CLEAN GROWTH IN CANADA'S AGRICULTURE AND AGRI-FOOD SECTOR

OCTOBER 2021

EXECUTIVE SUMMARY

Smart Prosperity Institute

About Smart Prosperity Institute

Smart Prosperity Institute is a national research network and policy think tank based at the University of Ottawa. We deliver world-class research and work with public and private partners – all to advance practical policies and market solutions for a stronger, cleaner economy.
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Overview

In 2019, agriculture (including on-farm fuel use) accounted for 73 Mt of greenhouse gas (GHG) emissions, equal to 10% of the country's total GHG emissions. While the overall GHG emissions-intensity of agriculture is declining, some concerning trends remain. Absolute emissions from crop production have increased significantly since 2005, and although Canada's soils continue to accumulate soil organic carbon, their annual sequestration rates have tapered off over the past fifteen years (ECCC, 2021b). Moreover, water quality has deteriorated – mainly due to the increased application of nutrients and pesticides – and the suitability of farmland for wildlife habitat has also declined over the past two decades (Clearwater, Martin & Hoppe, 2016).

These trends make clear that increasing the adoption of environmentally friendly practices and technologies is essential to meeting the growing global demand for food in a sustainable manner. This shift should be enabled by a deft agricultural innovation ecosystem, market signals that reward environmental performance, and behavioural interventions that encourage the use of beneficial management practices (BMPs), clean technology adoption, and sustainable consumption patterns.

In 2019, agriculture (including on-farm fuel use) accounted for 73 Mt of greenhouse gas (GHG) emissions, equal to 10% of the country's total GHG emissions.

Canada's Opportunity

Canada and the world are taking steps to reduce the environmental footprint of the agriculture sector, and corporate leaders are following suit. Canada has committed to reducing its GHG emissions by 40-45% below 2005 levels by 2030, and to achieve net-zero GHG emissions by 2050 (ECCC, 2021a). As part of these commitments, the federal government has set a national target to reduce GHG emissions from nitrogen fertilizers by 30% below 2020 levels by 2030. Canada has also committed to protecting 25% of its terrestrial area and its oceans and shorelines by 2025 (ECCC, 2020a).

An increasing number of agriculture and agri-food business leaders are also recognizing the need to produce and source their food sustainably. To name only a few examples: Maple Leaf is the first major food company in the world to go carbon neutral (Maple Leaf Foods, 2019), and in 2010 Unilever committed to sustainably sourcing 100% of its raw agricultural materials by 2020 (Unilever, n.d.).

These targets and initiatives come at a time when Canada's agriculture and agri-food sector is on the cusp of an extraordinary economic growth opportunity. Demand for high-value food (e.g. proteins and functional foods) is expected to increase significantly in the coming decades, as a result of population growth and an increase in the size and purchasing power of the global middle class. As the world's fifth-largest agricultural exporter, Canada has the opportunity to leverage its position as a trusted global leader in supplying safe, nutritious food in the 21st century (Farm Credit Canada, 2020).

In recognition of this economic growth opportunity, the federal government's Economic Sector Strategy Table for agri-food adopted an ambitious target of $85 billion in agriculture, agri-food and seafood exports and $140 billion in domestic sales by 2025. This represents a sizeable increase from the 2017 values of $64.6 billion and $110 billion for agri-food exports and domestic sales, respectively (ISED, 2018). To hit these growth targets, the sector must achieve a compound annual growth rate (in dollar terms) of over 3% per year.

Seizing these export growth opportunities partially depends on recognizing that market access is increasingly based on a country's ability to uphold strict environmental and safety standards. This can be seen from changing consumer preferences and from the inclusion of environmental provisions in trade agreements such as the Trans-Pacific Partnership and the Comprehensive Economic and Trade Agreement. The upshot is that leveraging Canada's reputation for safe, nutritious, sustainable, and affordable food (the 'Canadian Brand') on the international stage offers a promising pathway to diversifying Canada's export markets.

Unlocking Clean Growth in the Agriculture Sector

Canada's agri-environmental cost-share programs play an important role in rewarding environmental stewardship and encouraging the adoption of BMPs. Some provinces have adopted a number of innovative program designs for their cost-share offerings in recent years, such as rolling out more targeted programs and introducing cost-share programs for producer groups. However, these programs are still grappling with a number of problems, such as: (1) 'selection bias', where environmentally motivated farmers are more likely to participate in cost-share programs, rather than those in greatest need of environmental improvement; (2) producers mostly adopting BMPs that are highly visible, easy to trial, or that primarily provide private economic benefits; and (3) a paucity of rigorous impact evaluations that assess what environmental and economic outcomes would have been in the absence of the cost-share programs. Concerns with the performance of the cost-share programs suggest that new policies will be essential to meeting Canada's clean growth objectives.

To provide insight on the best way to approach Canada's clean growth opportunity, Smart Prosperity Institute (SPI) convened a workshop in Ottawa in January 2020 that featured representatives from government, industry, academia, and environmental non-governmental organizations. Workshop participants discussed two key themes for unlocking clean growth opportunities in Canada's agriculture and agri-food sector: (1) gauging the economic and environmental performance of existing federal/provincial/territorial agri-environmental programs (especially the cost-share programs under the Canadian Agricultural Partnership) and how they might be improved; and (2) potential focus areas for new policy interventions – grounded in specific geographies and food production systems – that could make a substantial contribution to the sector's economic and environmental objectives.

Focus Areas

SPI presented a list of six potential focus areas to workshop participants:

1. **Improving the efficiency of nitrogen fertilizer management**;
2. **Enhancing soil health**;
3. **Commercializing next-generation crop production technologies**;
4. **Reducing GHG emissions reductions in the beef and dairy livestock sectors through improved animal genomics**;
5. **Reducing GHG emissions reductions in the beef and dairy livestock sectors through better livestock feeding practices**;
6. **Circular economy approaches to agriculture and agri-food**.

The focus areas were identified based on three key criteria: the scope of the environmental challenges; the size of the economic opportunity; as well as the scalability of the policy and/or technological solutions. In addition workshop participants suggested additional case study topics of their own.

Nearly all of SPI's proposed focus areas were received favorably by workshop participants, but some case studies clearly stood head and shoulders above the others. For instance, participants were overwhelmingly in favour of focussing on nitrogen fertilizer management, improving soil health, and circular economy approaches to agriculture and agri-food – due to their ability to build on existing policies and for their potential to realize a broad array of economic and environmental benefits. There was also significant enthusiasm for a case study assessing a broad suite of GHG mitigation opportunities across the beef and dairy livestock sectors (e.g. improved livestock feeds, animal genomics, carbon sequestration on prairie grasslands, etc.). Many of these focus areas studies will be the subject of in-depth research and convening in future years.

Among the case studies proposed by workshop participants, changes to business risk management programs and ecosystem service approaches to agriculture were particularly well received – the former because it builds upon an existing program framework to incentivize BMP adoption, and the latter because of the potential for realizing integrated environmental-economic benefits for producers and society. The ecosystem services approach also has the potential to simultaneously advance a number of federal, provincial, and territorial government objectives, such as nature-based solutions to climate change mitigation, and natural infrastructure for enhancing climate change adaptation and resilience.

Policy Options

New policies will also be necessary to help Canada make the most of this clean growth opportunity. This report examines five complementary policies for driving clean growth in the sector: (1) behavioural economics approaches; (2) taxes on environmental externalities (or agricultural inputs linked to these externalities); (3) voluntary ecological certification; (4) targeted agri-environmental subsidies (especially reverse auctions and spatially targeted payment schemes); and (5) offsets for greenhouse gas emissions, water quality, and for biodiversity.

Each of these policies has their respective strengths and weaknesses and each can play an important role in further unlocking clean growth within the sector. To best address the sector's environmental challenges in an actionable way, these policy tools need to be grounded in solid analysis and piloted (and then scaled up) in key production systems across the country.

Canada is facing an unprecedented opportunity to foster clean growth in the agriculture and agri-food sector while contributing to Canada's environmental objectives. But current approaches are not enough to get us there. Through innovative policy approaches, federal, provincial, and territorial governments can help increase technology deployment and BMP adoption to the benefit of producers, industry, the environment, and all Canadians. Canada's clean growth opportunity awaits us – but only if Canada acts. And the time to act is now.

KEY MESSAGES

1. Canada's agriculture and agri-food sector is on the cusp of an extraordinary economic growth opportunity. Demand for high-value food (e.g. **proteins** and **functional foods**) is expected to increase significantly in the coming decades, as a result of population growth and an increase in the size and purchasing power of the global middle class.

2. In recognition of this opportunity, **the Economic Sector Strategy Table for Agri-Food adopted an ambitious target of $85 billion in agriculture, agri-food, and seafood exports and $140 billion in domestic sales by 2025.** As the world's 5th largest agricultural exporter, Canada has the opportunity to leverage its position as a trusted global leader in supplying safe, nutritious food to diversify its exports markets.

3. Meeting these targets and satisfying the growing global demand for food in a sustainable manner should be a top priority for Canada. In 2019, agriculture (including on-farm fuel use) accounted for 73 Mt of greenhouse gas (GHG) emissions, equal to **10% of the country's total GHG emissions**. In addition, soil carbon sequestration rates, water quality indicators, and the suitability of farmland for wildlife habitat have been in decline.

4. Canada has already taken the first steps toward reducing the environmental impact of the agriculture sector. The federal government has committed to reducing its GHG emissions by 40-45% below 2005 levels by 2030, and as part of these commitments, has set a national target to reduce GHG emissions from nitrogen fertilizers by 30% below 2020 levels by 2030. In addition, leaders in the agri-food industry have started to adopt sustainable sourcing commitments throughout their supply chains.

5. Reconciling the economic opportunity with the environmental challenge will be no small feat and no single instrument or practice will be sufficient to do the job. For example, the adoption and use of beneficial management practices or clean technologies is pivotal to reducing the environmental impact of the agriculture sector; however, there are several concerns facing Canada's Federal-Provincial-Territorial cost-share programs — one of the main vehicles for promoting the adoption of environmentally friendly management practices. These concerns include:

- Selection biases that result in environmentally motivated farmers being more likely to participate in the cost-share programs, rather than those in greatest need of environmental improvement.
- The tendency for producers to mostly adopt BMPs that are highly visible, easy to trial, or that primarily provide private economic benefits.
- A paucity of rigorous impact evaluations that assess what environmental and economic outcomes would have been in the absence of the cost-share programs.

6. To unlock clean growth opportunities in Canada's agriculture and agri-food sector, there are several key areas to focus on. Participants at SPI's workshop in January 2020 identified **nitrogen fertilizer management**, **improving soil health**, and **circular economy approaches** to agriculture and agri-food as some of the most promising opportunities for clean growth in Canada's agriculture sector.

7. Decoupling economic growth from environmental harm requires a well-targeted and comprehensive package of policies for the agriculture sector. Some of the most promising policy options moving forward include:

- Behavioral Economics Approaches
- Taxes on Environmental Externalities
- Voluntary Ecological Certification
- Targeted Agri-environmental Subsidies
  - Reverse Auctions
  - Spatially Targeted Payment Schemes
- Offsets for Greenhouse Gas Emissions, Water Quality, and Biodiversity.

8. Canada is facing an unprecedented opportunity to foster clean growth in the agriculture and agri-food sector, while also contributing to Canada's environmental objectives. But current approaches are not enough to get us there. Through innovative policy approaches, federal, provincial, and territorial governments can help increase technology deployment and BMP adoption to the benefit of producers, industry, the environment, and all Canadians.