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The role of Canadian agriculture in climate change mitigation

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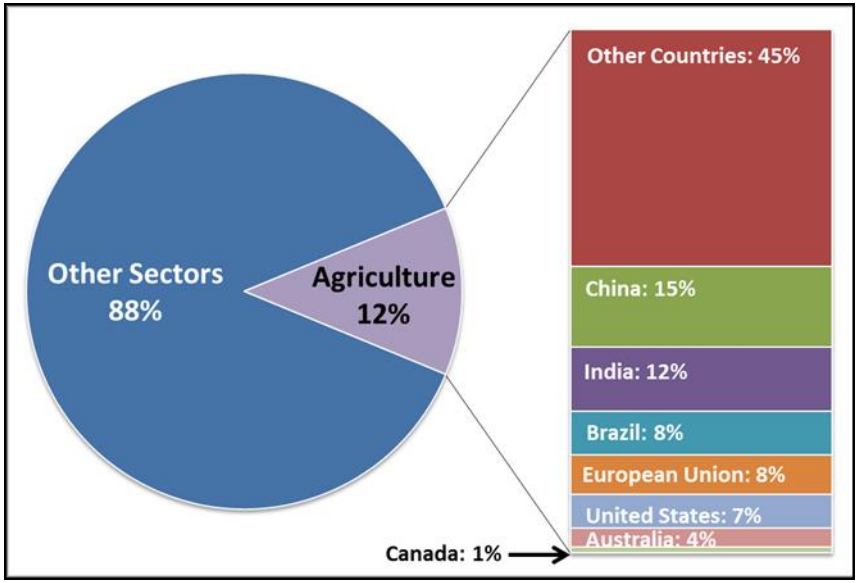
Canada

Background

- Agriculture is important in the global climate change agenda....
  - 12% of the world's total GHG emissions
  - the 4th highest global emitting sector
  - 'affordable' reduction potential exists (75% in developing countries)

… and in Canada's economy-wide emission reduction strategy, as agriculture contributes 10% of Canada's total GHG emissions.



Contributions by selected countries to the agricultural share of global GHG emissions (2012)
Source: World Resources Institute

Canada's agriculture sector emits 1% of global agriculture GHG emissions and 10% of Canada's GHG emissions

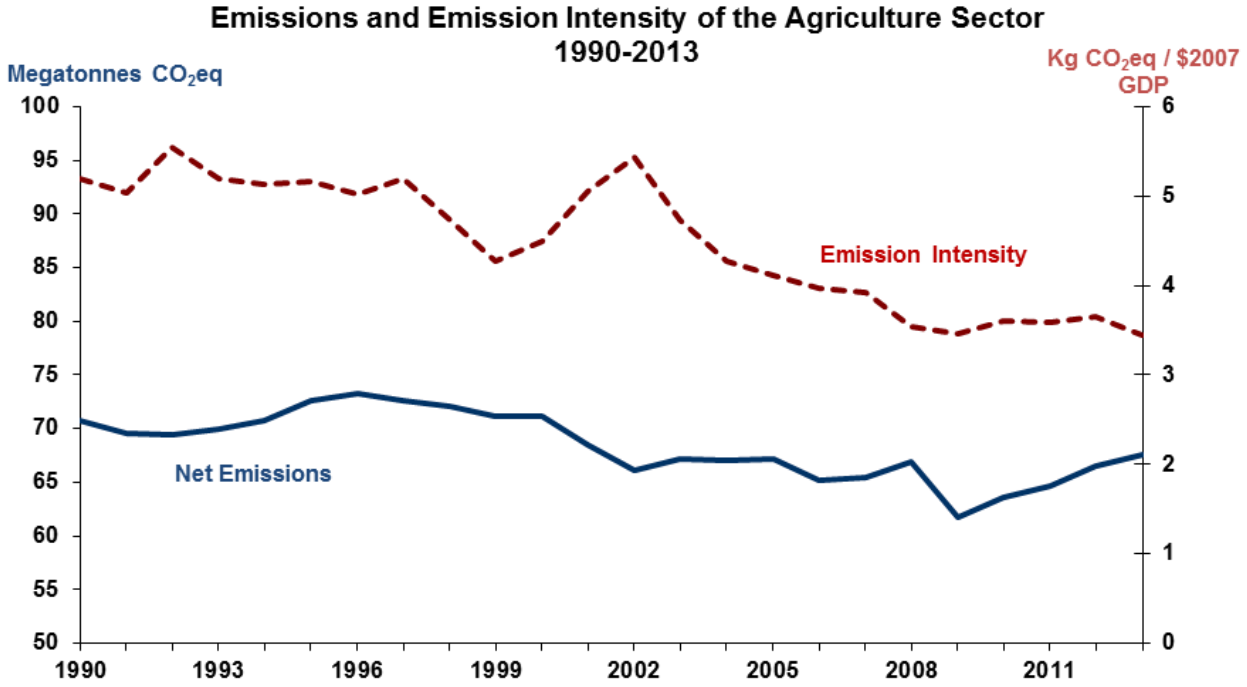
Does Paris Change the Agriculture GHG Agenda?

- UNFCCC 2015 Paris Agreement
  - First *universal* agreement to reduce GHGs
  - Each country sets its own target towards a common goal
  - UN process included a strong role for sub-national governments
- UNFCCC Non-State Actor Zone
  - ➢ Reduction pledges from:
  - 25% of the world's largest companies; aggregate revenue of US$19.2 trillion
  - Investors representing US$10 trillion committed to portfolio carbon foot-printing
  - Includes the global food and input industry (e.g. Monsanto pledged carbon neutral operations by 2021, including working with farmers to cut emissions)

Although Canada represents only 1.6% of the world's greenhouse gas emissions, Canada **remains committed to doing our part** to address climate change. Canada intends to achieve **an economy-wide target** to reduce our greenhouse gas emissions by 30% below 2005 levels by 2030.

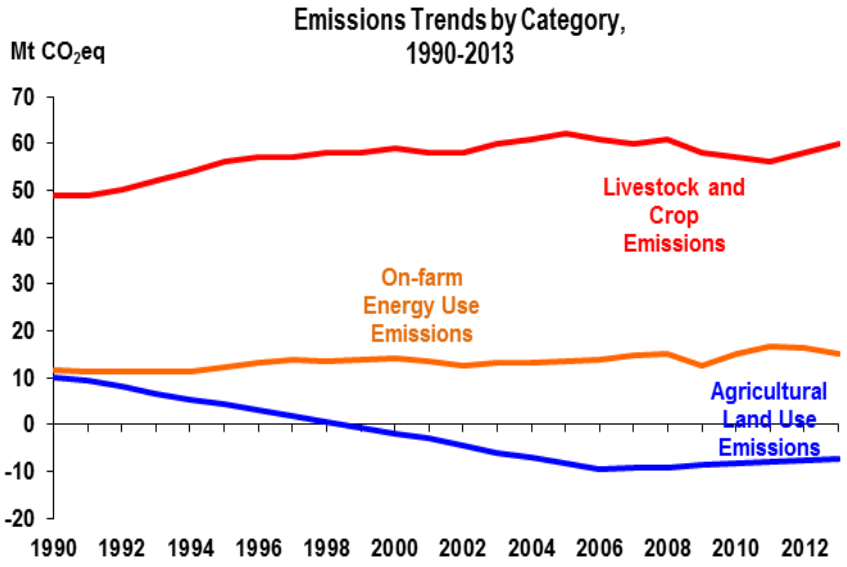
- Canada's intended Nationally Determined Contribution (iNDC) to the UNFCCC

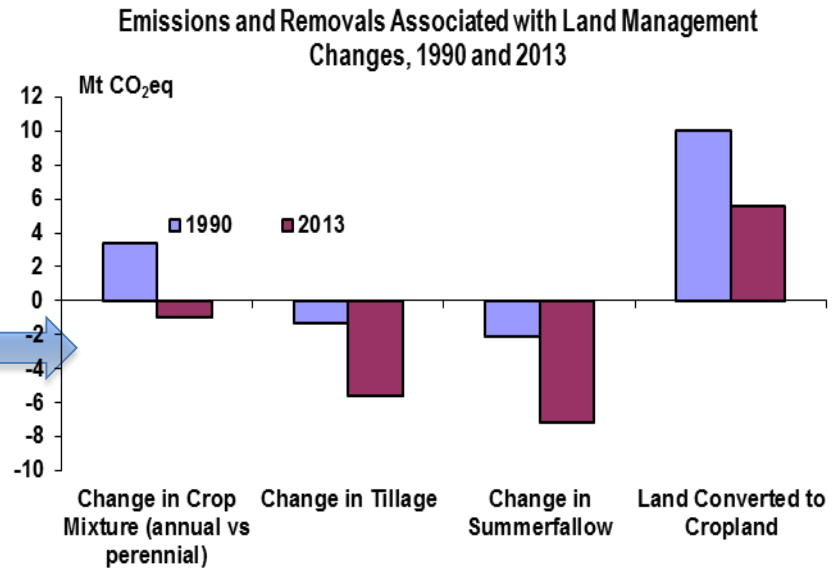
Canada's agriculture sector has seen its net emissions and emission intensity decline in the last two decades



Source: Environment Canada, National Inventory Report 2015 and Natural Resources Canada, National Energy Use Database, 1990 to 2013

Emission reductions have mainly been the result of improved land management practices …



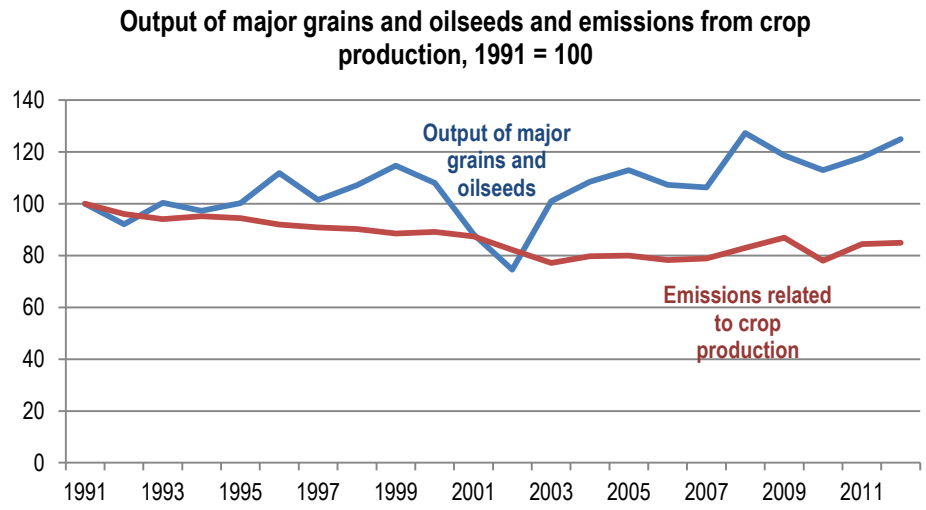


Source: Environment Canada, National Inventory Report 2015 and Natural Resources Canada, National Energy Use Database, 1990 to 2012

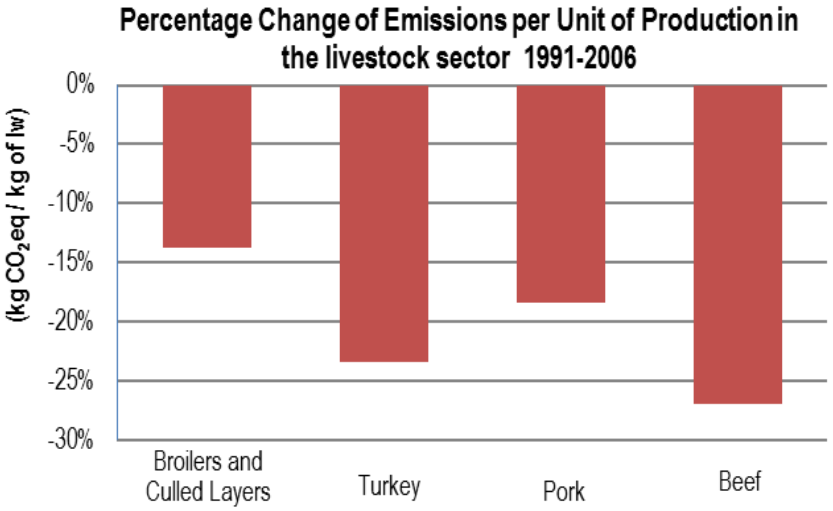
- While emissions from production remain relatively constant, important changes have occurred during the past decades in land management practices that have reduced emissions and enhanced soil carbon sequestration.

… but further emissions reductions from this source are expected to be limited

Improvements in productivity have contributed to reductions in emission intensity



Source: AAFC calculation using data from Statistics Canada and Environment Canada's National Inventory Report.



Source: AAFC: Vergé, X.P.C., Dyer, J.A., Desjardins, R.L., et Worth, D.E. (2009)

- Farmers have been adopting, for economic reasons, technologies that enhance their productivity and financial position, which allowed for reductions of GHG emissions per unit of goods.

Existing climate change policies at the provincial level

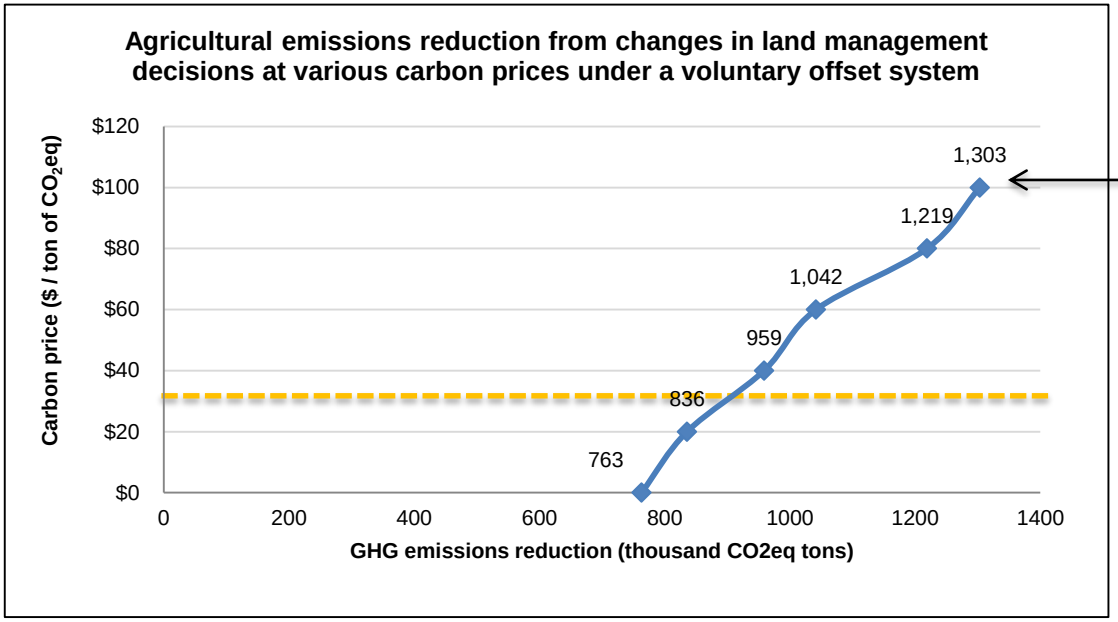
- Agriculture and the Environment are both shared jurisdictions in Canada, and provinces and territories have been taking actions to address climate change according to their unique circumstances.

British Columbia: Revenue-neutral carbon tax ($30/tonne CO2e) paid by all those who consume fossil fuels in the province

Ontario and Québec: Cap-and-Trade; The **Ontario** Feed-in-Tariff (FIT) program

Alberta: Cap-and-Trade among industrial emitters that produce more than 100,000 tons of GHGs annually.
Alberta carbon pricing in development

Provincial carbon offset credits unlikely to incent further changes in land management practices

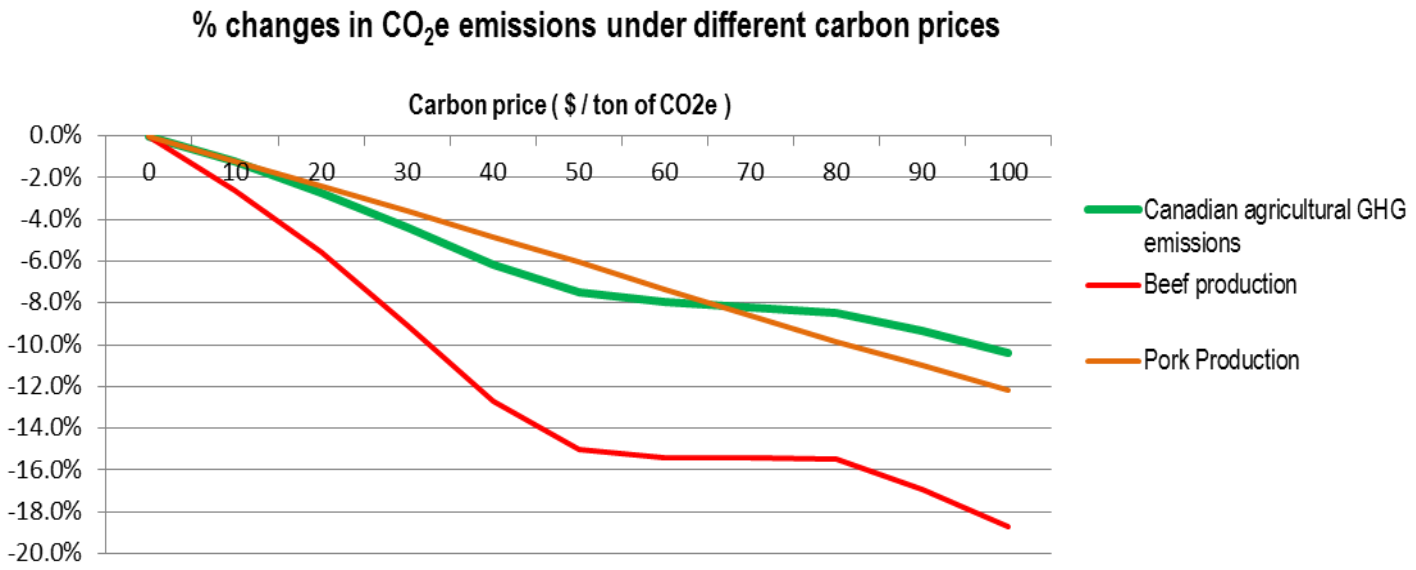


Source: AAFC analysis from modelling simulation

- Mitigation options analyzed: adoption of soil management techniques (increased no-till and reduced summerfallow) and the use of precision fertilizer techniques, under a voluntary offset system.
  - Even at a price of $100/ CO2e tonne the potential of these activities is very limited, i.e. a 1.3 Mt reduction or less than 2% of agricultural emissions.
  - Fertilizer reduction accounts for the bulk of these reductions.

A direct carbon price on agricultural production is not desirable…

- An emission-intensive and trade exposed sector



* AAFC modelling results.

- The emissions decrease is almost entirely driven by a reduction in red meat production in Canada.
- Without policy coherence among major trading partners, emission intensive activities could relocate to the least cost jurisdiction, reducing the effectiveness of any domestic policy by increasing emissions elsewhere.

…without measures to ensure competitiveness.

Revenue-neutrality can be designed to avoid production loses and still create incentives to change behavior

- Under a cap-and-trade program: output-based allocation.
- Performance standards with a carbon price: each sector must meet an average emissions requirement or pay for the extra emissions or be rewarded for lower emissions.

The core idea is to push capital towards more efficient production, not to compensate those that are less efficient.

- By design, the policy rewards farms that are more efficient when it comes to GHG emissions per unit of production and penalizes those that are less efficient.

- **Key challenges when implementing a revenue-neutral carbon pricing scheme in agriculture**
  - Robust measurement of emissions at the field level
  - The potential high transaction costs
  - Competitiveness impacts
    - Substitution effects within the sub-sector - farms within the same sub-sector will be in competition for reducing their respective emissions.
  - Even if there are improvements in emissions intensity it does not offer a guarantee that net emissions would decrease in the future.

Pan-Canadian framework for combatting climate change

- A joint federal, provincial, and territorial (FPT) initiative to address climate change while supporting a transition to a sustainable, low-carbon economy
- Four FPT working groups mandated to identify specific actions to grow Canada's economy while reducing greenhouse gas emissions and adapting to climate change
- Agriculture was one of the sectors examined by the *Working Group on Specific Mitigation Opportunities.*
  - Practical, implementable policy options identified for each key sector to achieve ambitious GHG emissions reductions by 2030
  - Policy options for agriculture are limited to incentives to encourage further adoption of GHG reducing practices.
  - Carbon pricing is another type of mitigation policy measure, which has been addressed by the *Working Group on Carbon Pricing Mechanisms*. Agriculture is not directed implicated in the carbon pricing proposals.

Conclusions

- Growing global population with higher income levels will lead to increased demand for agricultural commodities.
- Canada's agriculture sector has seen its emissions and emission intensity decline in the last two decades, while producing significantly more food. Changes in management practices and productivity enhancements have been the drivers of this.
- Primary agriculture has little to offer as a provider of carbon credits under current policy and technology constraints despite expectations.
- Where agriculture is a main component of a province's economy, provinces' contributions to a pan-Canadian framework for GHG reduction may require reduction commitments from agriculture at the provincial level.
- Research, innovation, technology transfer and on-farm support have resulted in some GHG successes and continue to be the best policy mechanisms for advancing agriculture GHG reductions.