L. Smith, Director & CEO, BioFuelNet Canada and James McGill Professor, McGill University

Panels & Forum

Dr. Naveed Aziz, Director, Technology Programs, Genome Canada

Rattan Gill, Analyst, Agriculture and Regulatory Affairs, Bioenterprise Corporation

Dr. Abdul Jalil, Assistant Deputy Minister, Western Economic Diversification



Shaping a Path Forward

How can we ensure the adoption of environmentally sustainable innovations?

Discovery Talks

Dr. Dilantha Fernando, Professor, Agricultural and Food Sciences, University of Manitoba

Glenn Friesen, Industry Development Specialist, Manitoba Agriculture – Livestock Industry Branch

Alison Sunstrum, CEO, GrowSafe Systems

Panels & Forum

Dr. Mohammad Khakbazan, Research Scientist, Agriculture and Agri-Food Canada, Brandon R&D Centre

Dan Mazier, President, Keystone Agricultural Producers

Jolene Noble, Extension Coordinator, Alberta Farm Sustainability Extension Working Group

Guest Speaker: Dr. Karen Churchill, Director of Research & Market Support, Cereals Canada

Presentation files can be found on the [Conference Resources](http://www.aic.ca/aic2017-resources) page: www.aic.ca/aic2017-resources



1.1 Background

Climate change introduces major uncertainties into the planet's current and future capacity to produce food, feed, fibre, and fuel for the ever-growing population. The agriculture sector is particularly vulnerable to climate change and will need to adapt to changing patterns of precipitation, temperature and extreme weather events.

As the source of approximately 10-12 percent of the world's total anthropogenic greenhouse gases (GHG), the agriculture sector can actively contribute to climate change mitigation efforts. The ability to produce sufficient food and non-food products without increasing agriculture's GHG footprint depends on the scientific community's ability to develop and share new information and technologies that reduce climate-related production uncertainties.

1.2 Discovery Talks: Climate Change and Air Quality

Theme 1 *Discovery Talks* showcased technologies and farm practices that help reduce greenhouse gas emissions, improve soil management and assist the agricultural and food sectors with options to adapt to a changing climate.

Dr. Karin Wittenberg, Dean of the University of Manitoba's Faculty of Agricultural and Food Sciences, highlighted that Canada's vision of increased productivity in the agri-food sector requires a strong commitment to environmental sustainability. Anticipating change, enhancing resilience or 'adaptive capacity', and developing science-based policy are key tools for successful adaptation and greenhouse gas mitigation in the sector. In highlighting innovation in Canada's beef sector, Dr. Wittenberg emphasized that public and consumer perception on how we practice agriculture has a relevant effect on the growth of the sector as a whole.

Dr. Brian McConkey from the Swift Current Research and Development Centre (AAFC) spoke of the latest developments of carbon sequestration in Prairie soils and their potential for climate change mitigation. He pointed out that Prairie agriculture can be justly proud of its accomplishments for carbon sequestration primarily due to reduced fallow and reduced tillage. He also argued that, while the rate of growth of carbon emissions has been gradually reduced, there is still a need for greater investment in infrastructure and research to make the most of the new opportunities arising from emerging areas of research such as biochar.

Dr. Steven Frey from Aquanty Inc. and the Assiniboine River Basin Research Project carried out a demonstration of the *HydroGeoSphere Simulation Platform* – a fully-coupled hydrologic simulator. Dr. Frey's work showed how interdisciplinary research can be used to tackle complex

challenges in the sector including climate change, and most importantly, how multi-stakeholder support and collaboration at different stages of the project can ensure the adoption of high-impact research outputs.

Finally, during the Q&A session, delegates and panelists agreed that agricultural innovation and research are key decision support tools to reduce agriculture's impact on the environment and to create evidence-based policy that successfully tackles complex issues facing the sector.



1.3 Panels & Forum: Climate Change and the Agricultural Sector

Theme 1 *Panels & Forum* presentations addressed climate change issues affecting the agriculture sector including climate change in public policy and how agricultural innovation should respond to existing and future climate shocks.

John Wilkinson, Senior Vice President of GreenField Specialty Alcohols, Inc., began the discussion by acknowledging that strategic partnerships across the sector are fundamental to push green initiatives. He noted that closing the loop to create a circular carbon economy that transforms waste into resources is the key principle to integrate the agriculture sector to the new bioeconomy.

Dr. Hank Venema, from the Prairie Climate Centre, an initiative of the International Institute for Sustainable Development and the University of Winnipeg, explained why precision infrastructure is a vital concept in the clean growth and climate change debate. While the agricultural sector lies at the heart of this discussion on climate change, it does not seem to be at the table with 'Green Infrastructure' discussions. Dr. Venema stressed that there is a need

Transforming Challenges into Opportunities



How can innovation minimize agriculture's contribution to **climate change**?

for increased involvement of the agriculture sector in the development of clean technologies and concluded his presentation by stating that climate change adaptation in agriculture is a great investment opportunity – but one that requires strong policy leadership and more private sector involvement if it is to thrive.

Dr. Mario Tenuta, from the University of Manitoba, reminded the audience that most farmers are still skeptical about the advantages and opportunities of reducing emissions through new technology. Dr. Tenuta, however, stressed and explained that reductions in carbon emissions are both attainable and profitable.

Following the presentations, delegates expressed some concern about the increasing costs of adopting new research at the farm-level. However, speakers expressed

that benefits arising from innovation exceed costs of adoption.

Stakeholders also highlighted the need to create offset protocols that valorize efforts to lower emissions, such as tax reductions, as well as recognize the unintended consequences that can occur as a result of policy decisions.

Many agreed that producers are willing to be part of the solution while remaining competitive, but increasing costs and the challenges posed by emerging carbon pricing make it difficult for the average farmer.

Conference delegates also acknowledged that forums like AIC2017 promote a constructive dialogue to seek adequate responses to climate change together as a sector.





Key Features of Agricultural and Environmental Public Policy

Establishing a common and inclusive innovation agenda that minimizes agriculture and food's contribution to climate change.

Policies should be:

- **Proactive** to effectively prepare adaptation tools and strategies in response to future climate shocks;
- **Goal-based** to set short-, medium- and long-term targets to respond to changing conditions;
- **Precise** to allow a better shared understanding of the agricultural innovation agenda;
- **System-oriented** to avoid unintended consequences for some segments of the value chain and to drive change over the whole food system by grouping various projects into broader streams to deliver high-impact, and integrated adaptation solutions;
- **Adaptable** to regional conditions to effectively address the different types of agriculture taking place across Canada and to allow for regional solutions that extend beyond political boundaries while continuing to engage nationally;
- **Climate-resilient** with a focus on initiatives that build resiliency and reduce emissions while incentivizing the adoption of green agricultural innovations; and
- **Producer-focused** to capture increased input from agricultural producers and end-users in the policy-making process.

Key Policy Recommendations

Creating a roadmap for innovation-based solutions to climate challenges in the agriculture sector.

Use carbon pricing as a driver for agricultural innovation.

Rather than an unavoidable challenge, carbon pricing could become a key driver of innovation in the sector. This requires collaboration between key players and provincial governments to decide how tax revenue can be reinvested in green innovations for the agriculture sector, thus making it more cost-effective to innovate. Small farmers should also be provided with incentives - such as discounts or tax credits, strict regulations, and penalties on emissions - to help lower risks and encourage adoption of new technologies that work to achieve minimum carbon emissions. New policy in other areas (e.g. biofuels) can also supplement carbon pricing regulations.

Build capacity in emerging areas of research that support carbon-neutral farming.

Additional research funding should be provided in areas such as water management, rural housing, biofuels, urban vertical farming, forecasting data, high-resolution modelling, data storage, and cost-benefit analysis of innovations. Public funds for research and innovation must be deployed in a more efficient and effective manner.

Promote a circular carbon economy.

Agricultural innovation should promote the development of a circular economy, embracing new sources of energy and offering incentives for biofuel production.

Strengthen strategic cross-sectoral collaboration.

Multi-stakeholder collaboration across sectors should be enhanced by using different models and adopting best practices, including, but not limited to, value-chain roundtables, cross-sectoral partnerships with other sectors of the economy (health care, tech sectors) or other countries. Governments should take on an enabling role in collaborative research initiatives, working alongside producer groups and technical experts, as well as continuing to encourage multi- and interdisciplinary research that is backed up with strong core and foundational research.



Key Policy Recommendations

Creating a roadmap for innovation-based solutions to climate challenges in the agriculture sector.

Raise the profile of agricultural innovation.

Canada has a unique opportunity to provide an efficient, low-carbon source of agri-food products to the world. Agricultural innovation must be included in federal and international discussions that aim to build stronger research networks and accelerate investments in agricultural R&D.

Strengthen social license for agricultural research and innovation.

With social license increasingly overlying the advancement of agricultural innovation, consumers' acceptance of innovative agri-food products is key to maximizing returns on agricultural R&D. Efforts should be made to better inform, communicate with, and engage the public.

Facilitate on-farm research and extension.

Producers need opportunities to work alongside extension specialists and researchers to understand the impact of new technologies on the ground, and to be guided through the adoption process. Producers, in day-to-day operations, should also test agricultural innovations.

Provide incentives for farmers to adopt sustainable green innovations.

Innovative farmers and early-adopters who have been proactive on their own before the introduction of mandatory regulations should be recognized and rewarded. A new stream of Growing Forward 2 AgriStability can contribute to increased adoption at the farm level, reducing risks and unintended consequences arising from implementation.

Increase infrastructure investments.

Proper infrastructure – research facilities, broadband access, and new agricultural transformative infrastructure – needs to be in place for producers to fully realize the opportunities derived from innovative agricultural R&D.

Consider the environmental impact of improved productivity.

With an expected rise in the international demand for Canadian agri-food commodities, policy provisions should address the potential impact and adverse effects of productivity gains on the environment.



2.1 Background

As Canada moves toward a sustainable low-carbon economy, significant changes to agricultural production processes and products will be increasingly needed to remain competitive and meet productivity goals while reducing environmental pollution, resource use, and waste.

The federal government, as part of the implementation of the Government's Innovation Agenda, has proposed to provide substantial investments over the next four years to support the development and deployment of clean technologies in various sectors of the Canadian economy, including agriculture. To make the most of these resources and build on the sector's strengths, agricultural research stakeholders must engage in a constructive dialogue to identify new areas of opportunity and growth and avoid unnecessary duplication of efforts at the national and provincial levels.

2.2 Discovery Talks: Agricultural Biotechnology and Genomics

Principles of molecular biology, genomics and bioinformatics can be applied to contribute to solutions to both agricultural and environmental problems. Theme 2 *Discovery Talks* showcased cutting-edge technologies that can be applied to sustainable product development, food quality and safety, functional foods, nutraceuticals and novel bio-products.

Dr. Donald L. Smith, Director and CEO of BioFuelNet Canada and professor at McGill University, made a case for the development of environmentally-friendly inputs in the agricultural sector, particularly biofuels feedstock and food crops. Dr. Smith noted that new advancements in this field are increasingly becoming commercially available. He also highlighted the increased importance of cross-sectoral collaboration, while stressing the need for more partnerships to accelerate commercialization of research.

Genome Prairie's Director of Operations, Dr. Simon Potter explained how genomics research in clean technology can support Canada's commitment to mitigating climate change and lead to a climate-resilient economy. Dr. Potter emphasized that adaptation is no longer optional and that the agricultural sector must recognize opportunities arising from climate change. Economic growth in Canada will not happen without agricultural innovation to ensure a climate-proofed system.

Finally, Ian Affleck, Executive Director of Plant Biotechnology at CropLife Canada, spoke of the benefits of plant science innovations highlighting that science equals sustainability. New advancements help farmers be more efficient, use

fewer resources and have access to new crops that can thrive in changing climate conditions. Affleck noted, however, that increased regulatory requirements to get the products into the marketplace prevent technology from being implemented on the ground. Working with regulators and policy-makers, and creating science-based regulatory processes are key to support the availability and adoption of agricultural innovations.

2.3 Panels & Forum: Opportunities for Clean Technology Innovation in the Agricultural Sector

Theme 2 *Panels & Forum* presentations highlighted opportunities for clean technology innovation in the agriculture sector including funding opportunities for clean technology innovators.

Dr. Abdul Jalil, Assistant Deputy Minister of Western Economic Diversification, provided a comprehensive overview of new federal funding opportunities and initiatives to boost innovation and clean technologies in the agriculture sector. Dr. Jalil explained how new initiatives put an increased emphasis on business-led innovation to promote early-stage R&D and late-stage prototypes from Canadian innovators and entrepreneurs.

Dr. Naveed Aziz, Director of Technology Programs at Genome Canada, analyzed the crucial role of Genome Canada and its regional genome centres across the country in supporting the whole spectrum of innovation from discovery to translation – accelerating the application of Canadian genomics-derived solutions to real-world opportunities and challenges defined by users in public and private sectors. He also highlighted exciting funding opportunities available to the agriculture sector. Dr. Aziz concluded his presentation by stating that genomics is a powerful solution for unlocking biological solutions to climate change challenges and is an opportunity to help build a climate resilient bio-economy.

Finally, Rattan Gill, an Analyst with Bioenterprise Corporation described how Bioenterprise works to deliver necessary services to agri-technology businesses across Canada, ranging from opportunity analysis and access to networks to business & market, and financial strategy to translate innovations into marketable products.

Both conference delegates and presenters agreed that cross-sectoral and multi-stakeholder coordination remains the main challenge in delivering funding programs. While there are many success stories of clean technology innovation within the agriculture sector at the national and international levels, Canada struggles to become a leader in clean agri-technology development.



Strategies to support the advancement of an innovative and competitive agricultural sector that builds on Canada's research strength:

On human capital, strategies must aim to encourage young researchers and support early stages of their scientific careers to prevent future labour shortages in agricultural research and innovation.

On collaborative research, strategies should work to better facilitate international partnerships with global knowledge networks, better coordinate funding and programming across commodities and amongst producer groups, and strengthen joint industry collaboration through a larger national strategy for the agriculture sector

Actions – How can Canada become a global leader in clean technology?

A gap analysis and studies on project evaluation and monitoring standards should be conducted to identify the main barriers and responses to business-led innovation and set key research priorities. With improved processes and practices potentially set to replace many existing labour skills, research and assessments of the social impact of innovation on the ground are also essential to help producers and farmers adapt to a rapidly changing agricultural sector.

Public extension programs that focus on education and face-to-face communication must be improved to promote the adoption of agricultural clean technologies at the farm level. Stronger regional extension programs or applied research initiatives are needed to deliver direct messages to producers and bridge the gap between scientists and farmers.

Many delegates felt that increased support for other types of extension providers can help improve extension overall services. Not-for-profit applied research groups lack consistent funding for staffing and program enhancements needed to provide a better service to producers.

At the administrative level, concrete measures to streamline processes should be put in place to ensure timely and transparent decisions on research project selection and approval. Agricultural research projects, including a business-led stream, should also offer flexible timeframes to reach long-term goals.

Finally, there was a strong sense that the sector would benefit from a new, efficient, and competitive regulatory model to reduce the current burden on, and work to incentivize, agricultural innovators.

Delegates recommended specific actions to ensure a higher level of crucial private-sector investments in clean technologies for the agriculture sector in the following areas:

Funding and Incentives for the Private Sector

- **Create incentives for greater private sector investment** in agriculture R&D (BERD), including, but not limited to, tax breaks, rebates or credits for early adopters, patient capital funds, capital investment from outside sectors, and increased risk tolerance and risk-sharing mechanisms.
- **Explore new sources of funding for entrepreneurs** other than the public sector (i.e. crowdsourcing schemes).
- **Support agri-entrepreneurs and innovators** by subsidizing the process of innovation for start-up businesses, providing seed capital for SMEs, and facilitating the creation of networks between investors and new companies in the sector.

Agricultural Networks

- **Build and enhance networks** with the private sector and other industries, opening up opportunities for increased collaboration with commodity groups and academia. Agricultural start-ups should also participate in industry-led value chain roundtables to ensure high-impact investments.
- **Facilitate the sharing of multipurpose agricultural data** between the private and public sectors.



Scope of Business-Led Research

- **Increased focus on value-added technologies** that bridge the gap between research and commercialization by building on existing entrepreneurs and projects.
- **Market-based research** to identify potential markets for business-led innovations and improve marketing efforts to facilitate commercialization. Knowledge-based business ventures and technological innovations should demonstrate high returns on investment and provide a business plan with clear targets and indicators for the progress achieved.
- **Support good corporate citizenship** by ensuring emerging and solidly established Canadian agri-businesses demonstrate a strong commitment to socially and ethically responsible business practices.

Regulatory Environment

- Create an **enabling regulatory environment** and an agricultural intellectual property strategy that allows for the profitability of investments, reduces barriers of entry to markets and increases competition.



3.1 Background

The rise in voluntary approaches to the management of environmental responsibilities, such as industry-led assurance schemes, corporate social responsibility, and Environmental Farm Plans, has allowed for increased accountability regarding environmental impacts. Most importantly, the implementation of proactive environmental assessments presents a unique opportunity to speed-up adoption and dissemination of green innovations in the sector, and to evaluate the impact of agricultural research on the ground.

As outlined by AIC2017 Guest Speaker, Dr. Karen Churchill, Director of Research & Market Support at Cereals Canada, science-based information is fundamental to inform the agriculture sector and support a positive message on the sustainability of Canadian agriculture practices.

3.2 Discovery Talks: Agro-Ecosystem Productivity and Health

New technologies and integrated management practices can re-invigorate major crop and livestock systems. While past advances in agriculture have often resulted from single component innovations, future environmentally-friendly solutions are expected to arise from the enhancement of systems by optimizing the interplay between their components.

Theme 3 *Discovery Talks: Agro-Ecosystem Productivity and Health* showcased the latest environmentally responsible processes, methods, technologies and farm-level decision support tools that seek to promote the development of new sustainable crop and livestock production systems.

Dr. Dilantha Fernando, Professor in the Department of Plant Sciences at the University of Manitoba, explained how environmentally friendly disease control cleans up disease to ensure sustainable crop production, market access and strengthen Canadian agriculture. He noted that cropping practices are changing in the new millennium due to environmental concerns. Dr. Fernando stressed that emerging techniques and practices could improve the quality of our environment that we live in, and at the same time, benefit farming production.

Glenn Friesen from Manitoba Agriculture, stated that adoption is a key element in the innovation continuum. Friesen explained the importance of producers and end-user involvement in the diffusion and adoption of innovation. By sharing experiences of the Manitoba Beef & Forage Initiatives (MBFI), Friesen highlighted the relevance of public-private partnerships and study stacking (applied and foundational research) in helping link extension staff and researchers, and to generate more producer interest.

Programs like Canada's first mobile laboratory will allow scientists to take research to the farms.

Alison Sunstrum, CEO of GrowSafe Systems, emphasized that disruptive innovation with a positive return on investment is needed to reduce waste and emissions while meeting productivity goals. Sunstrum stressed that Canada has a strong scientific base, but an increasing commercialization gap prevents research outputs from being adopted at the farm level.



The audience noted that a post-adoption approach could incentivize increased adoption of research. For example, tax credits after implementing innovations at the farm-level can provide a greater incentive to producers to adopt new technologies and knowledge.

3.3 Panels & Forum: Cross-Sectoral Dialogue on the Adoption of Environmentally Sustainable Innovations

Theme 3 *Panels & Forum* encouraged a cross-sectoral dialogue on the next major steps needed to ensure the adoption of environmentally sustainable innovations including industry-led assurance schemes and tools to manage risk and stimulate the innovation and adoption of green technologies.

David Wiens, Vice-President of Dairy Farmers of Canada, explained how assurance schemes allow farmers to collectively demonstrate responsible stewardship of their animals and the environment, while sustainably producing high-quality, safe, and nutritious food for consumers. Wiens also mentioned that international collaboration could increase opportunities for enhanced research and greater efficiency at the farm level.

Shaping a Path Forward

How can we ensure the **adoption** of environmentally sustainable innovations?



Jolene Noble, from Alberta Farm Sustainability Extension Working Group (AFSE), stressed that sustainability is not a new concept in the agriculture sector. Producers are already adopting many sustainability practices, but there is room for improvement and a need to bring more information to producers about value propositions. Farmer surveys have identified improving land stewardship for the next generation as the most important reason to focus on sustainability. Noble concluded her presentation by stating that the social license of producers to operate is intrinsically linked with consumer perceptions more than ever before.

Dan Mazier, from Keystone Agricultural Producers, stressed that policy discussion requires greater producer and societal participation to move forward effectively and find solutions. The next agricultural policy framework must then be more time-flexible, especially in research and innovation, to capture evolving priorities that change

rapidly in consultation with producers. Mazier also spoke of the lack of social licence in the sector and a need for and increased focus on sustainability goals in agricultural policies.

Finally, Mohammad Khakbazan, from Agriculture and Agri-Food Canada, demonstrated how agricultural systems can reduce resource consumption and environmental impacts through the adoption of new technologies and alternative management practices.

Following the panel presentations, the audience expressed concern about the existing limited infrastructure capacity to support the implementation of new practices and technologies. Reduced broadband access, for example, hampers the adoption of innovations on the ground such as precision agriculture.





What are the main opportunities and obstacles to the increased adoption of clean technologies in the agriculture sector?

Opportunities

1. An increasing interest in environmental sustainability and stewardship across the whole value chain can improve the development and adoption of clean technologies;
2. The existing policy framework and funding opportunities brings valuable opportunities for green innovation in the sector;
3. Non-profit players are willing to provide extension and training through existing initiatives;
4. Existing aggregate data can enable conditions for a systemic-oriented approach to agricultural innovation, and facilitate interactions within the sector;
5. There are many technologies available for adoption given Canada's strong scientific base in agricultural research;
6. Agricultural research and innovation offers proven high economic profitability – an incentive for early adopters of technology; and
7. From canola to biofuels, many success stories in agriculture remain untold, yet their potential for promoting innovation on the farm is unlimited.

Obstacles

1. Uncertainties arising from the existing regulatory environment and legal constraints for commercializing research;
2. Biased technology evaluation and assessments;
3. Limited contact with producers and weak farmer awareness;
4. Reduced willingness of producers to share on-farm data with government or other players;
5. Multiple risks associated with innovation including risk of early adoption, small margins of profit and potential economic loss;
6. High upfront R&D costs that make innovation unaffordable for small producers;
7. Perceived notion by farmers that they are bearing the total cost of adopting emerging technologies while third-parties benefit from their investments at no cost, if benefits are not made clear;
8. Diminishing public trust in the sector; and
9. A growing gap between policy-makers and farmers.

How can we encourage the development and in-field application of sustainable technologies in the agri-food system?

Tools to support dissemination initiatives:

Mobile-based interactive apps, a web-based forum, data collection and management tools, new extension models with a focus on the proper use and maintenance of new technologies, and success stories featuring innovative producers and farmers – early adopters – to which farmers can readily relate.

Practices to facilitate adoption of innovation:

The creation of user-friendly, relevant information resources for end-users to help address implementation barriers, turning early technology adopters into influencers and advocates of agricultural innovation, , more opportunities for farmers to participate in pilot and research projects to demonstrate the benefits of adopting sustainable technologies, and encouraging knowledge translation and transfer (KTT) in its various forms.

Conference Participants




Agriculture and Agri-Food Canada
Agricultural Producers Association of Saskatchewan
Ag-West Bio
Alberta Canola
Alberta Farm Sustainability Extension Working Group
Alberta Wheat Commission
Aquanty Inc.
BC Egg Marketing Board
Beef Cattle Research Council
Bioenterprise Corporation
BioFuelNet Canada
Canadian Association of Agri-Retailers
Canadian Agri-Food Policy Institute
Canadian Canola Growers Association
Canadian Federation of Agriculture
Canadian Horticultural Council
Canola Council of Canada
Cereals Canada
CropLife Canada
Dairy Farmers of Canada
Dalhousie University
Ducks Unlimited
Egg Farmers of Canada
Genome Canada
Genome Alberta
Genome Prairie
Glacier FarmMedia
GreenField Specialty Alcohols, Inc.
GrowSafe Systems
Keystone Agricultural Producers
Labrador Institute of Memorial University
Life Science Association of Manitoba
Manitoba Agriculture, Agri-Resource Branch
Manitoba Beef Producers
Manitoba Forage & Grassland Association
Manitoba Pork
Manitoba Pulse & Soybean Growers
Maple Leaf Foods

Mushrooms Canada
Natural Sciences and Engineering Council of Canada
Newton Farms
Olds College Centre for Innovation
Ontario Ministry of Agriculture, Food and Rural Affairs
Ontario Pork
Prairie Climate Centre
Pulse Canada
Saskatchewan Wheat Development Commission
Smart Prosperity Institute
Synthesis Agri-Food Network
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