



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada



Canadian Policy Context For Climate Change

Ag & Forestry GHG Modeling Forum

Shepardstown WV, Sept 26-29, 2011

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Canada 



Purpose

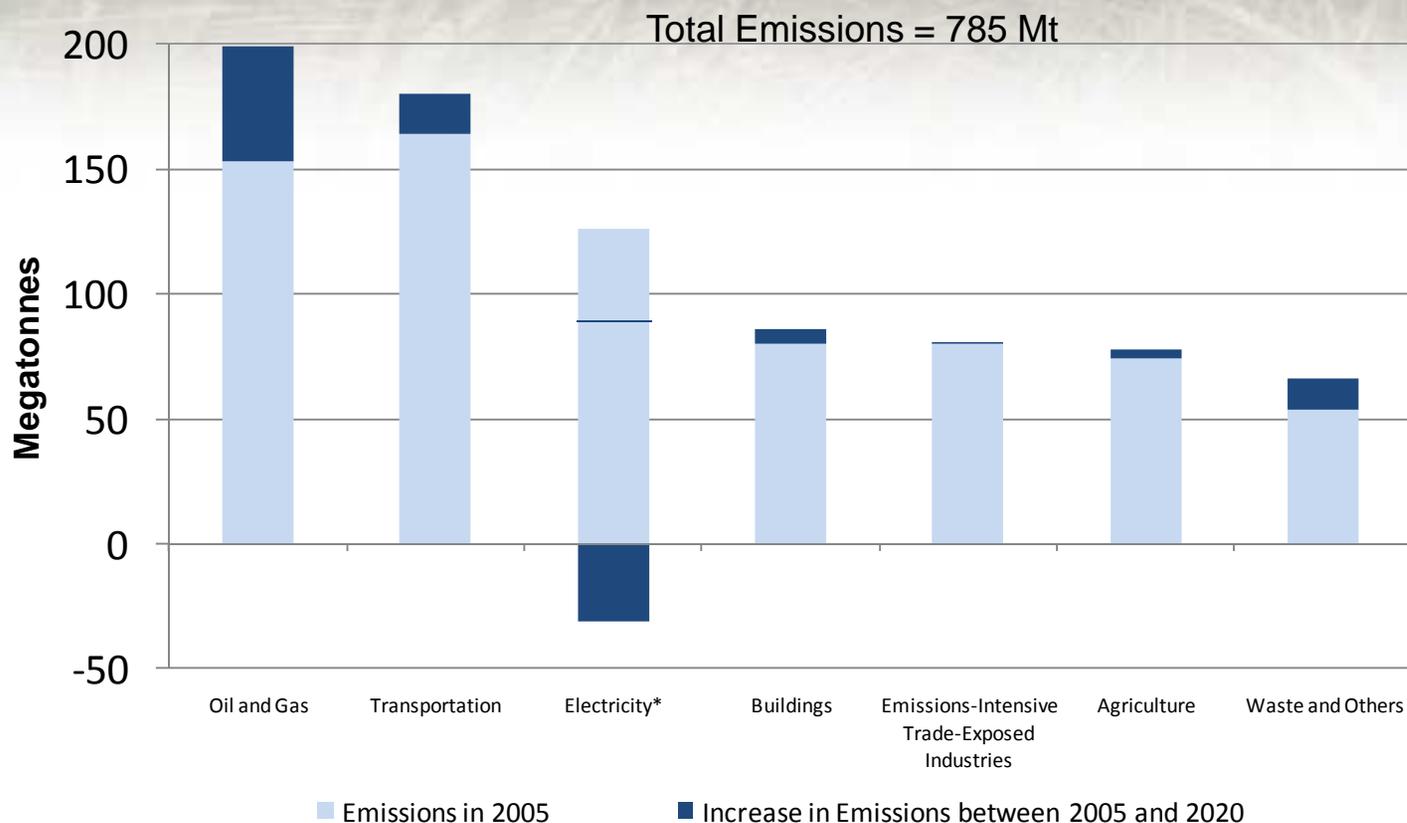
- To outline Canada's national circumstances and key issues and challenges for climate change mitigation
- To provide an overview of Canada's sector-by-sector regulatory approach
 - Progress to date in reducing emissions
 - Further action proposed towards achieving Canada's target
- Review progress made in the agriculture and food sector in terms of environmental management and contribution to GHG reduction
- Discuss the potential nature and scope of an AAFC "departmental" strategy, that could contribute to Canada reaching the goal of a 17 percent reduction from 2005 levels by 2020
- To highlight an approach to climate change adaptation

Canada's unique national circumstances make tackling climate change a formidable challenge

- Canada has an extreme climate
- Canada has a large landmass, coupled with a very low overall population density
- Canada has a growing economy and population
- Canada is a net exporter of energy
 - Increased oil and gas production in response to strong global demand for energy is a significant contributor to the overall rise in Canada's emissions
- Canada has an energy intensive industrial sector
- Canada's economy is highly integrated with that of the U.S.

Without further action, emissions are projected to grow in almost all sectors

Projected Emissions in 2020



•For electricity generation, emissions are projected to fall by 31 Mt below 2005 levels.

Given Canada's energy intensive economy, economic growth and emissions are connected

- Progress on clean energy and energy efficiency is essential to the long-term competitiveness of the Canadian economy
 - Canada is the 2nd highest per capita energy consumer in the OECD

- Energy investment decisions taken today will affect the future economic prosperity and carbon footprint of Canadians
 - Oil and other fossil fuels will remain an important part of global energy mix even with the transition to a low carbon economy

- Oil sands represent an important source of economic prosperity but are also driving Canada's emissions growth
 - From 2005 to 2020, production is projected to increase from 1.7 to 5 million barrels/day (200%)
 - During the same period, GHG emissions are projected to increase from 30 to 92 Mt (207%)

Meet Canada's target through sector by sector regulations, aligned with the U.S.

- Canada's target under the Copenhagen Accord matches that of the U.S.
 - Reduction of 17% below 2005 levels by 2020 (equal to 607 Mt)
- The target is ambitious given Canada's growing population and projected emissions growth in key economic sectors
- Canada's plan is to pursue systematic sector by sector regulations, aligned with the U.S. where appropriate
 - North American economy is integrated
 - Need to maintain economic competitiveness relative to our largest trading partner
- In the absence of Congressional cap and trade legislation, the U.S. Environmental Protection Agency (EPA) is moving forward with regulations under the Clean Air Act



We have the legislative and institutional capacity to enforce and administer our measures effectively

- Canadian Environmental Protection Act (CEPA) is the primary regulatory instrument for limiting GHGs
 - CEPA's enforcement regime allows for the designation of both enforcement officers and analysts, and the creation of various tools that can be employed in order to promote compliance and enforce the Act's provisions
- Proposed legislation including administrative details are reviewed and discussed at two committees:
 - House of Commons Standing Committee on the Environment and Sustainable Development
 - Cabinet Committee on Environment and Energy Security

Initial focus in reducing emissions has been in the transportation and electricity sectors

- Transportation is currently Canada's largest source of GHG emissions, with forecasted growth.
 - Alignment with the U.S. is critical given the highly integrated nature of the North American automotive industry
 - Performance standards have already been implemented to address emissions from new cars and light trucks (2011-2016 model years); further action to address later model years and emissions from heavy duty vehicles is underway
 - Requirement for an avg. 5% renewable fuel content in gasoline came into force Dec. 2010; provisions for diesel fuel and heating oil to take effect in July 2011

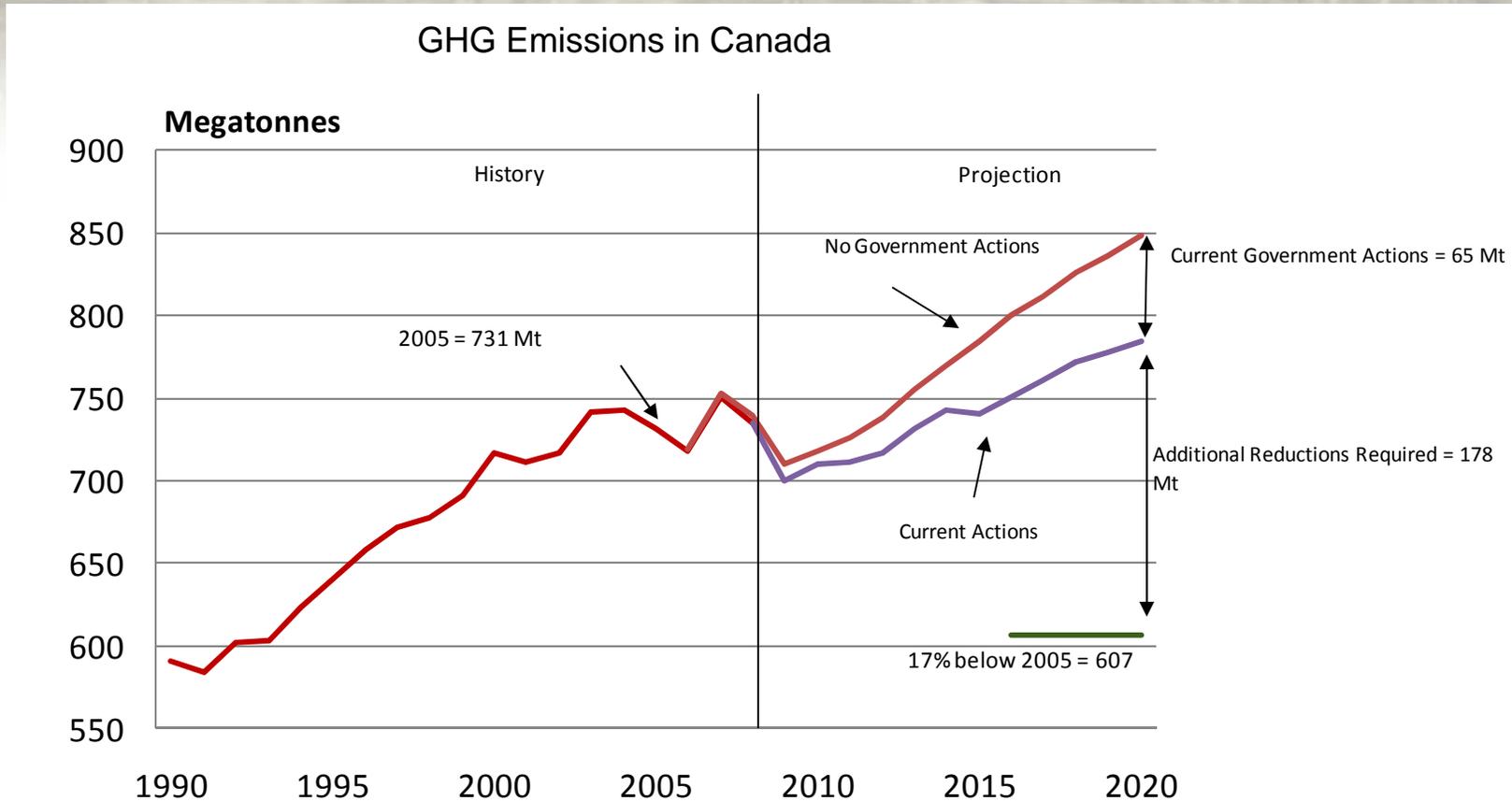
- Electricity is an area where Canada is leading relative to the U.S.
 - Canada has a much higher proportion of non-emitting generation (approx. 75%)
 - U.S. relies on coal for about half of total generation, whereas only ~19% of Canada's electricity generated from coal-fired units
 - Capital stock turnover provides the opportunity for ambitious action
 - Proposed performance standards for coal-fired generation to come into force in 2015 and would move Canada off of traditional coal



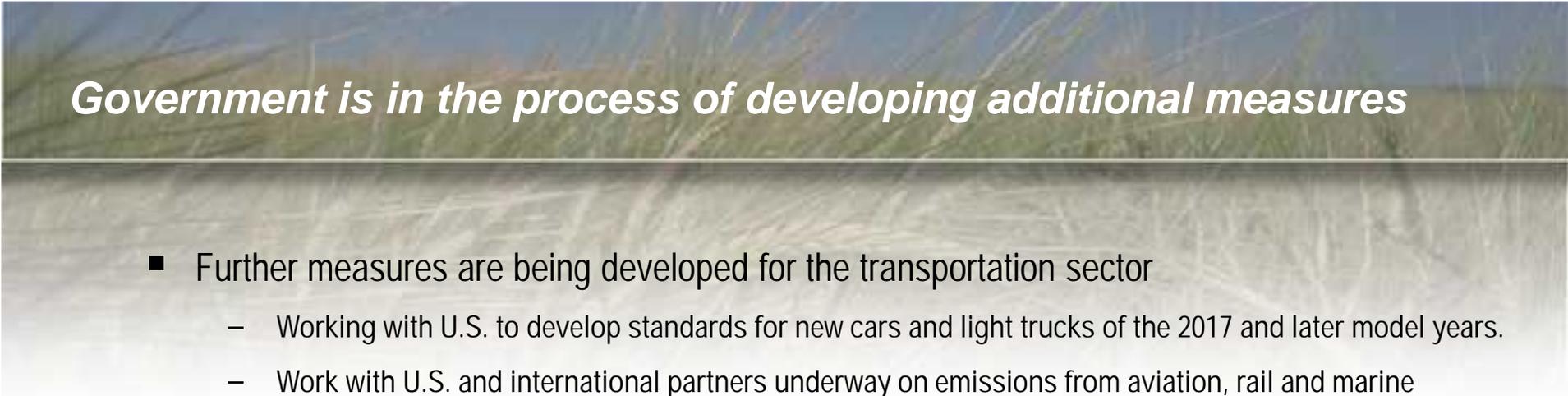
Provinces and territories have been taking action

- Provinces and territories have established their own targets
- They hold many of the levers for action on climate change and are developing tailored strategies that reflect their individual circumstances
- There are a range of initiatives being implemented by provinces:
 - Regulatory framework in Alberta
 - Carbon tax in British Columbia
 - Various measures to support energy efficiency and renewables (e.g. Ontario feed-in tariffs)
- Actions from provinces and territories are contributing about half of the expected reductions towards meeting Canada's emissions target, and there is potential for them to do more (e.g. Western Climate Initiative)

Current measures have brought us a quarter of the way to the Copenhagen target and significant work remains



Each and every new measure contributes to the additional reductions required



Government is in the process of developing additional measures

- Further measures are being developed for the transportation sector
 - Working with U.S. to develop standards for new cars and light trucks of the 2017 and later model years.
 - Work with U.S. and international partners underway on emissions from aviation, rail and marine

- Performance standards would be designed to achieve equivalent or better outcomes to those implied by the U.S. approach

- They would also take into consideration:
 - Equitable treatment across regions and industrial sectors
 - Competitiveness and minimizing stranded capital
 - Promoting development and deployment of new technologies
 - Minimizing regulatory overlap and duplication



In taking action, minimizing adverse socioeconomic impacts is a key concern

- Canada is aligning policies with the U.S. where appropriate to maintain economic competitiveness
- Current measures have been implemented with a view to achieving an equitable treatment among sectors and minimizing employment impacts
 - For example, analysis of federal measures implemented to date indicate that there is no negative impact on employment, and no distributional concerns across sectors or regions in terms of reductions and costs
- Adverse socio-economic impacts outside of continental and national borders are also minimized by:
 - Ensuring that the processes of establishing and implementing climate policies include consultations with Federal departments with international responsibilities (Canadian International Development Agency, Department of Foreign Affairs and International Trade)
- Canada also contributed \$400M of fast-start funding to assist developing and vulnerable countries to address climate change and its impacts



However, Canada's climate will continue to change regardless of mitigation activities

- Impacts are already evident across Canada
 - Changes in temperature, precipitation, ice coverage and melt, and sea level rise
 - More frequent and severe extreme weather events
 - Significant impacts on human health and the economy

- Canada is experiencing faster warming than countries farther south
 - Increased risks for health, safety, infrastructure, viability of natural resource industries, coastal communities, water, and natural ecosystems
 - The North is particularly vulnerable

- Adaptation involves adjusting activities, decisions, and thinking to moderate harm and take advantage of new opportunities
 - E.g. infrastructure standards for more frequent and extreme weather events, surveillance programs for shifting ranges of infectious disease

Agricultural GHG Sources and Sinks

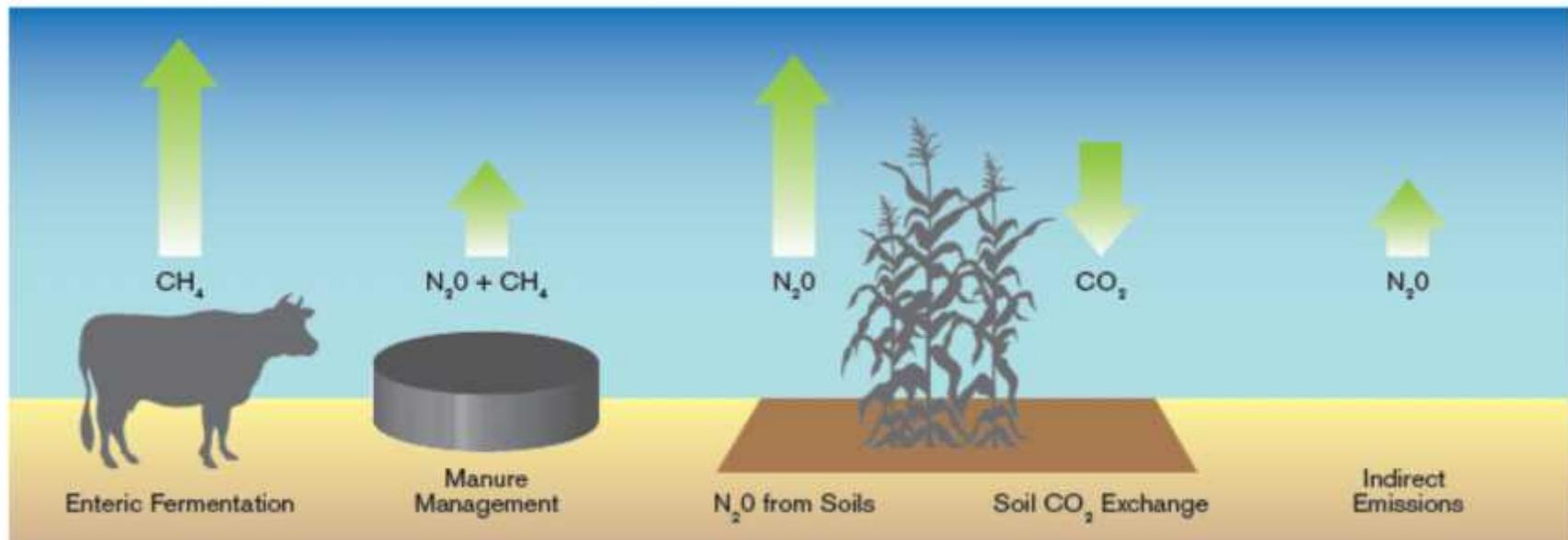
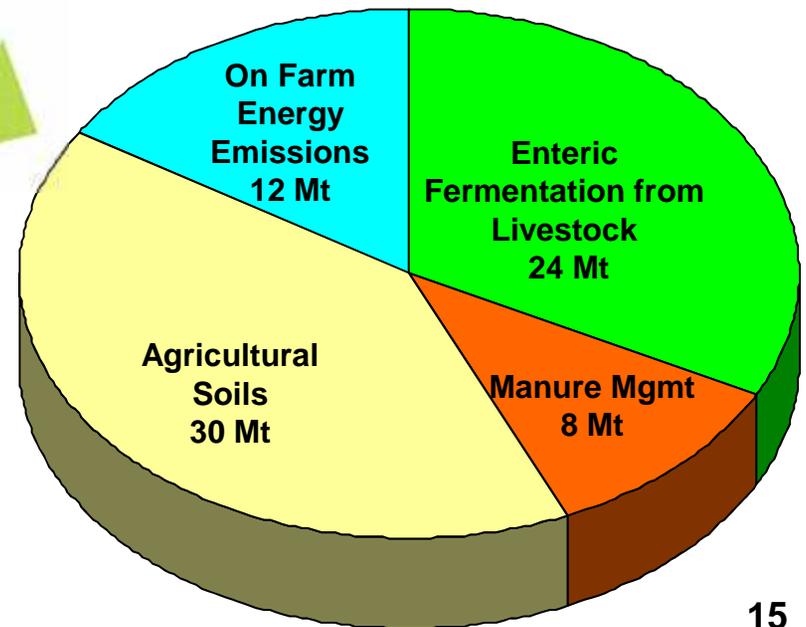
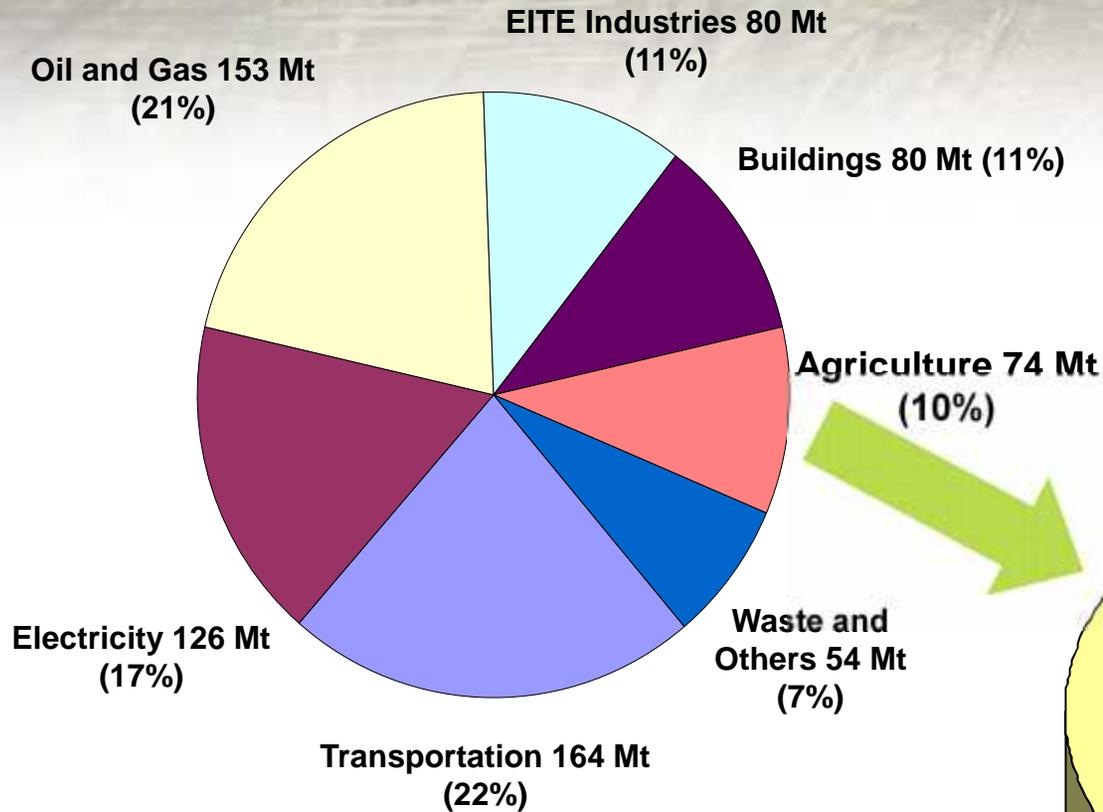


FIGURE 16-1 Net sources and sinks of GHGs from Canadian agriculture exclusive of emissions from fossil fuels and energy use. The size of the arrows indicates the relative magnitude of the source or sink.

- Canada elected to account for emissions and removals from cropland management under the Kyoto Protocol, reflecting the significant investment in science
- Cropland emissions and sinks are counted under the “LULUCF” sector (Land Use, Land Use Change and Forestry)

Agricultural GHG Emissions in Canada

Summary of Agricultural GHG Emissions in 2005

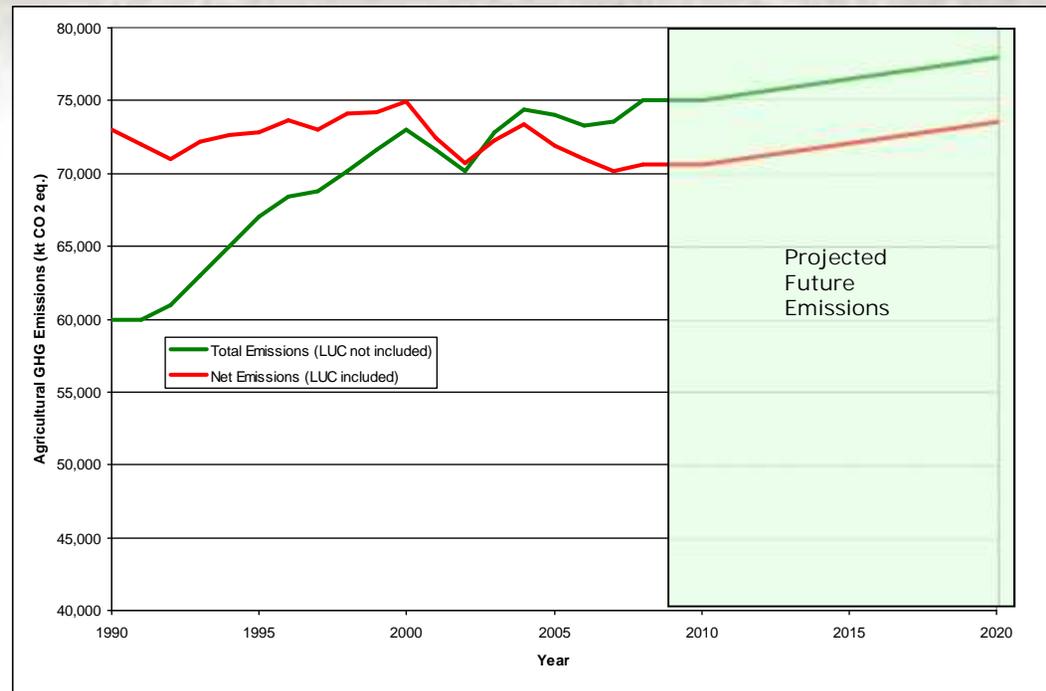


Excludes LULUCF

Agricultural GHG Emissions in Canada

- Agricultural GHG emissions have increased since 1990
 - Increase in hog and beef numbers and fertilizer use
- However net emissions, which include LULUCF, have declined
 - Changes in soil management have moved cropland from a source in 1990 to a carbon sink
- The sector has made progress in decoupling production from net emissions
 - Agricultural output increased over 40% for the period 1990-2005
- Emissions may rise in the future

Figure 1: Agricultural GHG Emissions in Canada 1990-2008 and Projected into 2020



Sources:
Environment Canada, Greenhouse Gas Division. National Inventory Report
Greenhouse Gas Sources and Sinks in Canada 1990–2008.

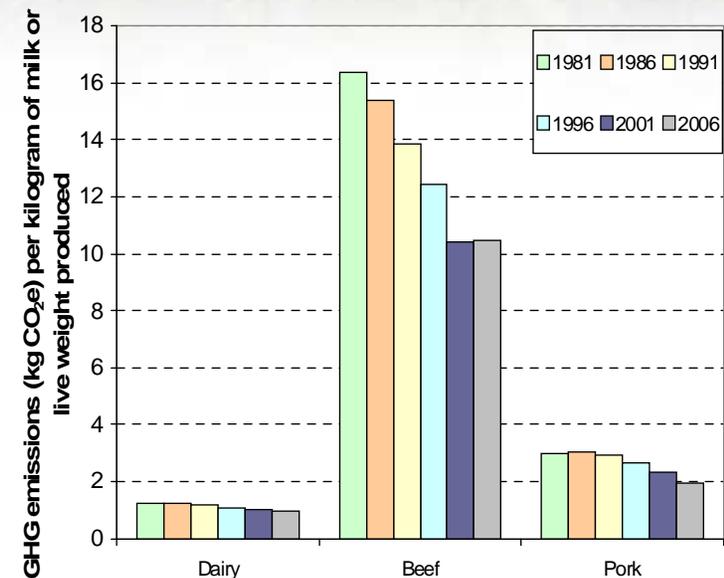
Submission to the United Nations Framework Convention on Climate Change.

Environment Canada Modeling for 2020 (relative to 2008).

Reduction of GHG Emissions Intensity for Livestock in Canada

- Meeting growing world demand for food is still the priority for the sector
 - 40% of output is exported
- GHG Emissions Intensity is the measure of GHG emissions per total weight of production
 - e.g. CO₂ equivalent per kg of milk or animal live weight produced
- From 1981 to 2006, farmers made significant improvements in their management practices, including improved nutrient management, reduced energy consumption and better genetics, increasing the efficiency of production.
 - Resulted in improvements to GHG emission intensities (Figure 2):
 - Dairy: 20% decrease CO₂ eq. /kg milk,
 - Beef: 36% decrease CO₂ eq. /kg live weight
 - Pork: 37% decrease CO₂ eq. /kg live weight

Figure 2: Greenhouse gas emission intensities for milk, beef and pork production in Canada, 1981–2006



Source:

Eilers, W., R. MacKay, L. Graham and A. Lefebvre (eds). 2010. Environmental Sustainability of Canadian Agriculture: Agri-Environmental Indicator Report Series — Report #3. Agriculture and Agri-Food Canada, Ottawa, Ontario.



International cooperation

- Canada, the US and other countries have worked closely on forming the Global Research Alliance on Agricultural Greenhouse Gases, announced in Copenhagen in 2009
- Objective of the Alliance is to help farmers improve efficiencies, reduce costs of production and lower emissions
- Working with industry and university partners to cover the continuum from research to tech transfer through the \$27M, five-year Agricultural Greenhouse Gas Program

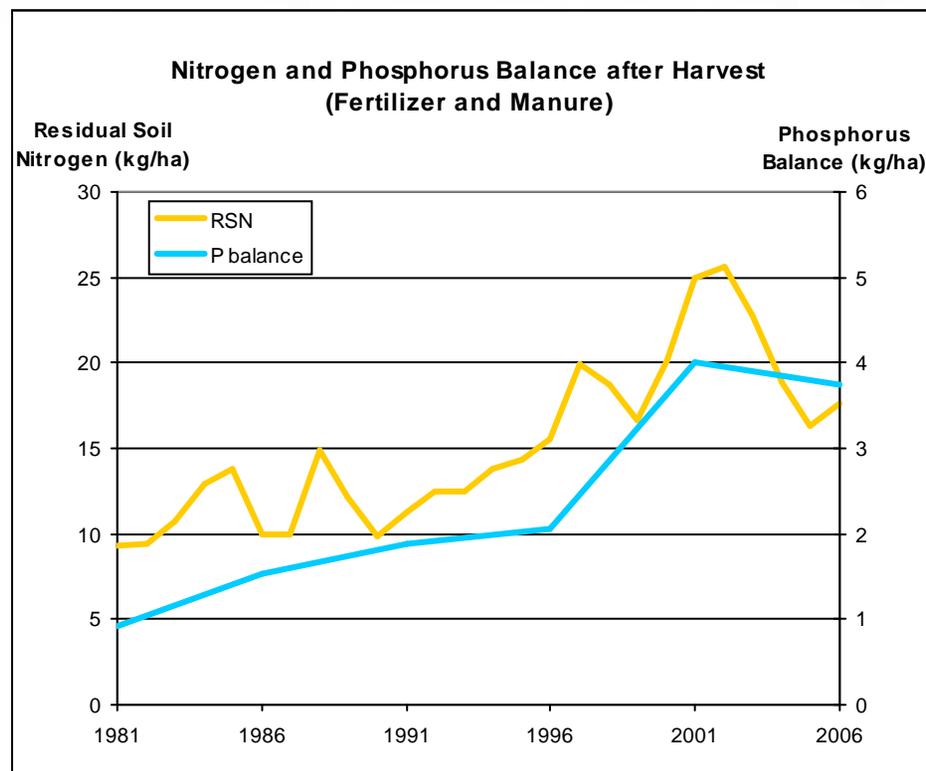
An agriculture sector strategy could focus on three areas:

- As a complement to ongoing research that improves productivity and helps to decouple GHG emissions from agricultural output, future effort could focus on:
 1. Nutrient management
 - conduct science, create decision tools and encourage adoption of best practices
 2. Climate change mitigation and adaptation
 - develop goals for agricultural emissions
 - improve measurement and monitoring
 3. A biomass / bioproducts strategy that moves beyond biofuels and contributes to a low-carbon economy

Nutrient management challenge is a common thread connecting many agri-environmental issues

- Nitrogen, phosphorus and manure management link to many key issues for modern agriculture
 - GHG emissions
 - water contamination
 - potential energy generation
 - potential for green certification
 - smog
 - odour
- Loss of nutrients from agriculture into the surrounding environment is a cost to producers, and in many cases represents inefficiencies in production. There is significant opportunity for “win-win” scenarios.

Increased nitrogen inputs have resulted in increased yields, but also increased risk.



Source: Agri-Environmental Indicator Report
Series — Report #3, AAFC, 2010



Improved nutrient management practices can support Canada's emission target

- GHG emissions can be mitigated by improving farm practices related to nutrient management such as
 - new animal feeding strategies
 - more efficient use of crop production inputs
 - new waste treatment techniques

- Cost and/or technological barriers often prevent the widespread adoption of these practices
 - Environmental Farm Plans, technical and financial assistance to adopt beneficial management practices (BMPs) help address these barriers

The path forward on agricultural GHG emissions

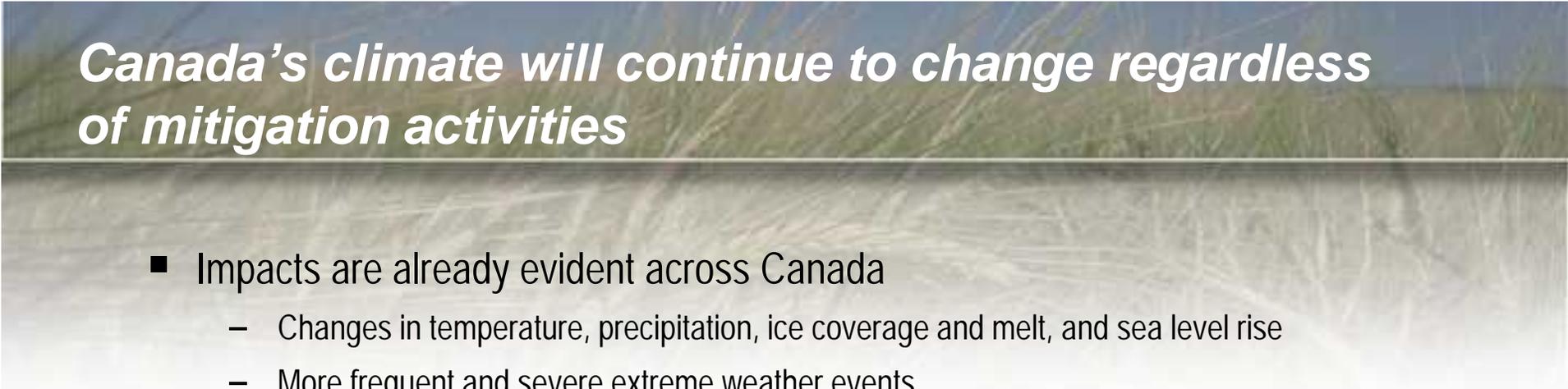
- Breakthrough discoveries are possible, but further reductions in agriculture emissions are likely to be small in absolute terms
 - some potential for additional soil carbon sequestration, but widespread adoption occurred prior to 2005 baseline period
 - agriculture is part of a biological system in which some greenhouse gas emissions are natural
 - a limited number of practices can provide emission reductions, however, many come with high additional costs to farmers
- Given the imperative to achieve global food security, it is important to emphasize improved efficiency through productivity research, lowering the carbon intensity of agricultural production
- Agriculture's greatest potential to reduce emissions would likely occur by replacing coal with biomass, but this will only occur if incentives change



Conclusion for Mitigation

- 1) Through adoption of innovative farming practices, the agriculture sector has reduced net emissions and improved emissions intensity
- 2) “Departmental” environmental agenda at AAFC will be delivered through Growing Forward 2 starting in April 2013
- 3) AAFC environmental strategy could include a focus on
 - improving nutrient management practices
 - reducing GHG emissions intensity
 - supporting the bioproducts industry

Currently the agricultural sector has no Policies or Measures that have GHG emission reductions as an objective



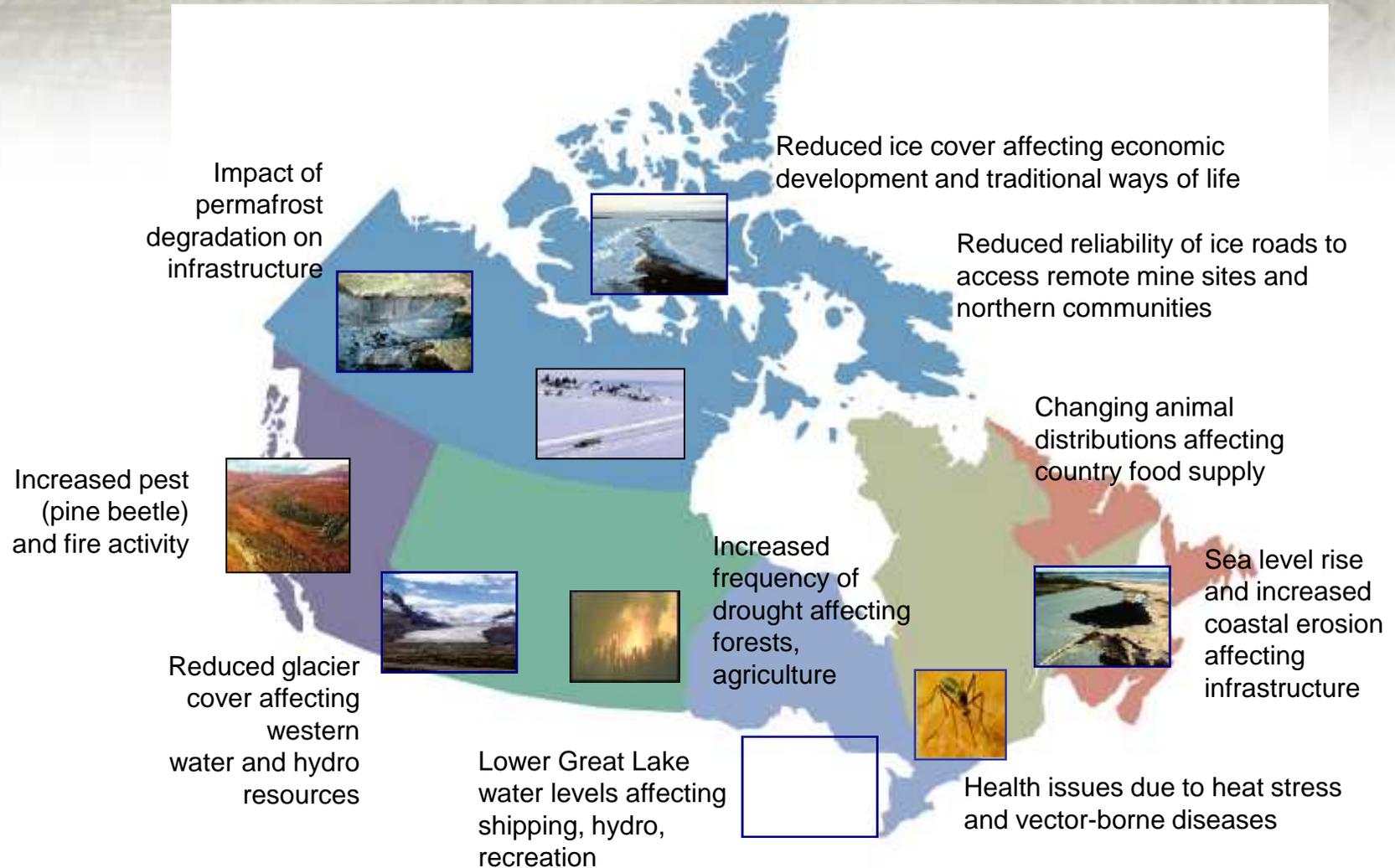
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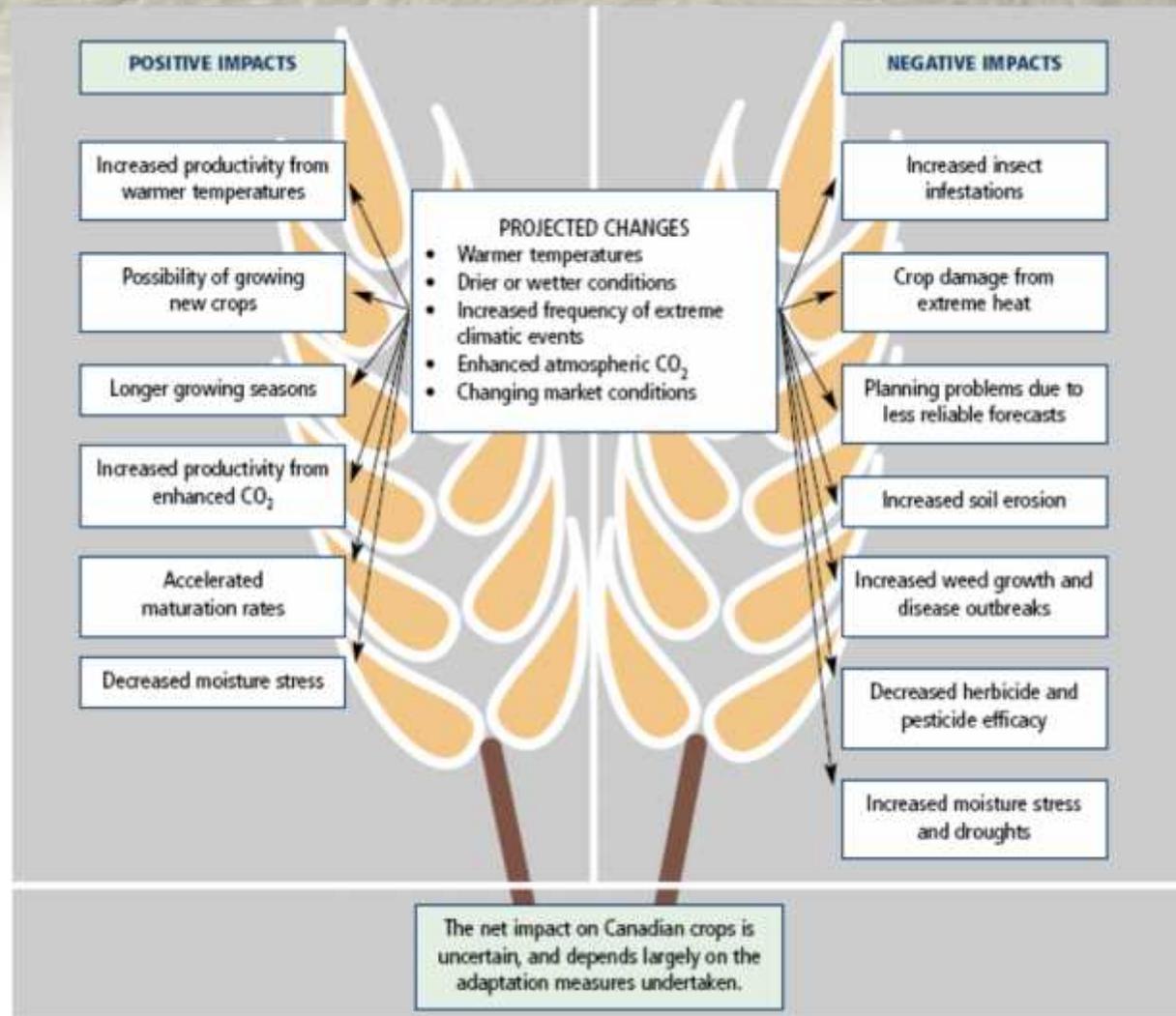
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 - E.g. infrastructure standards for more frequent and extreme weather events, surveillance programs for shifting ranges of infectious disease

The impacts of climate change are already evident across Canada



Agriculture must be prepared to adapt to challenges and opportunities



Source: Natural Resources Canada, 2004. Climate Change Impacts and Adaptation: A Canadian Perspective, 56.



Canada is making investments to improve our understanding of climate change and developing a comprehensive sector strategy

- Continuing to fund research to understand impacts and evaluate adaptation strategies to improve resilience

- A comprehensive Foresight activity involving wide spectrum of participants to help frame the long term challenges and opportunities

- Canada wide consultations to gauge sector understanding of issues related to impact and adaptation and to help frame a sector strategy that could have the following elements
 - Contributing to mitigation objectives
 - A sector ready to adapt
 - Seizing opportunities that emerge with a changing climate
 - A global citizen