

Food Systems, Climate Change and
Sustainable Diets
Nutrition Exchange, May 23, 2018

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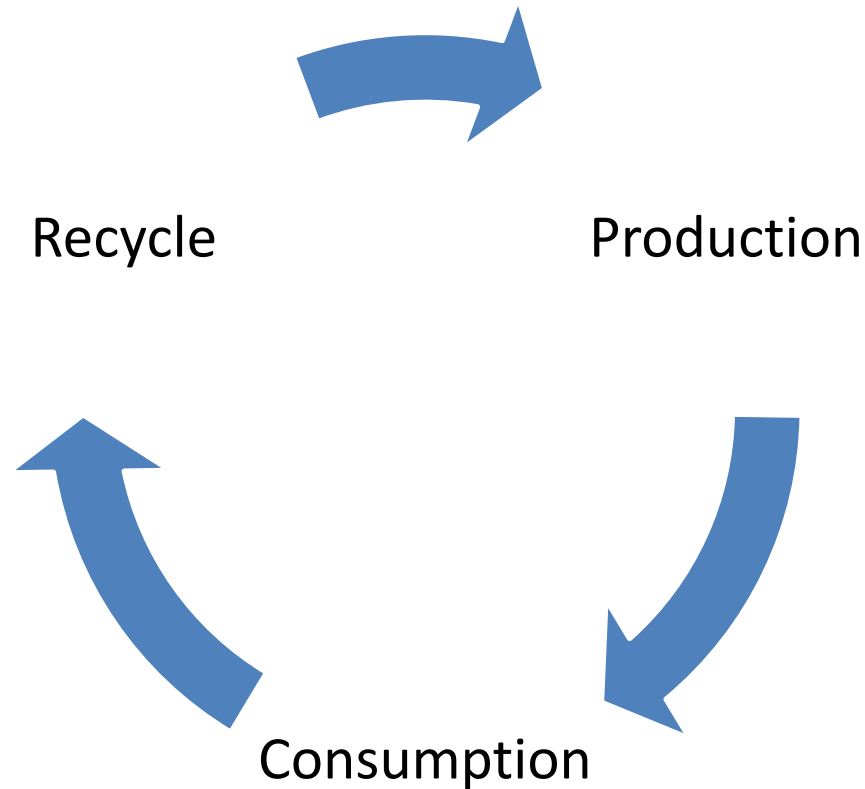
York University

What can eaters do?

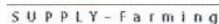
Dramatic changes are required to meet targets

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Food system for most of human history



Food System Map
Version 1.2 March, 2009



Food - DEMAND

The rules of the dominant food system

- High productivity, high inputs
- High volume, scale efficiency, low cost
- Shareholder value, dominate markets
- Centralization, distancing, export
- Value-added to extract consumer dollar, homogenize taste
- Externalize costs – health and environment
- Niches: quality, health, organic

Myth: Consumers are sovereign

Reality:


Advertising creates demand

Many products are copy cats;
system attempts to
homogenize taste

Consumer information is
incomplete

Prices don't reflect value

Food deserts restrict ability to
acquire food



What do those food labels really mean?
by Jodi Hemler

URBAN FARM
ONLINE.COM
SUSTAINABLE CITY LIVING

Animal Welfare Approved: Products are from farms and ranches where animals were raised humanely from birth to slaughter. The certification requires animals to be raised outdoors on a pasture or range and with rigorous standards of care set by Animal Welfare Approved.

Antibiotic Free: Banned by the USDA on food labels. Producers of meat and poultry products are permitted to use the labels "no antibiotics administered" or "raised without antibiotics" to imply the animals did not receive antibiotics during their lifetimes. No independent system verifies claims.

Bird Friendly: Coffee must be certified organic and grown on farms with substantial shade cover that provides habitat for migratory and resident birds; administered by the Smithsonian Migratory Bird Center.



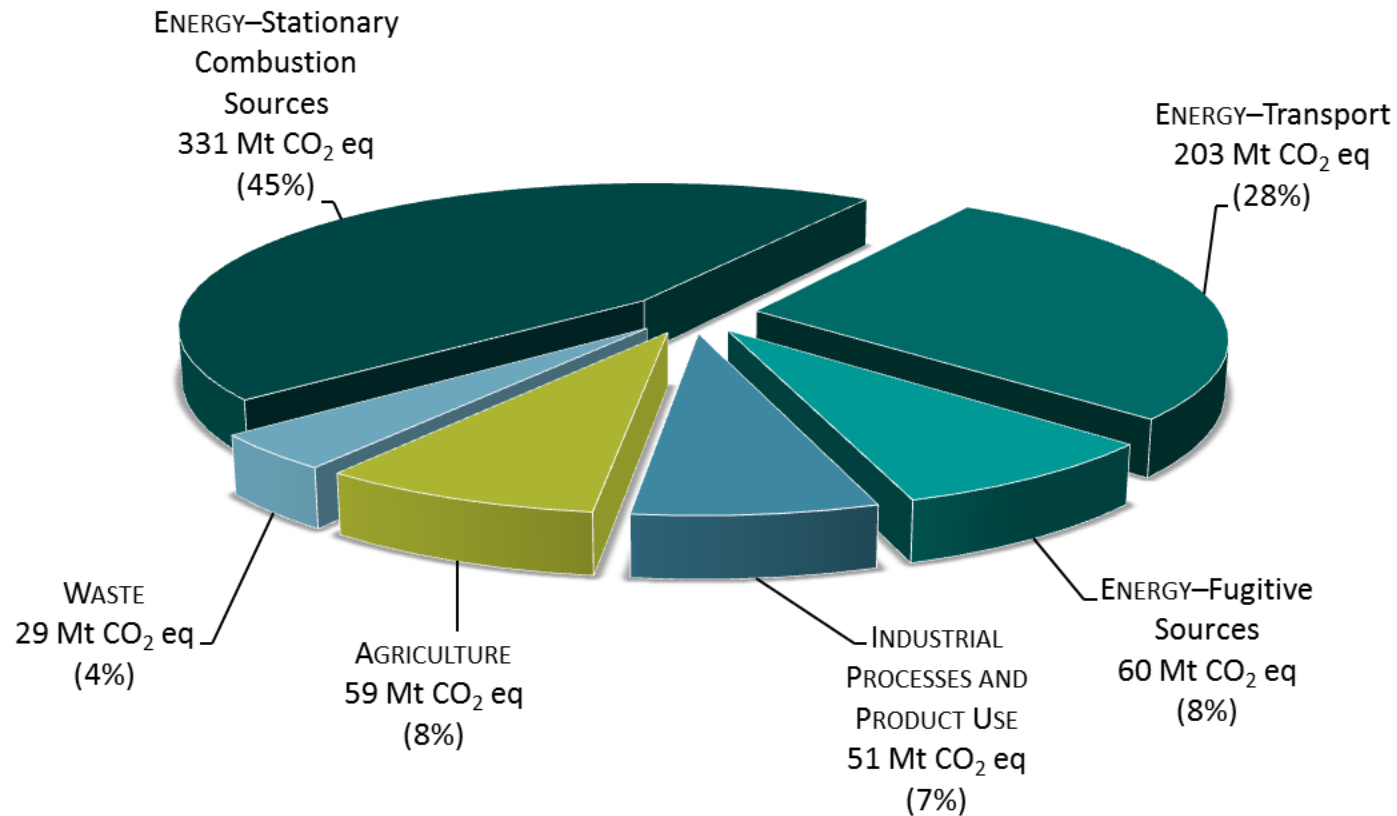
Purpose and two themes

- Purpose: To better understand strategic opportunities to use the food system to reduce climate change impacts

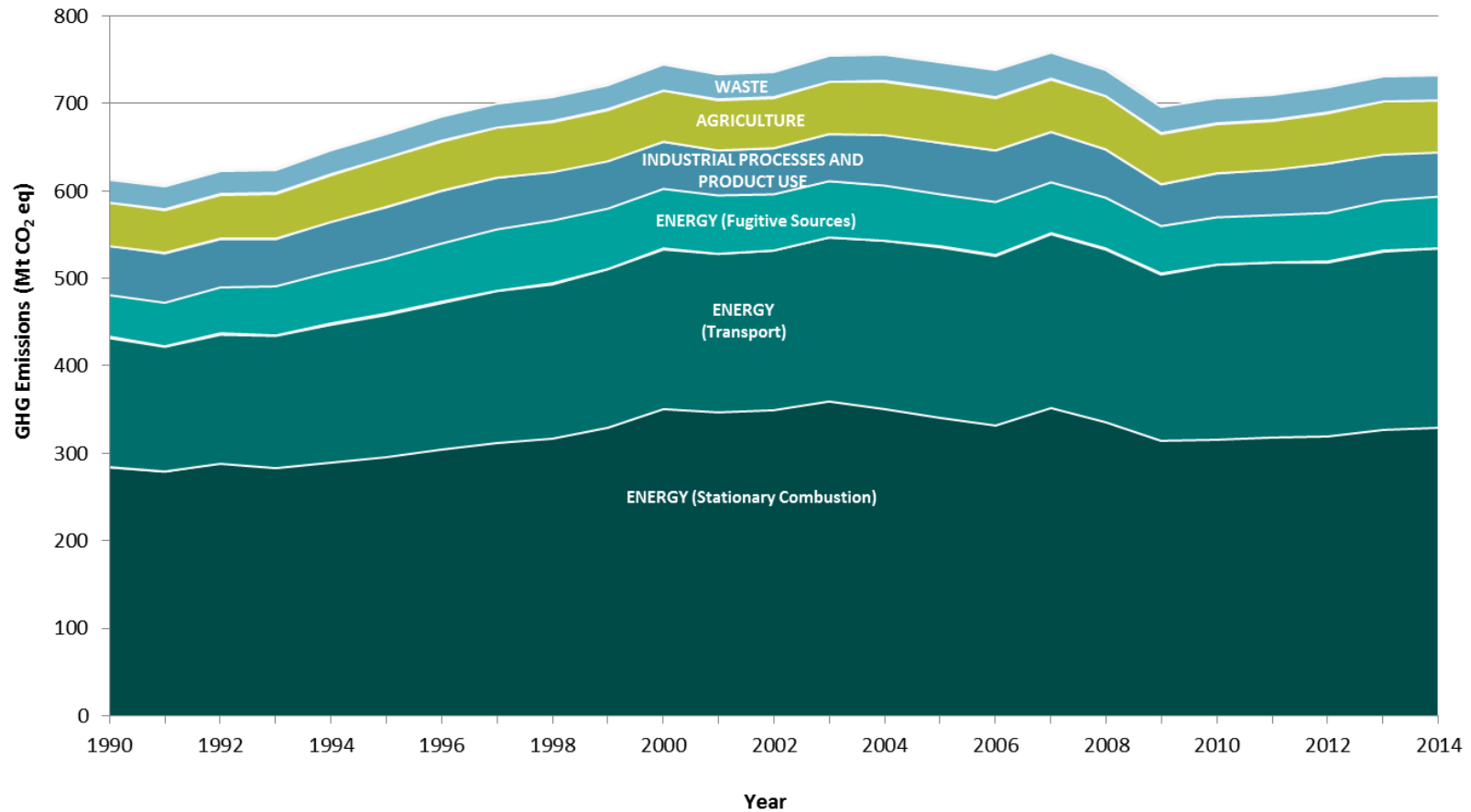
Themes

- Food system is a bigger contributor to emissions than most decision makers recognize [up to 30% of total (EC 2006; Vermeulen et al. 2012)]
- Food system emissions not always occurring where analysts think and that means interventions may be misdirected.

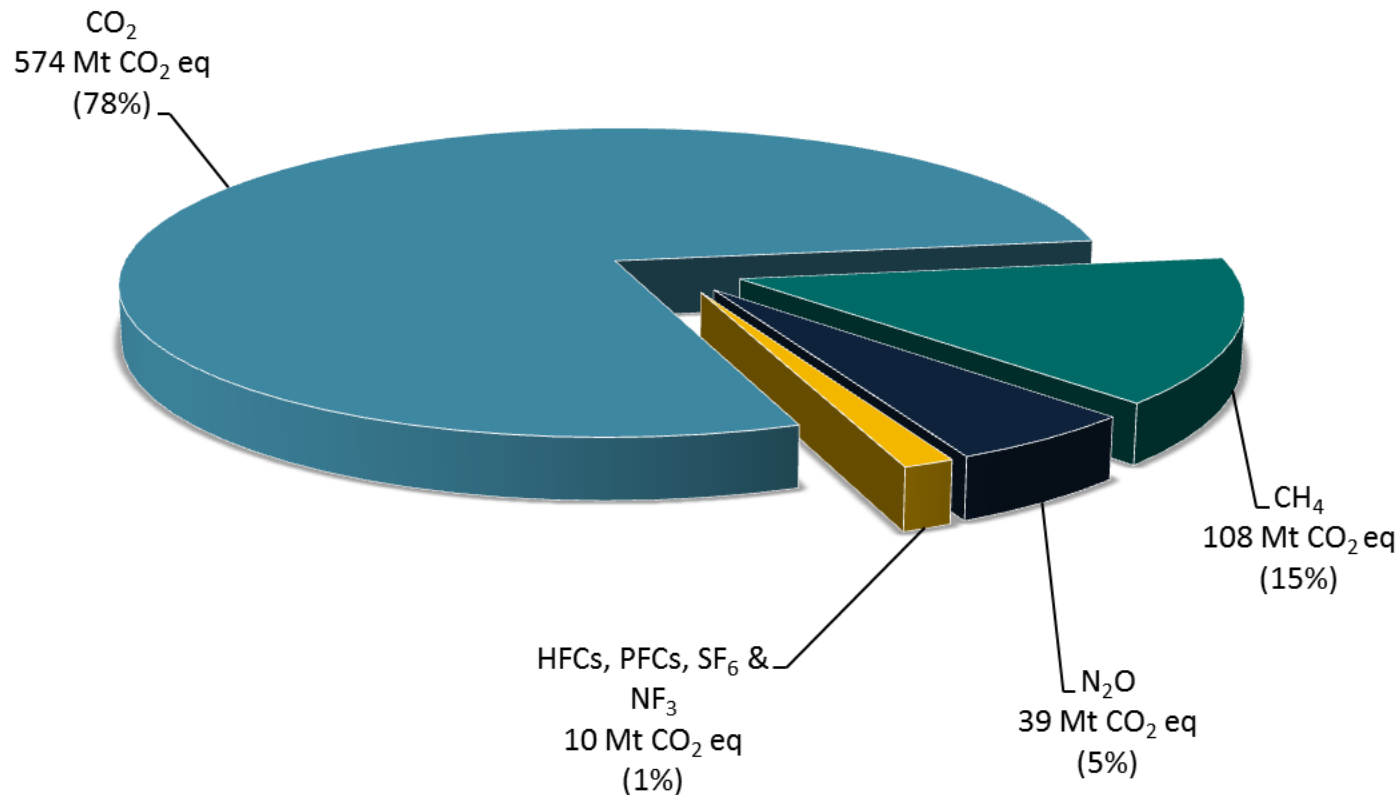
Trends in Canadian GHG emissions (National Inventory Report 1990-2014, exec summ)



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Canada's emission breakdown by GHG (National Inventory Report 1990-2014 (exec summ))



NAHARP. 2005, 2010. Environmental Sustainability of Canadian Agriculture Reports 2 and 3. AAFC, Ottawa.

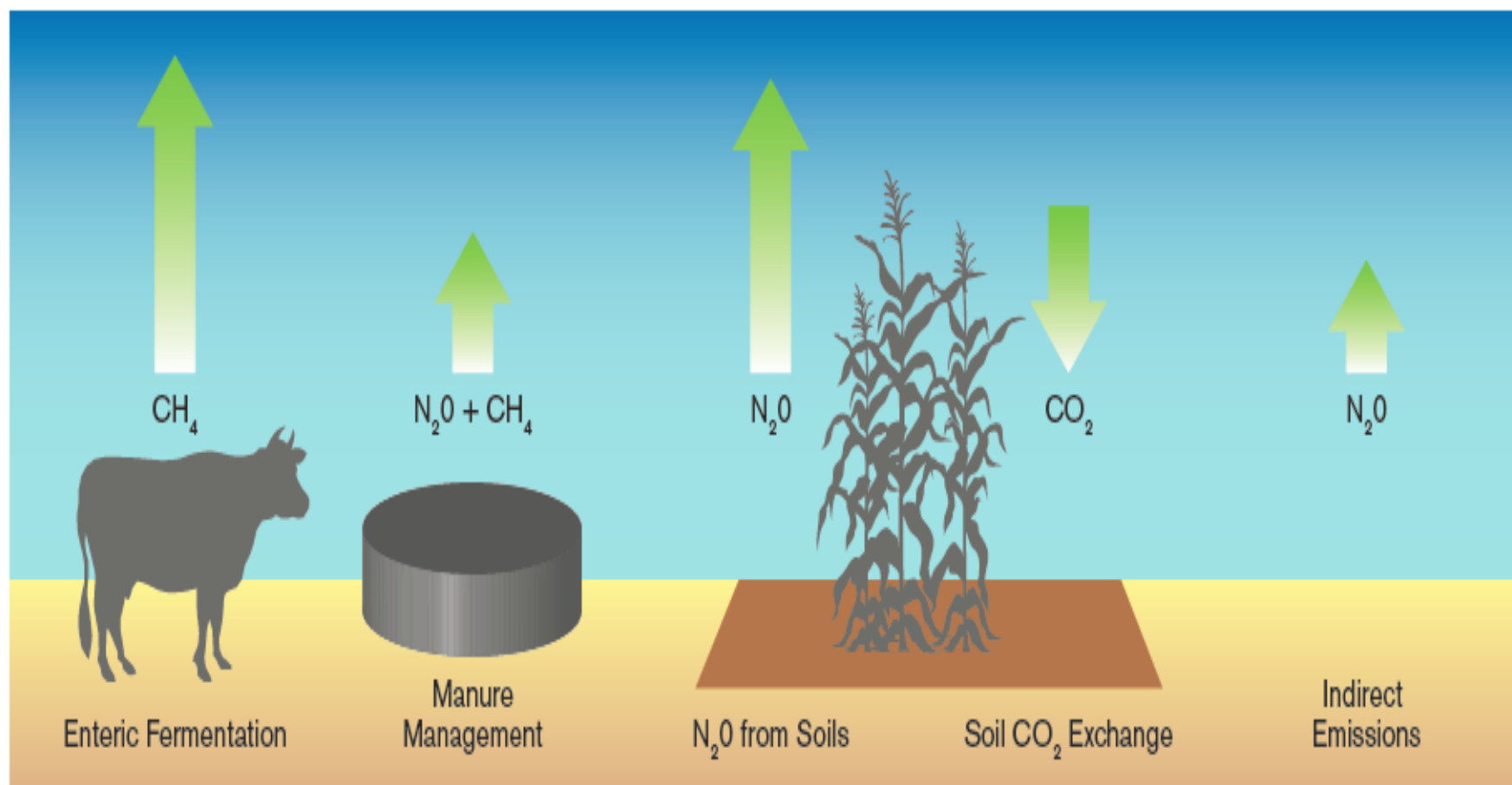
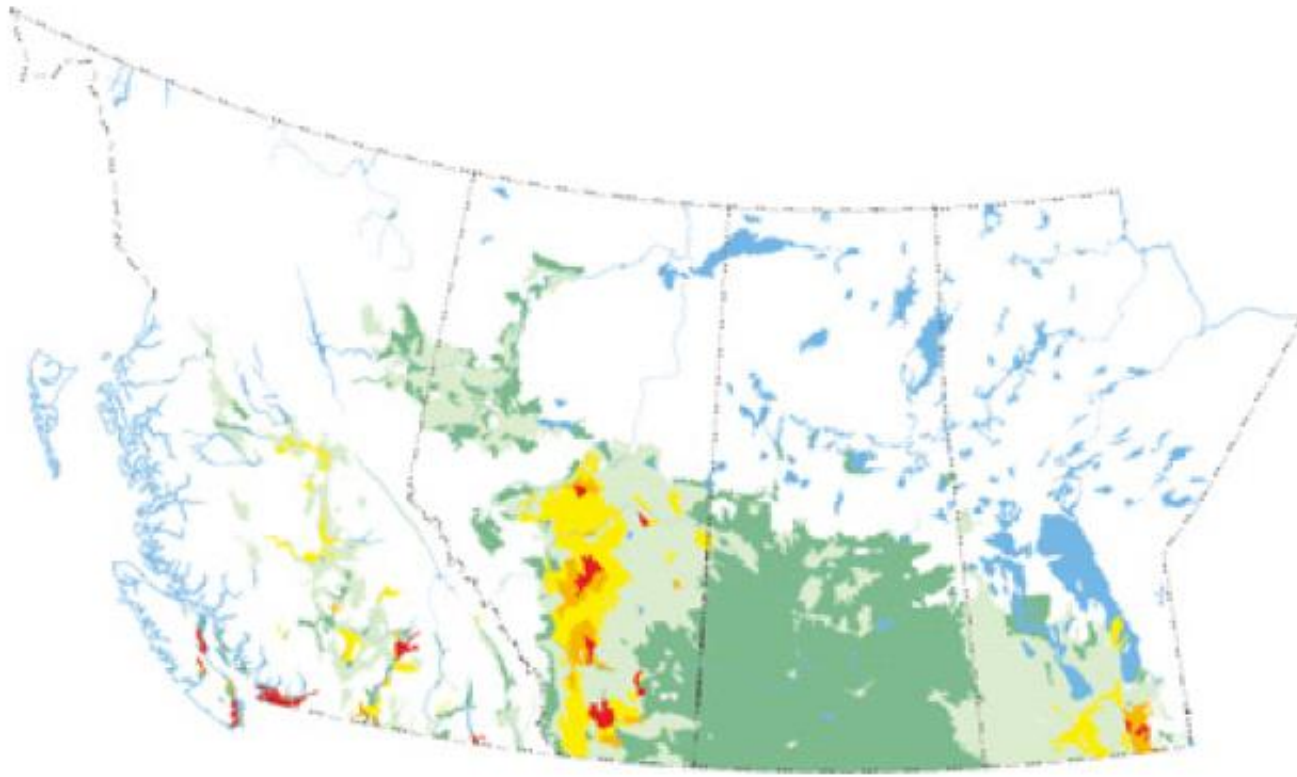
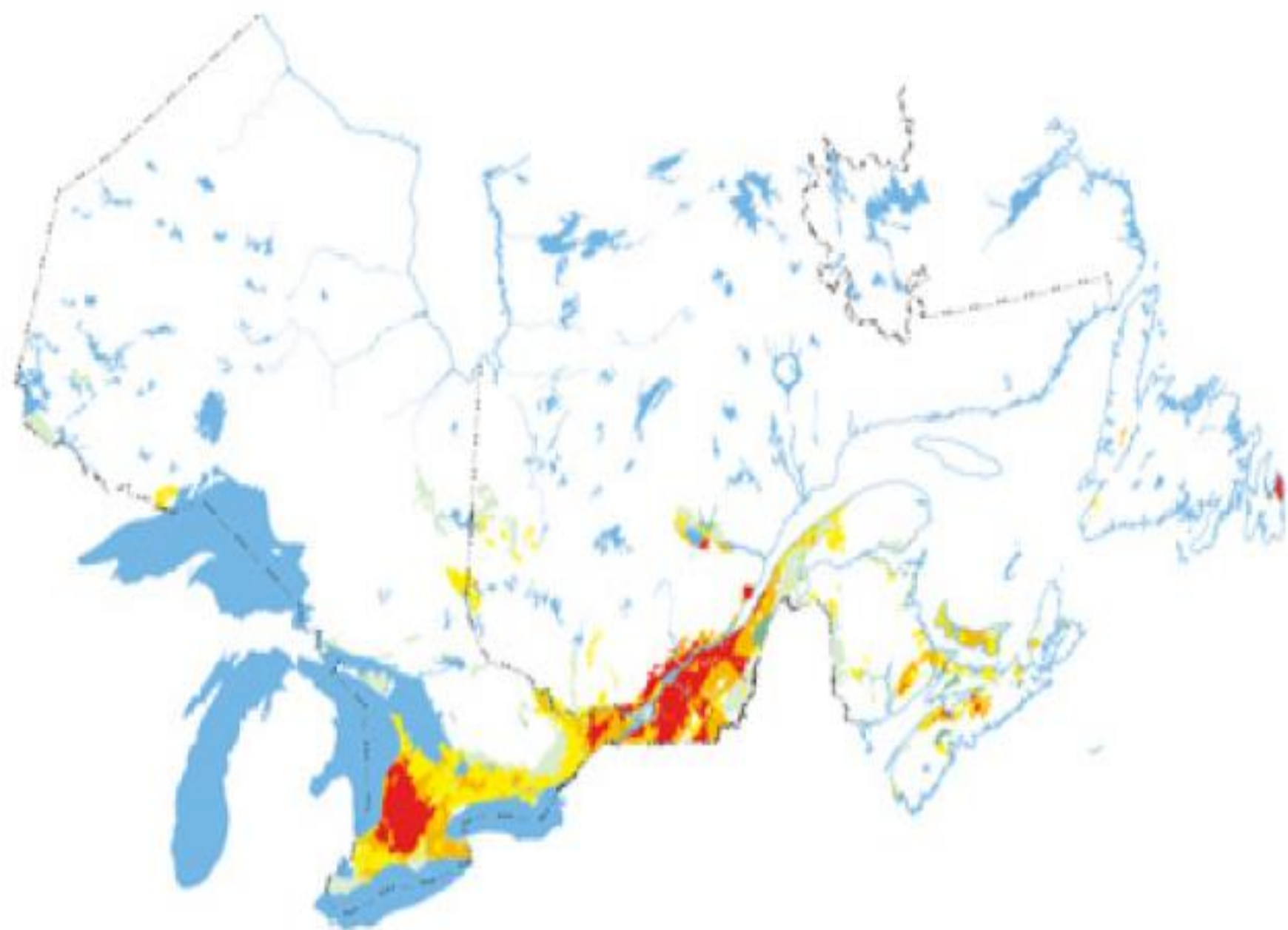


FIGURE 16-1 Net sources and sinks of GHGs from Canadian agriculture exclusive of emissions from fossil fuels and energy use. The size of the arrows indicates the relative magnitude of the source or sink.

GHG emission hotspots (NAHARP, 2005)

Figure 21-2: Agriculture Greenhouse Gas Budget under 2001 management practices





Breaking out agriculture's contributions (National Inventory Report 1990-2014, exec summ)

- 10 Mt increase since 1990, 21%
- 70% of total national nitrous oxide emissions
- 27% of total national methane emissions
- Soil a net carbon sink? Contested
- Big drivers of emissions: N fertilizer manufacturing and use, and livestock populations and densities and livestock feed

Food system contributions

Category	Food system activities	Notes
Energy - stationary	Heating and cooling motors	Inefficient motors and spaces; refrigerant loss
Energy - transport	Farm operations Food transport (truck, ship, rail, air) Inputs (ship, rail, truck) Waste hauling	Domestic (2007): 65 billion t-km, 22% truck, 70% rail, 8% ship; Imports: 61 billion t-km, 68% ship, 28% truck, 4% rail
Energy - fugitive	Oil and natural gas extraction and transport	N fertilizer; cookers in manufacturing and homes; Agr 1% of total?
Waste	Food waste (all phases) Residential yard waste (potential fertilizer)	1/3 solid waste stream is compostables; higher emissions than other waste
Industrial	Food manufacturing Input manufacturing Equipment manufacturing	CO ₂ from combustion; CH ₄ &N ₂ O from wastewater

Who's responsible for Canada's \$31B-worth of food waste?



Adapted from "Canada's Annual Food Waste – \$27 Billion Revisited" by Value Chain Management International Inc. vcm-international.com

Estimates of potential short-medium term GHG savings in the Canadian food system (MacRae et al., 2013)

Component	% Food System emissions	Component Savings?	Food System savings?	Key challenge
Production	30-40	5-20	2-8	Land use, N fert.
Cooling	8-16	20-50	2-8	Motors
Processing and packaging	10-20	20-50	2-10	Process redesign
Transport	10-20	20-50	2-10	Getting out of trucks
Consumption	20-30	30-60	6-18	Animal products

The food system as solution

- Dramatically reduce reliance on N fertilizer which means significant changes in crop rotations and manure management; creates opportunities for soil carbon sequestration as well. Minimal opportunities for liquid biofuel feedstocks.
- Dramatic reductions in animal populations, particularly large animals that are metabolically inefficient. Reductions in animal feed lead also to landscape level change
- Expand ecological horticultural production in short supply chains (inc. ecological greenhouse designs) with minimal truck traffic and revised grading standards and vendor protocols

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More details on policy / program drivers for change

- Foodpolicyforcanada.info.yorku.ca
- See in particular Goal 2, Demand – supply Coordination

Citations

- European Commission. 2006. *Environmental impact of products: Analysis of the life cycle environmental impacts related to the final consumption of the EU-25*. Technical Report EUR 22284 EN. Spain: European Commission, Joint Research Centre, Institute of Prospective Technological Studies
- NAHARP. 2005, 2010. Environmental Sustainability of Canadian Agriculture. Reports 2 and 3. AAFC, Ottawa.
- Kissinger, M. 2012. International trade related food miles—The case of Canada. *Food Policy*, 37, 171–178.
- MacRae, R. et al., 2013. The food system and climate change: an exploration of emerging strategies to reduce GHG emissions in Canada. *Agroecology and Sustainable Food Systems* 37(8):933-963
- Tetra Tech 2014. 2013 Waste composition monitoring program. Metro Van
- Trends in Canadian GHG emissions by IPCC category (National Inventory Report 1990-2014, exec summ)
- Vermeulen, S.J. et al. 2012. Climate Change and Food Systems. *Annu. Rev. Environ. Resour.* 2012. 37:195–222.