group of companies

profitable farms
healthy food
improved lives

The Other Side of the Sustainability Story

The Opportunities for Sustainable Livestock Production in Canada


GVF
group of companies
Canadian Agriculture.
A Force For Food.
A Force for Good.

GVF
group of companies

Growing Tension

Feed the World?

OR

“Save the Planet?”

A New Era

Globally, we are moving from an era of the problem of food abundance to the problem of food scarcity.

World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100

“In 2020, between 720 and 811 million people faced hunger”

The State of Food Security and Nutrition in the World 2021

The world is at a critical juncture

The number of people in the world affected by hunger increased in 2020 under the shadow of the COVID-19 pandemic. After remaining virtually unchanged from 2014 to 2019, **the prevalence of undernourishment (PoU) climbed to around 9.9% in 2020,** from 8.4% a year earlier.

In terms of population, taking into consideration the additional statistical uncertainty, it is estimated that between 720 and 811 million people in the world faced hunger in 2020. Considering the middle of the projected range (768 million), 118 million more people were facing hunger in 2020 than in 2019 – or as many as 161 million, considering the upper bound of the range.

Inadequate protein intake is the cause of nutritional inadequacy

"The Food and Agriculture Organization has recently estimated that ~850 million people are chronically hungry, and even more suffer from nutritional inadequacy. **About 1 billion face an inadequate protein intake**, causing a variety of nutritional deficiencies, impaired growth, poor health, etc. Essential amino acids are key parameters in food quality assessment.

Source: Tessari et al. 2016. "Essential amino acids: master regulators of nutrition and environmental footprint?" Scientific Reports 6:260-274

https://www.nature.com/articles/srep26074

Global Food Security
Volume 29, June 2021, 100548

Population protein intakes and food sustainability indices: The metrics matter

Paul J. Moughan

Show more

+ Add to Mendeley Share Cite

https://doi.org/10.1016/j.gfs.2021.100548

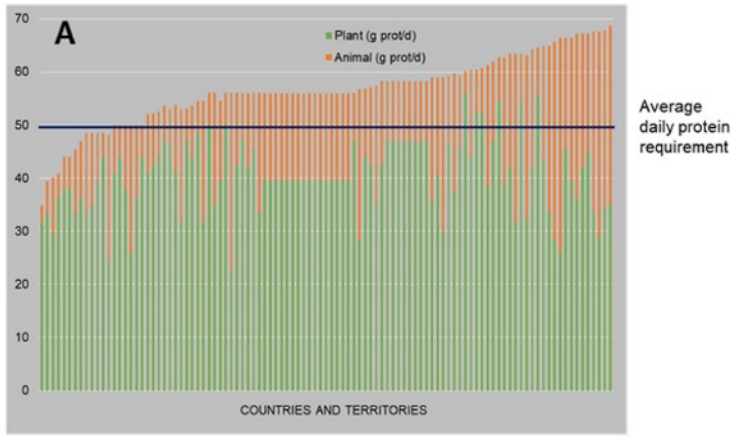
Get rights and content

Global Food Security vs. Digestible Protein Security

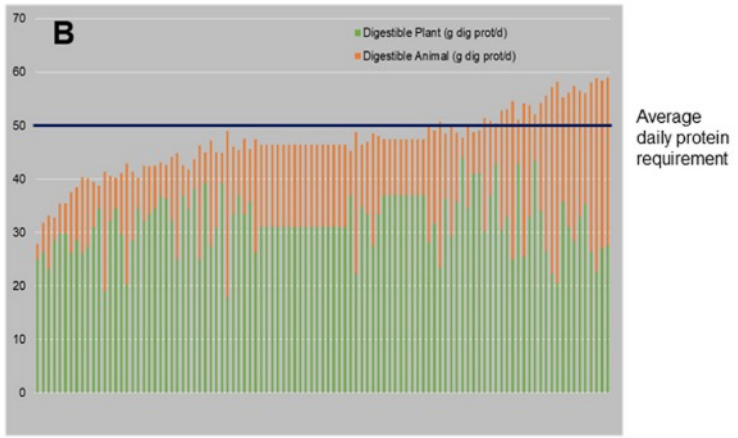
Metrics Matter

(Moughan, 2021)

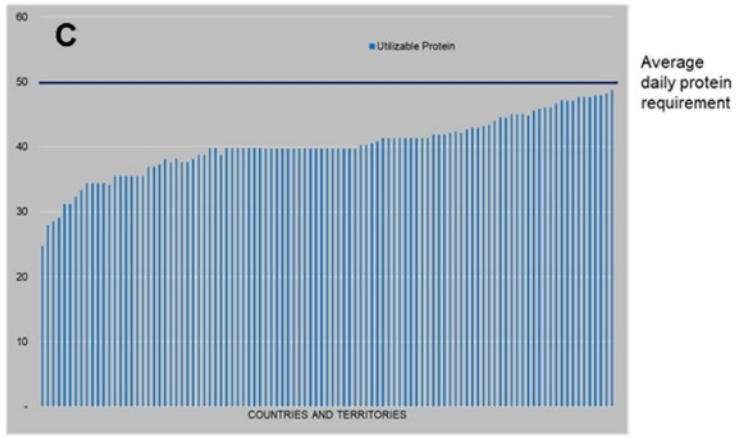
- Corrected for protein quality, protein intakes may be found to be limiting
  - Protein digestibility
  - Amino acid profile
- 103 countries not meeting DIAAS requirement
- These metrics need to be considered when discussing future food systems & protein security



Original data set



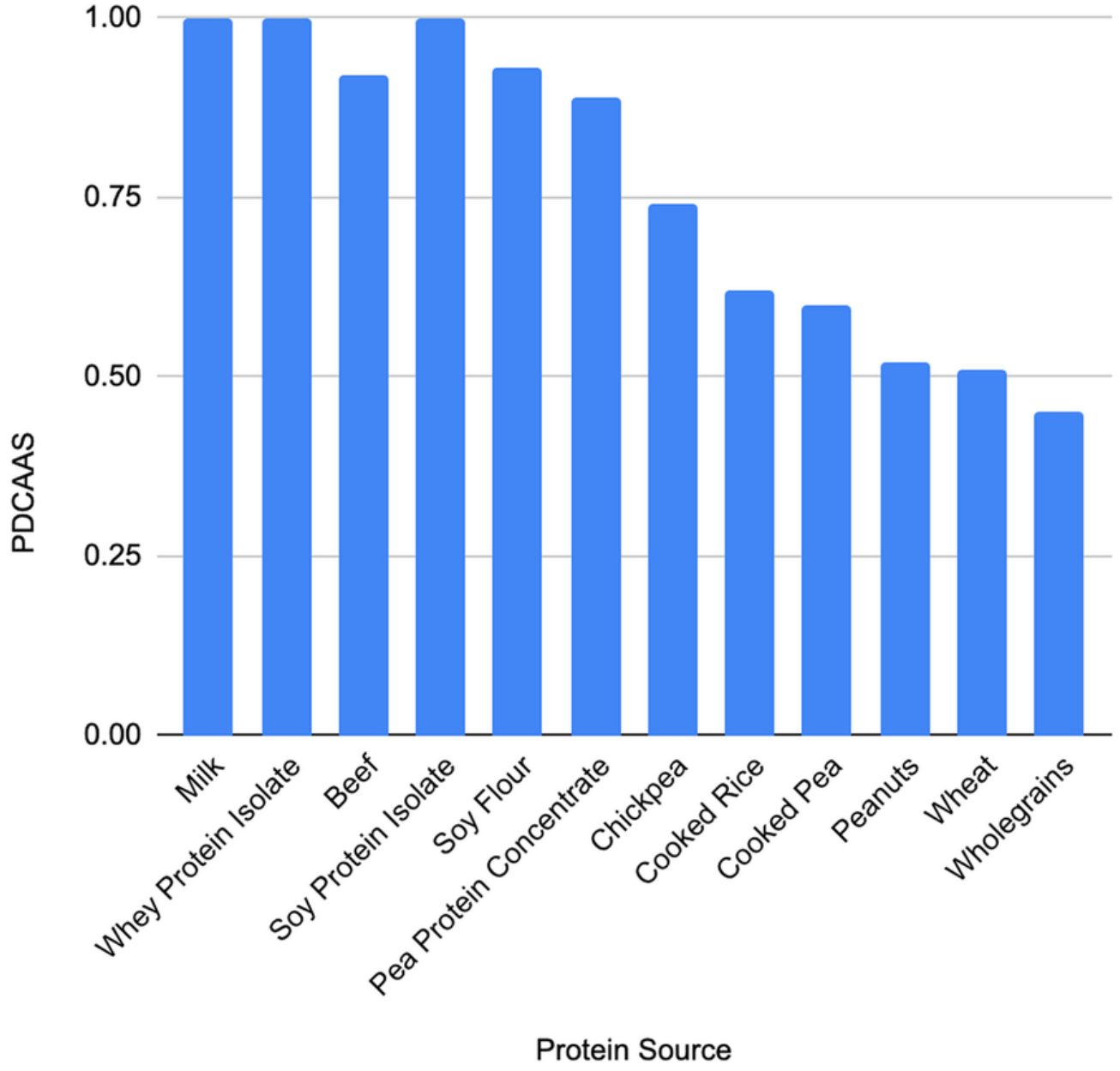
Corrected for digestibility



Corrected for amino acid profile

Alltech®

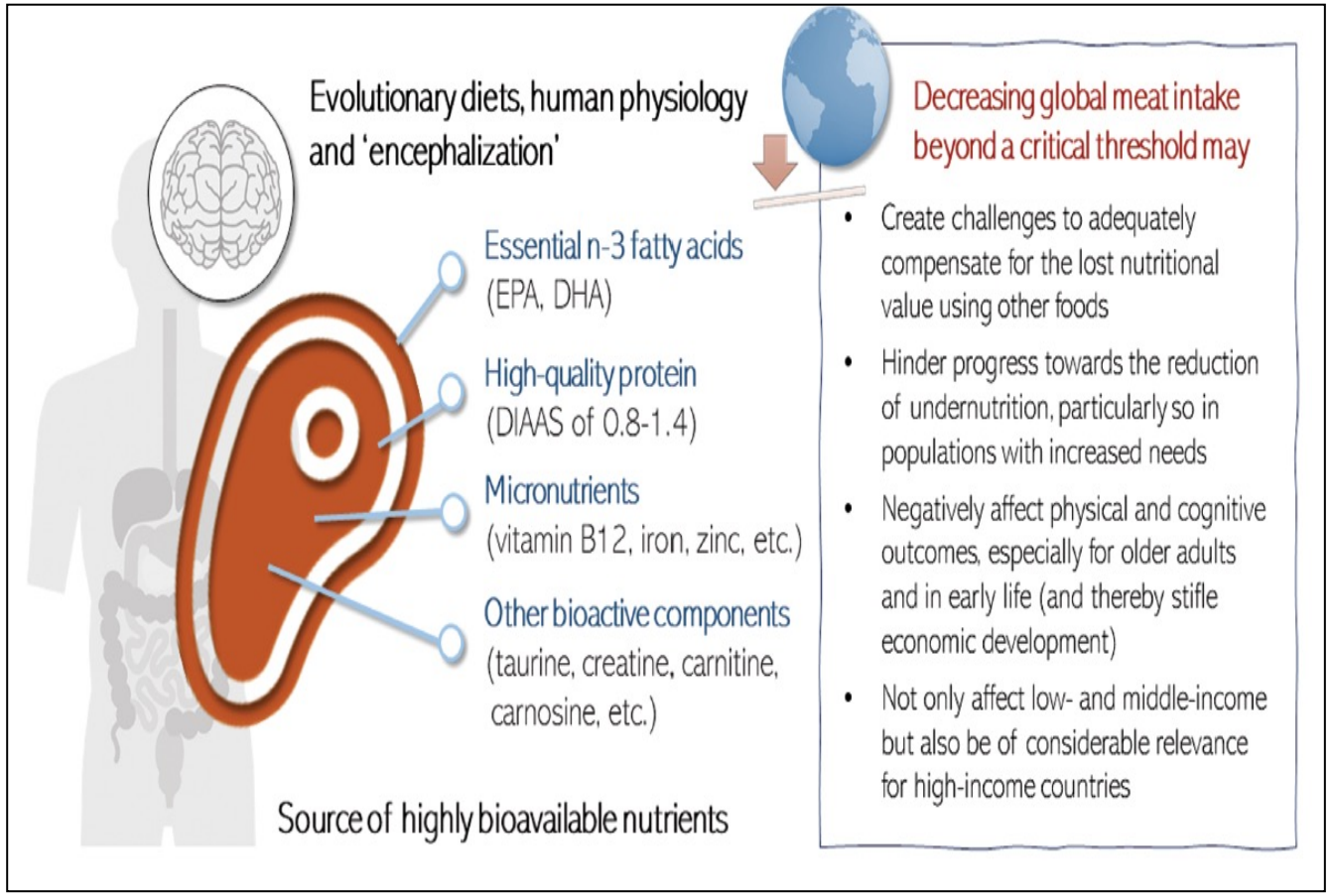
What Can We Actually Digest?



Animal proteins and other essential micro - nutrients are critical for human health

The FAO (2023) reported that:

"Terrestrial animal source food (TASF), provide high quality proteins, important fatty acics, and various vitamins and minerals, including iron, zinc, selenium, Vitamin B12, choline, and calcium among others."



Source: FAO, "Contribution of terrestrial animal source food to healthy diets for improved nutrition and health outcomes", 2023; Leroy et. al. Animal Frontiers, 2023.

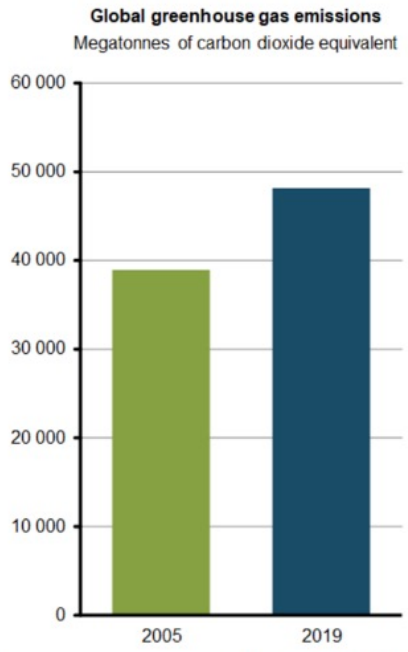
Essential amino acids are key parameters in food quality assessment. **Beef and milk production require less land than beans or peas when compared on an essential amino acid basis." (Tessari, 2016).**

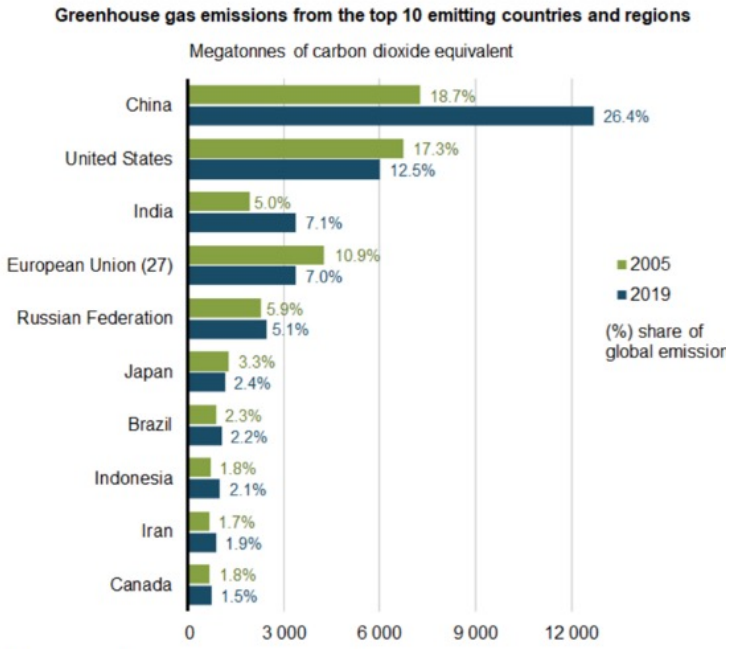
Livestock are key drivers for sustainable development in agriculture. They contribute to food security, nutrition, poverty alleviation, and economic growth. Through the adoption of best practices, the sector can reduce its environmental impacts and become more efficient in the use of resources

Avoiding meat and dairy is ‘single biggest way’ to reduce your impact on Earth

Biggest analysis to date reveals huge footprint of livestock - it provides just 18% of calories but takes up 83% of farmland

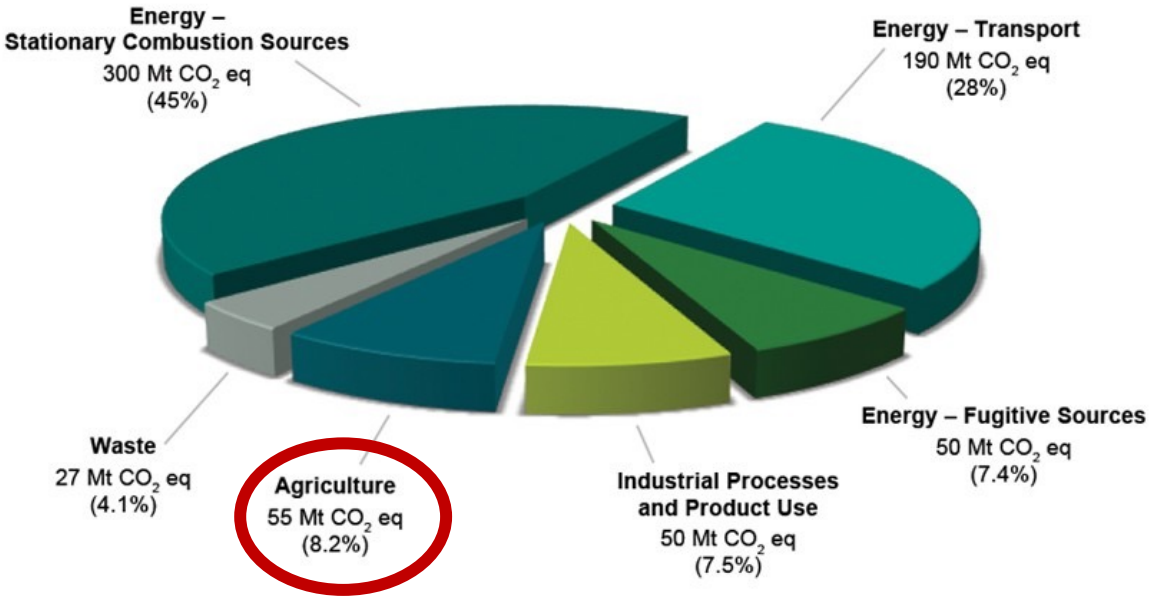
A. GLOBAL AND CANADIAN GHG EMISSIONS





Source: Government of Canada. 2022. "Global greenhouse gas emissions."

Canada's Breakdown of GHG Emissions by Economic Sector (2020)



- A legally binding agreement signed by 196 Parties – 195 States plus the EU (Nov 2016)

- GHG Decline 43% by 2030

Grand Valley
FORTIFIERS
FOR SOUND NUTRITION

Pathway to 2030

Prime Minister Justin Trudeau's Liberal government has pledged to cut climate-warming emissions 40-45 per cent below 2005 levels by 2030.

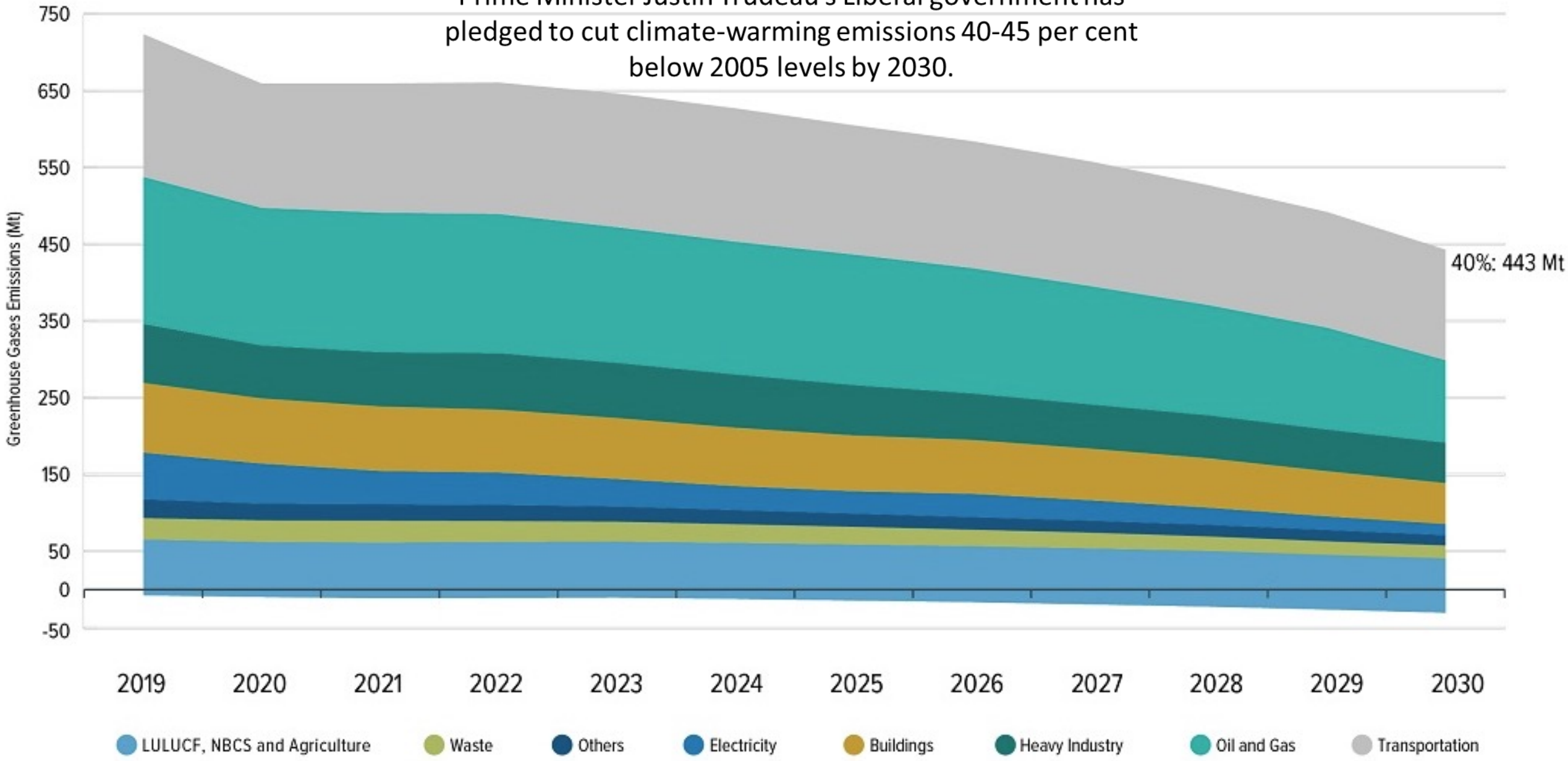
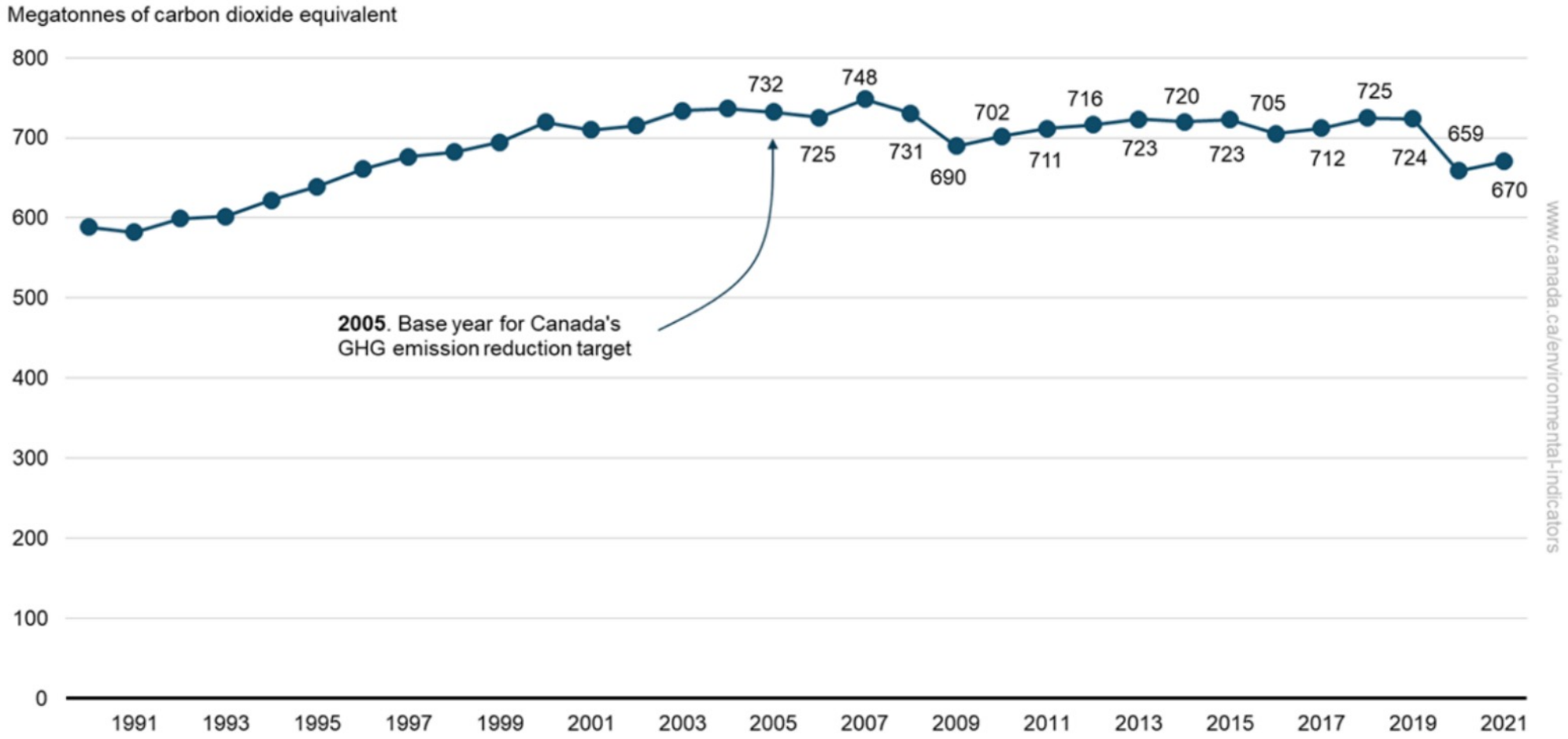


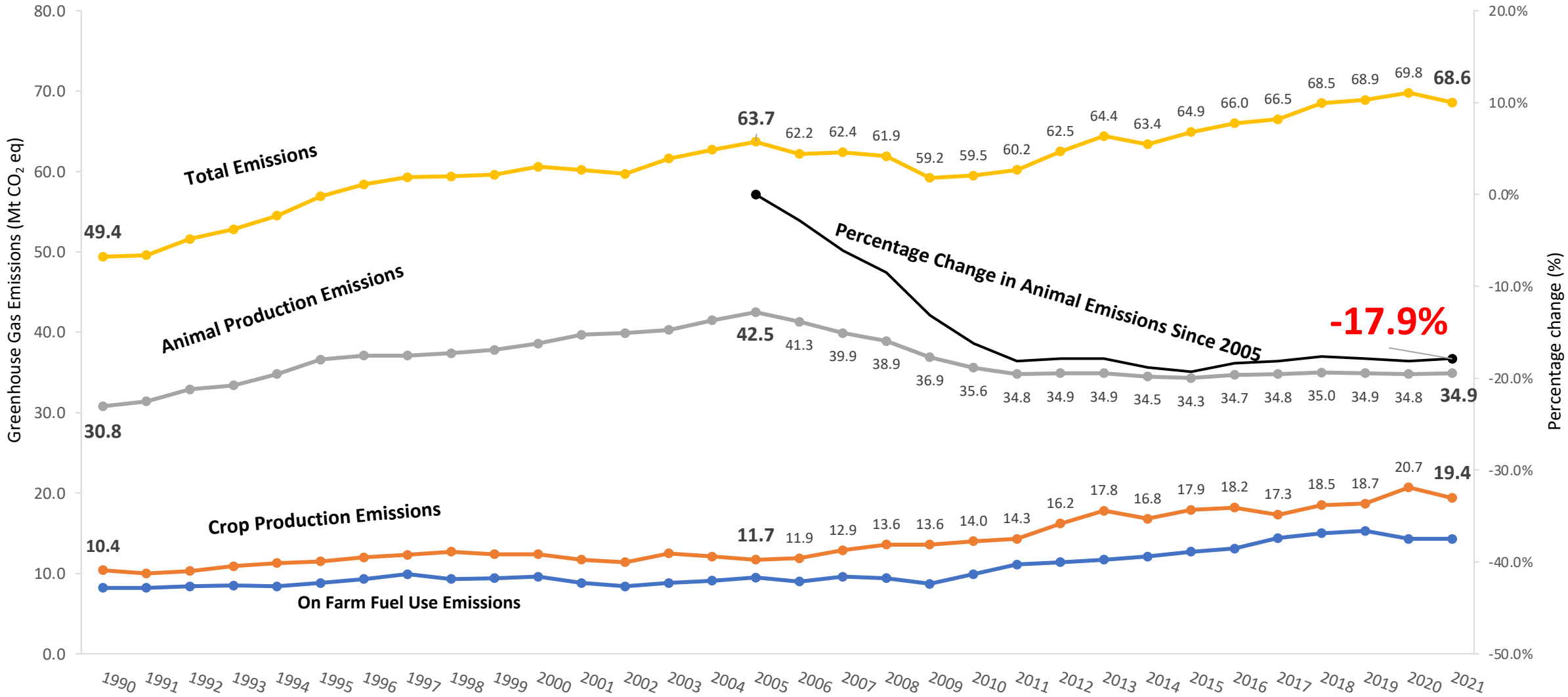
Figure 1. Greenhouse gas emissions, Canada, 1990 to 2021



Data for Figure 1

Note: Data are presented as rounded figures. The national indicator tracks 7 greenhouse gases released by human activity: carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, perfluorocarbons, hydrofluorocarbons and nitrogen trifluoride. Emission levels for some years have been revised in light of improvements to estimation methods and availability of new data. Emissions and removals from the land use, land use change and forestry sector (LULUCF) are excluded from national totals to allow for a focus on greenhouse gas released from human activity only. Consult the interactive figures to explore the national results in a dynamic and customizable format.
Source: Environment and Climate Change Canada (2023) National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada.

Canadian AG Sector Annual Emissions & Percentage Change in Livestock Emissions



Source: Environment & Climate Change Canada (2023) National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada

Meat, Milk & Eggs are key sources of digestible, amino acid rich protein

However, aren’t meat, milk and eggs environmentally intense sources of digestible protein?

Still, Villainizing Headlines Abound

TIME

'Cows Are the New Coal.' How the Cattle Industry Is Ignoring the Bottom Line When It Comes to Methane Emissions

Aryn Baker

December 2, 2021 · 4 min read

TOPSHOT-SWITZERLAND-FARMING-WASTE-ENVIRONMENT

Climate Crusaders and Animal Activists commission studies too.

Likely some attempts to blame shift from the Energy Sector as well.

FINANCIAL POST

FP Comment

Junk Science Week: Net-Zero Edition — Ross McKitrick: Junk science has led to junk policies

The way out of this mess begins by getting back to mainstream economics

Ross McKitrick, Special to Financial Post

Published Jun 24, 2022 • Last updated Jun 24, 2022 • 4 minute read

14 Comments

Mark Carney speaking at the 2020 United Nations Climate Change Conference (COP26) at the Guildhall on Feb. 27, 2020 in London, England. PHOTO BY TOLGA AKMEN/WPA POOL/GETTY IMAGES FILES

Climate Change & Livestock Farming

Let's look past the headlines


it's time to
change
the
narrative

The Dublin Declaration

Purpose of this Declaration (Launched Oct 2022 at the Societal Role of Meat Summit in Dublin, Ireland)

Livestock systems must progress on the basis of the highest scientific standards. **They are too precious to society to become the victim of simplification, reductionism or zealotry.** These systems must continue to be embedded in and have broad approval of society. For that, scientists are asked to provide reliable evidence of their nutrition and health benefits, environmental sustainability, socio-cultural and economic values, as well as for solutions for the many improvements that are needed. **This declaration aims to give voice to the many scientists around the world who research diligently, honestly and successfully in the various disciplines in order to achieve a balanced view of the future of animal agriculture.**

The Dublin Declaration

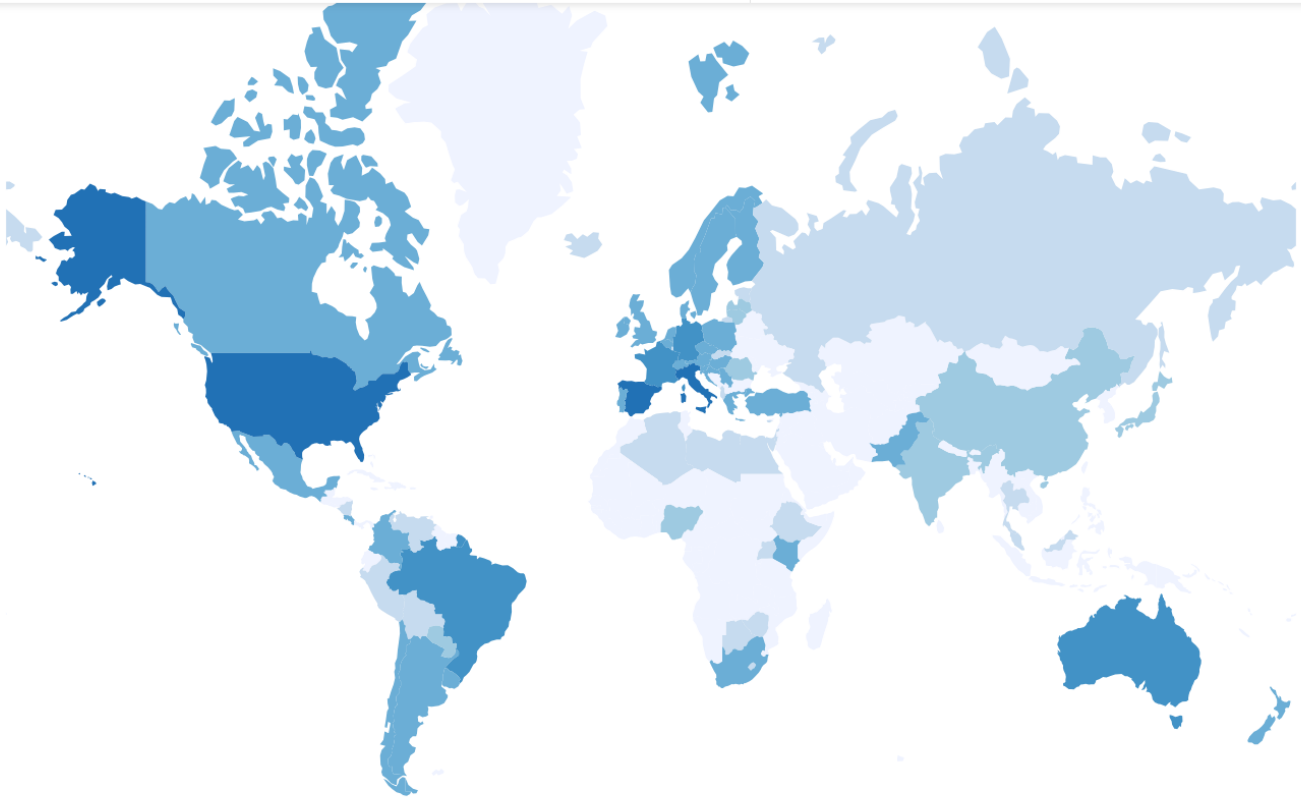
Outlook for Livestock*

United Nations | Food Systems Summit 2021

Human civilization has been built on livestock from initiating the bronze-age more than 5000 years ago towards being the bedrock of food security for modern societies today. Livestock is the millennial-long-proven method to create healthy nutrition and secure livelihoods, a wisdom deeply embedded in cultural values everywhere. Sustainable livestock will also provide solutions for the additional challenge of today, to stay within the safe operating zone of planet Earth's boundaries, the only Earth we have.

For scientific evidence, please refer to presentation recordings from the 19/20 October 2022 International Summit on the Societal Role of Meat. Evidence will also be published in the March 2023 Special Issue of Animal Frontiers.

The Dublin Declaration



1188

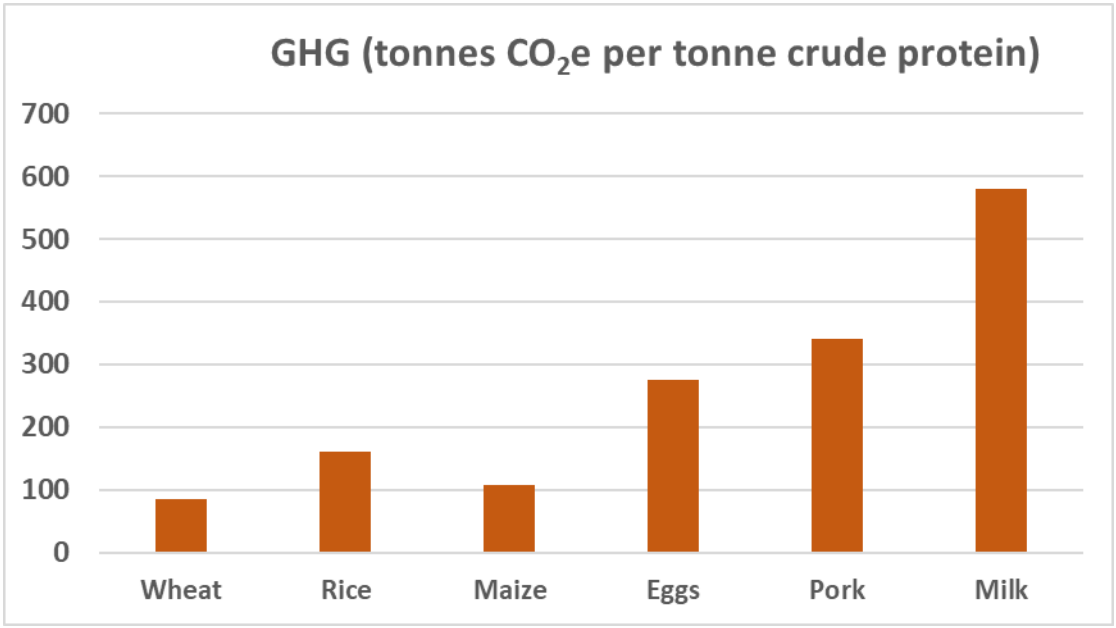
SIGNATURES

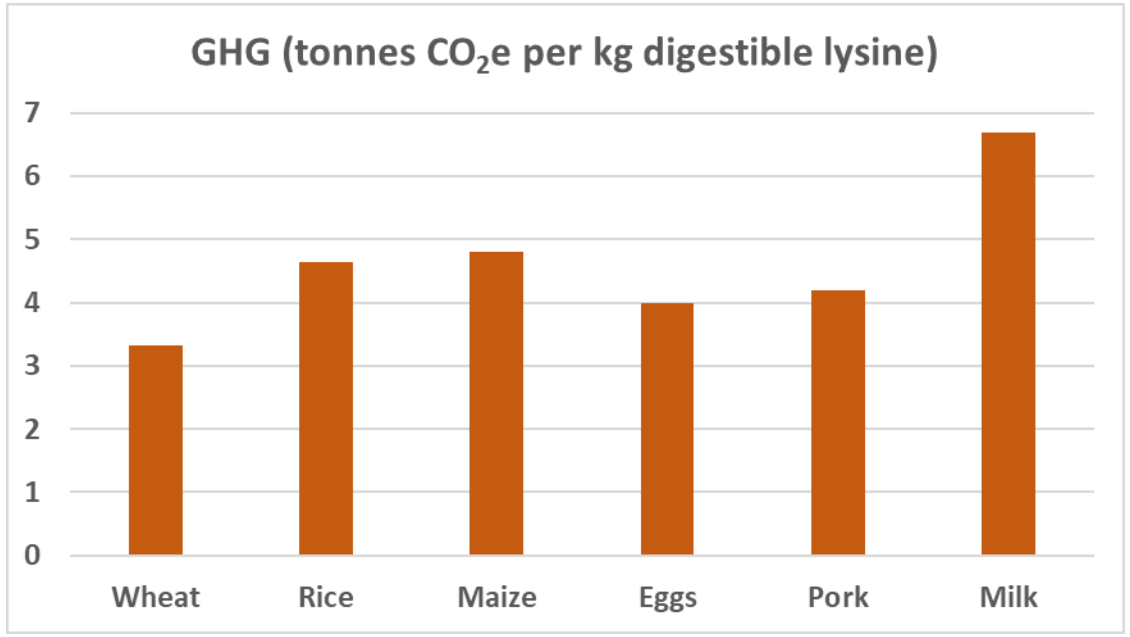
Last updated:
18. December 2023

LATEST SIGNATURES

All signees support the Dublin Declaration in their personal capacity only. They do NOT sign the Declaration on behalf of the organization, nor speak for the organization.

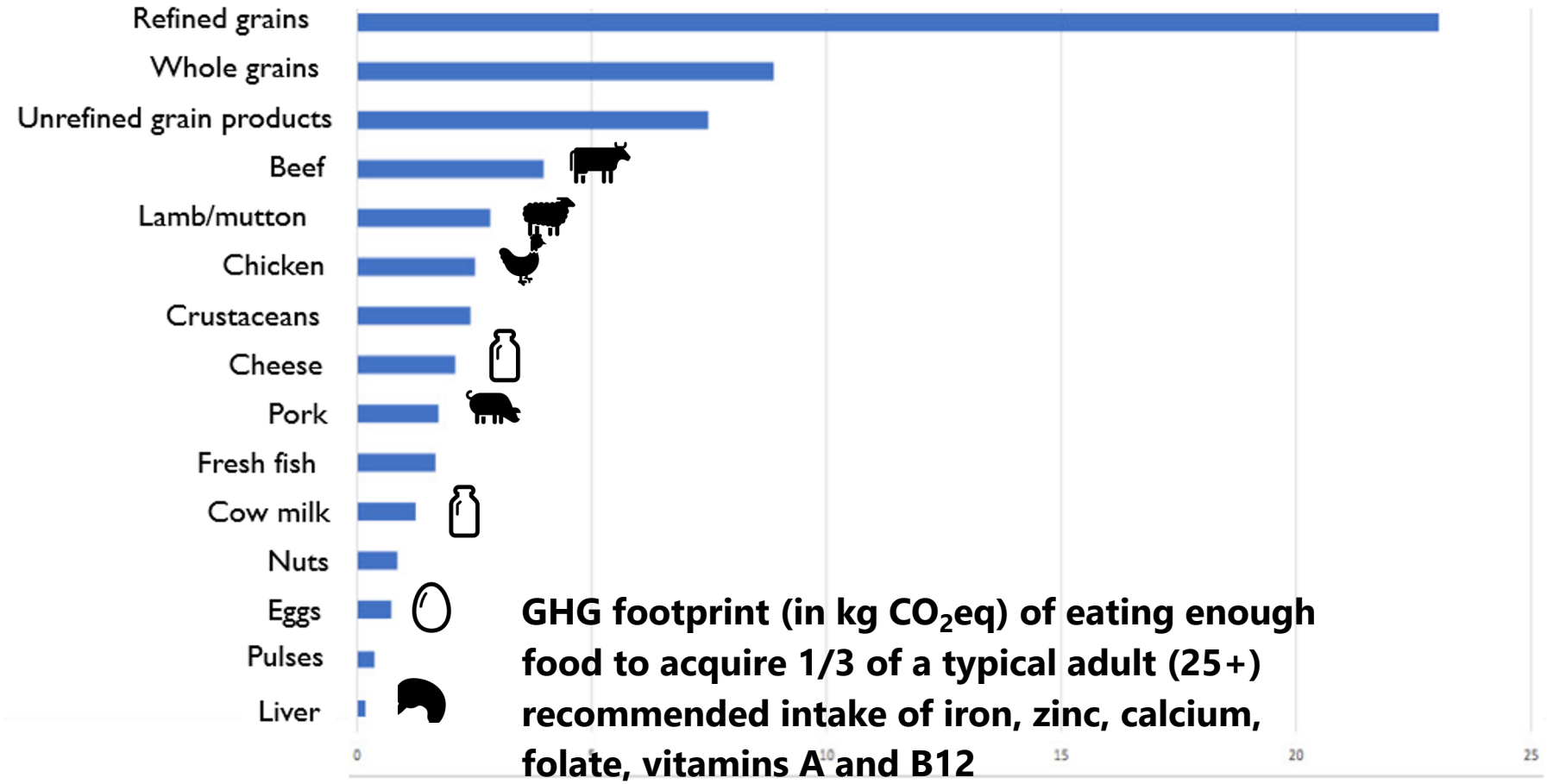
Sustainability Credentials





- **Crude Protein: Corrected for digestibility and amino acid composition**
- **Metrics matter** *(Moughan, 2021)*

Environmental impacts of foods based on vitamin & mineral density



GHG footprint (in kg CO_2eq) of eating enough food to acquire 1/3 of a typical adult (25+) recommended intake of iron, zinc, calcium, folate, vitamins A and B12

(Ty Beal, 2021)

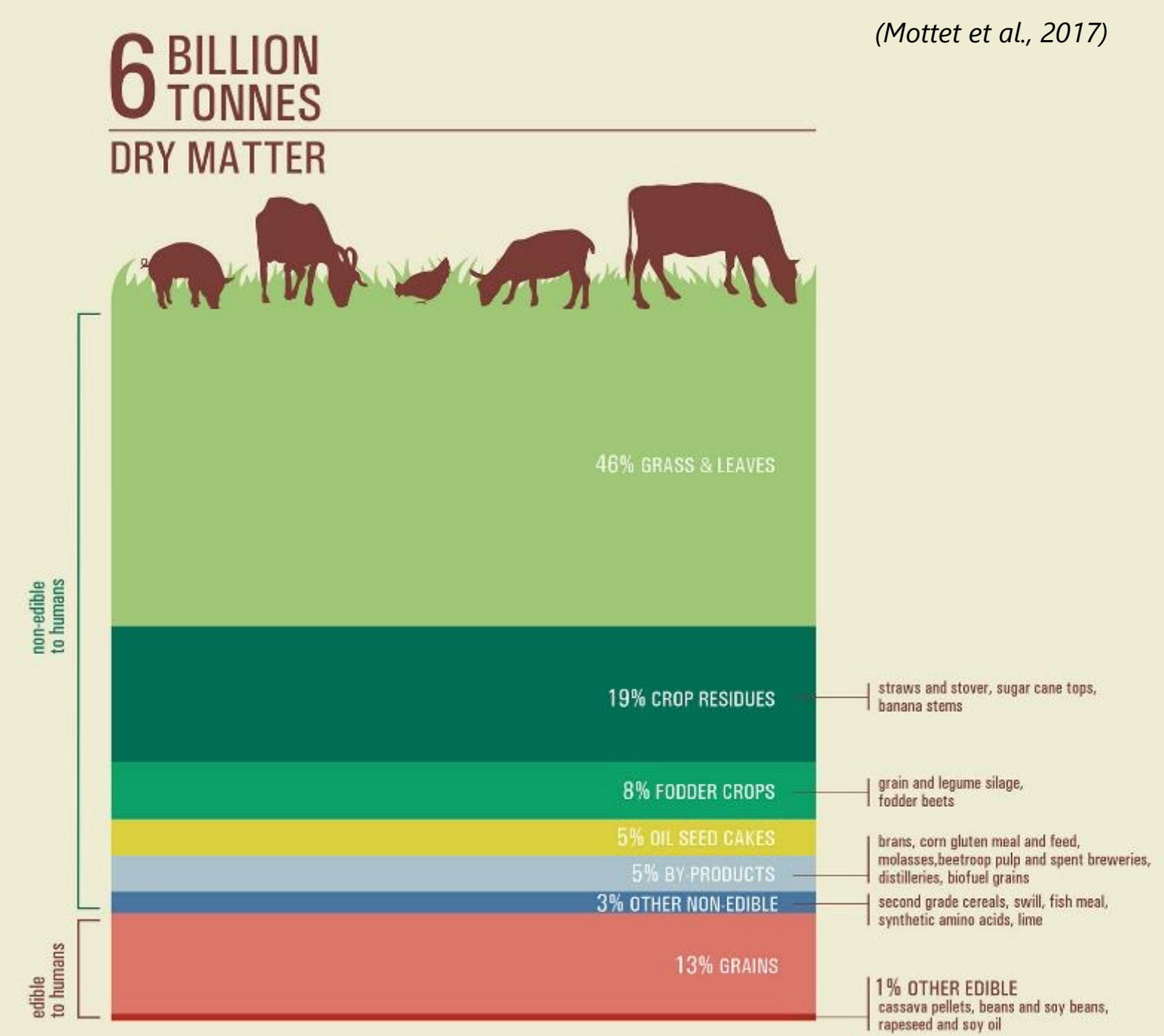
But animals are eating my food, and they aren’t efficient feed converters!

Animals competing for our food?

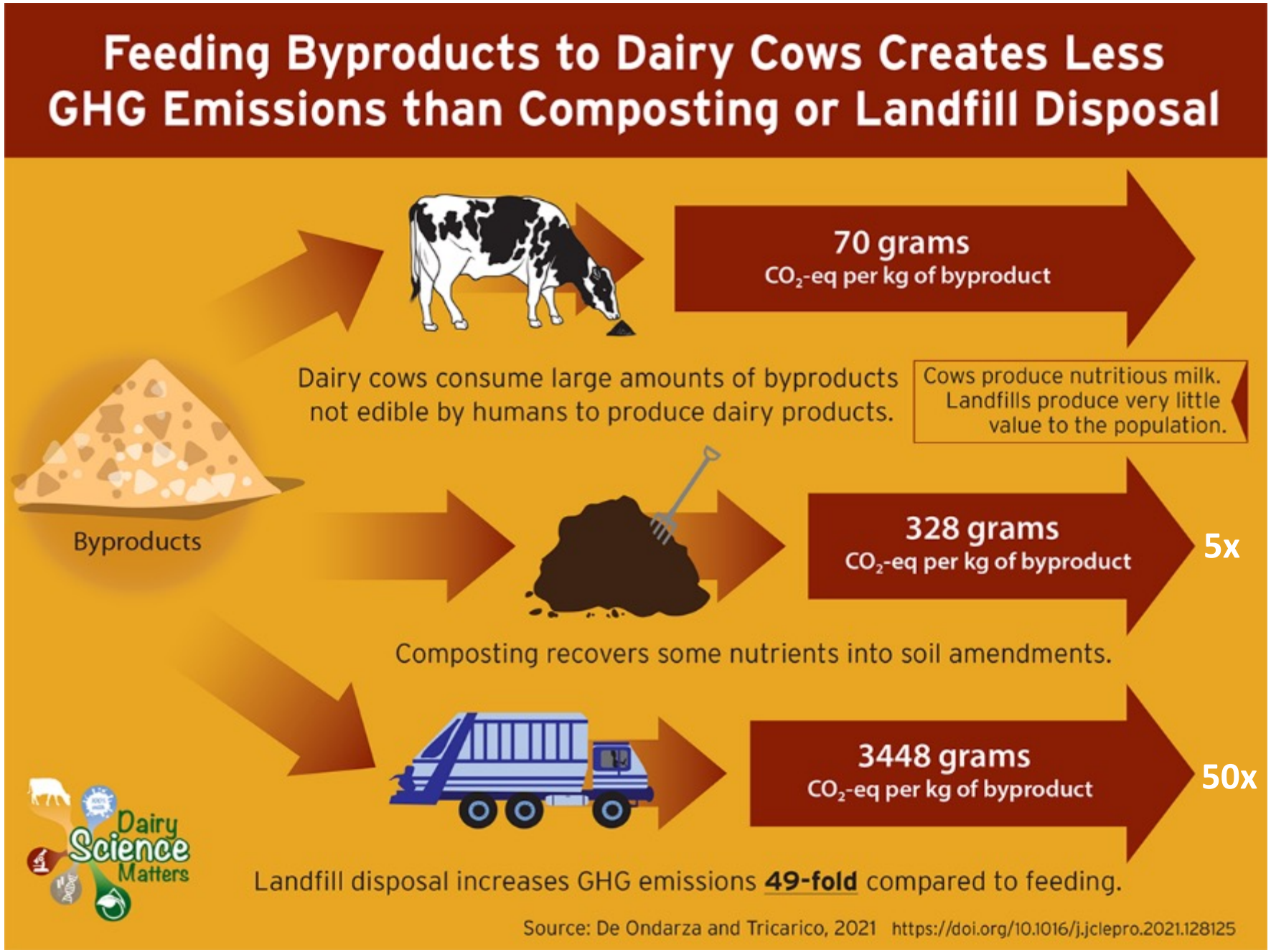
- **86% of global livestock feed is inedible by humans**
- Livestock, particularly cattle, are well-suited to upcycle inedible raw materials into high-quality protein and nutrient-rich foods

Alltech®

(Mottet et al., 2017)



Actually, the animals are eating your food waste and bio-fuel waste!



North American dairy cattle annually consume 40 million tonnes of by-products (like distillers grains from ethanol & alcohol) and turn unrecoverable nutrients into digestible protein rich food products.

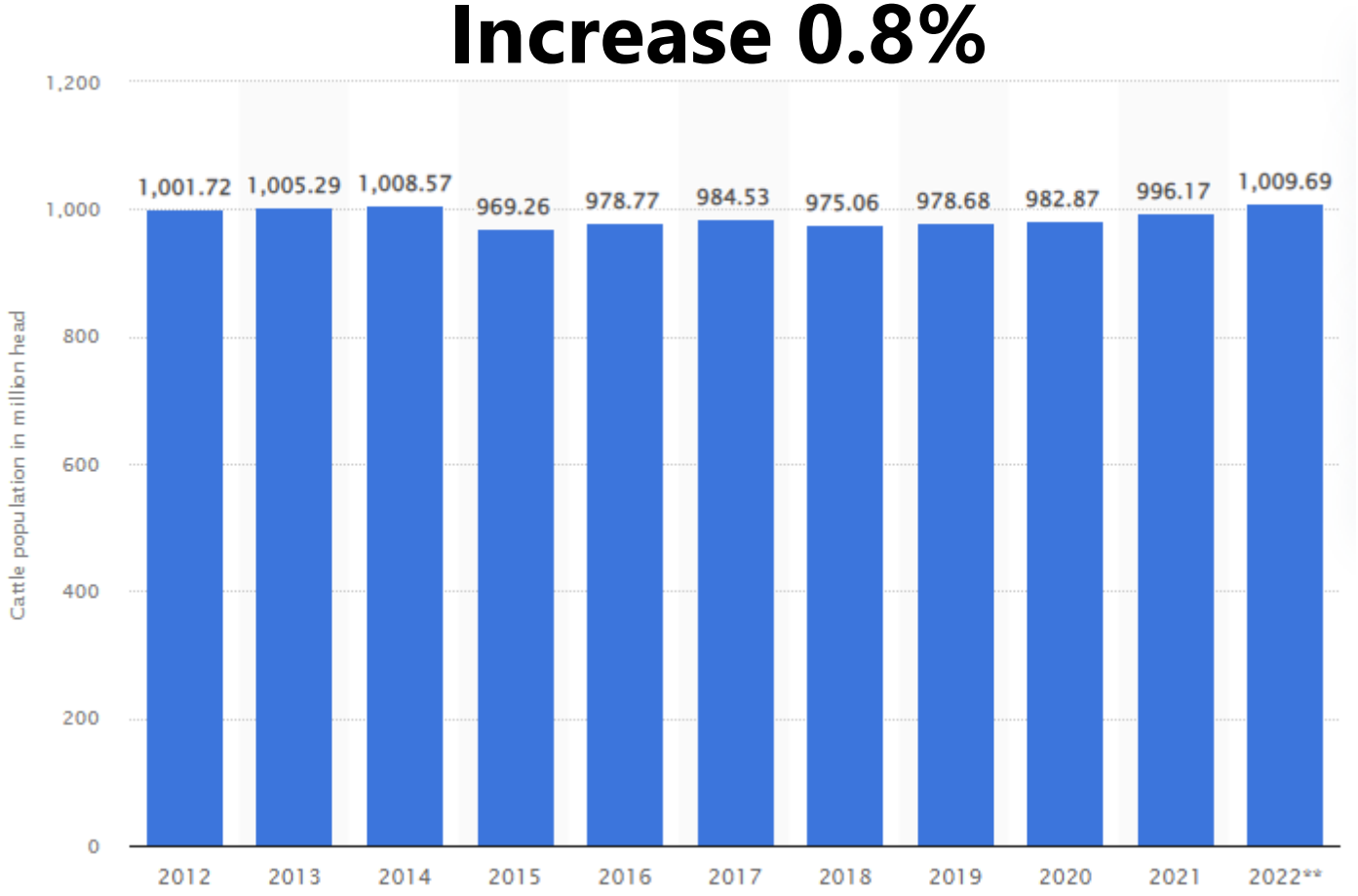
“Beef production is highly inefficient compared to other livestock”

Alltech®	Pounds of feed per pound of product, live weight/fresh milk	Pounds of human-edible feed (e.g., corn, soy) per pound of product, live weight	Net protein contribution** (values >1 mean more high-quality protein generated than used)
U.S. average grain-finished beef (full live cycle)*	13.8	1.6	2.53
Dairy cow (cow + 0.25 replacement; Wilkinson, 2011)	1.1	0.27	2.83
Broiler chicken (Avigen ROSS 308 at 40 days)	1.6	1.4	0.85
Pork (Wilkinson, 2011)	2.5	2.0	0.70

*From Rotz et al., 2019. Ag Syst. 169 (Feb.):1-13.
**Using DIAAS from Ertl et al., 2016.

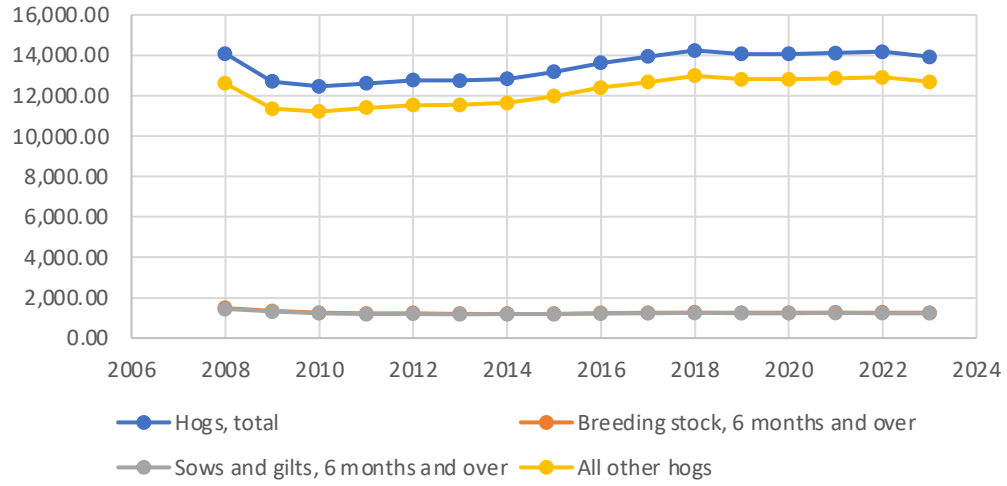
Number of cattle worldwide from 2012 to 2022

Increase 0.8%

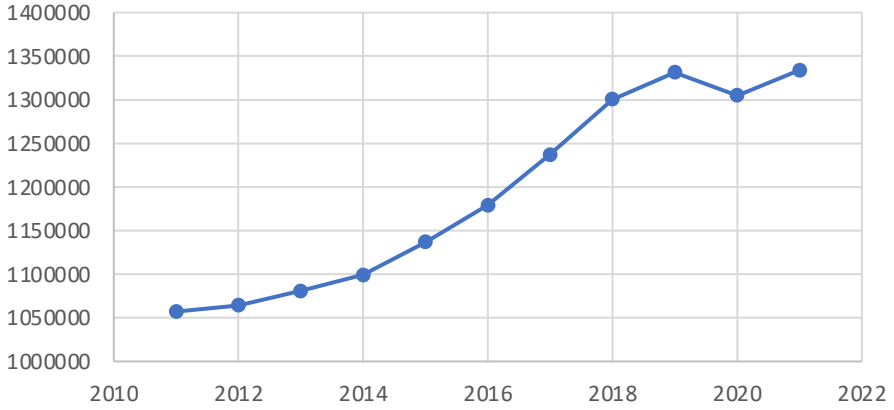



Improvements in Canadian Milk Production
2011
26.6 L/day
Today
35.6L/day

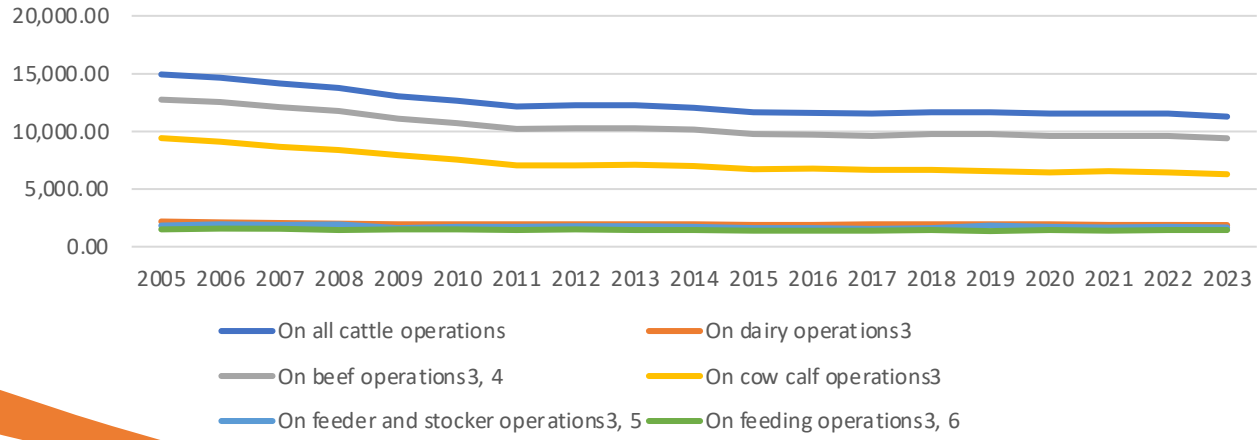
Canadian Hog Numbers - Stats Canada



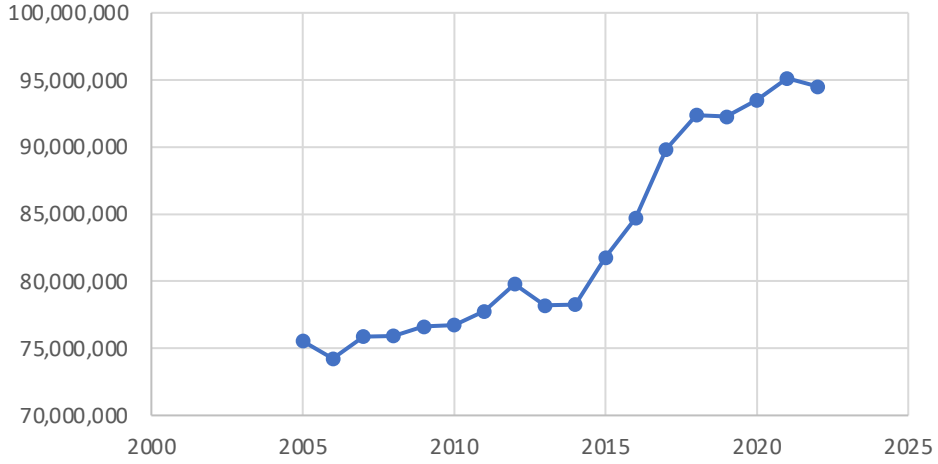
Canadian Poultry Production Tonnes - Stats Canada



Canadian Cattle Numbers - Stats Canada



Canadian Milk Production (hl) - Ag Canada



Developed nations food production reduction

- COVID shutdown related supply chain impacts
- Geopolitical unrest
- Civil unrest
- Multilateral agreement breakdowns
- Foreign animal diseases
- Food for “green” energy production
- Expensive feed stuffs resulting in tight or negative margins for livestock production
- Developed nations’ reductionist agenda for achievement of national GHG emission targets

Netherlands to buy up and close down 3,000 farms to comply with EU rules

jc/jd 29.11.2022, 10:58

Share:

Photo: Pierre Crom/Getty Images

The Dutch government has plans to purchase and shut down up to 3,000 farms near environmentally sensitive areas in order to fall in line with EU nature preservation

LATEST NEWS

Supplying depleted uranium to Ukraine not nuclear escalation, says UK

Greece: Routes gradually returning to normal after passenger train crash

More Korean K2 tanks, K9 howitzers have arrived in Poland: Def Min

Fury-Usyk undisputed heavyweight clash is a no-go for now

Polish PM welcomes Japanese counterpart to Warsaw to discuss current affairs

German politicians may be shifting blame but Nord Stream 2 remains embarrassment

Tanzania confirms first cases of deadly Marburg disease

More sanctions against Myanmar junta: U.S. official

Israeli air force hits vicinity of Syria's

REUTERS®

World Business Legal Markets Breakingviews Technology Investigations

Tractors roll into Brussels in farmer protest over plans to limit nitrogen emissions

By Bart Biesemans and Clement Rossignol

BRUSSELS March 3 (Reuters) - Farmers from Belgium's northern region of Flanders drove thousands of tractors into Brussels on Friday in a protest against a new regional government plan to limit nitrogen emissions.

Police estimated the number of tractors clogging the streets of Brussels at 2,700. Many were decorated with big signs reflecting the farmers' anger.

"Proud to be a farmer," read one.

8:19

FARMERS WEEKLY

EU approves Dutch plan to forcibly close farms

Philip Case 04 May 2023


© PMVFoto/Alamy Stock

The European Union has approved controversial plans for the Dutch government to forcibly buy out livestock farms as part of plans to cut nitrogen emissions.

Two schemes with a total budget of €1.47bn (£1.29bn) will be used to compensate farmers

Next: 8 clever technical innovations for poultry farmers

2 Case study: Food Valley has helped turn the Netherlands into a top agriculture innovation and investment hub

Food Valley NL was founded in 2004 to support the development of an agfood innovation cluster that brings together universities, research centers, start-ups, and large agfood companies.

Key components of Food Valley

University and research institutions

20 research institutions, like Wageningen University; >10,000 researchers working across agfood value chain

Private companies

>2,600 ag and food companies across the entire value chain located in the "Food Valley" region of Wageningen, NL

Government support & investment

Identified Agfood as a "top sector;" supports public-private R&D partnerships

International partnerships

Partnerships with global agfood networks, such as Food Innovation Network Europe (FINE)

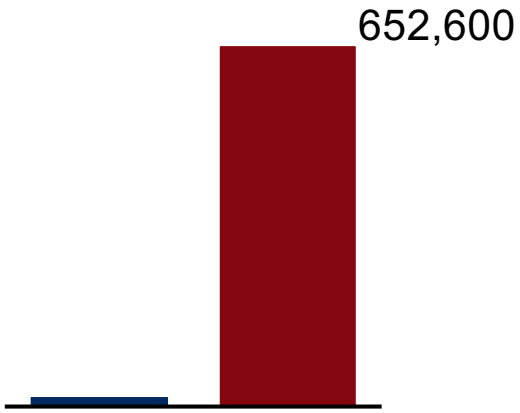
Results

- **2nd largest exporter** of agfood products globally
- Agfood represents **21%** of NL exports
- **4** Dutch agfood companies are in the **world's top 30**
- **85%** of the Dutch ag and food research is located in **Food Valley**
- **164** nationalities represented

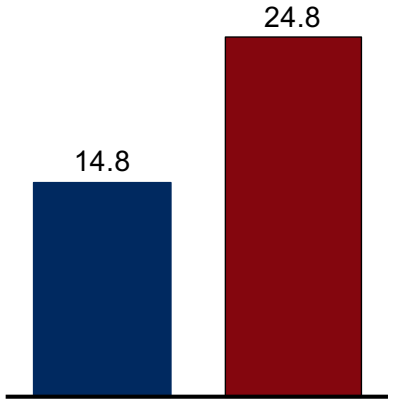
SOURCE: Wageningen Business Generator, Food Valley, Food Innovation Network Europe, press releases

2 Because of initiatives like Food Valley, the Netherlands is now one of the world's top agfood exporters despite limited natural resources

Arable Land
km^2



Agriculture GDP[1]
USD billions, 2014



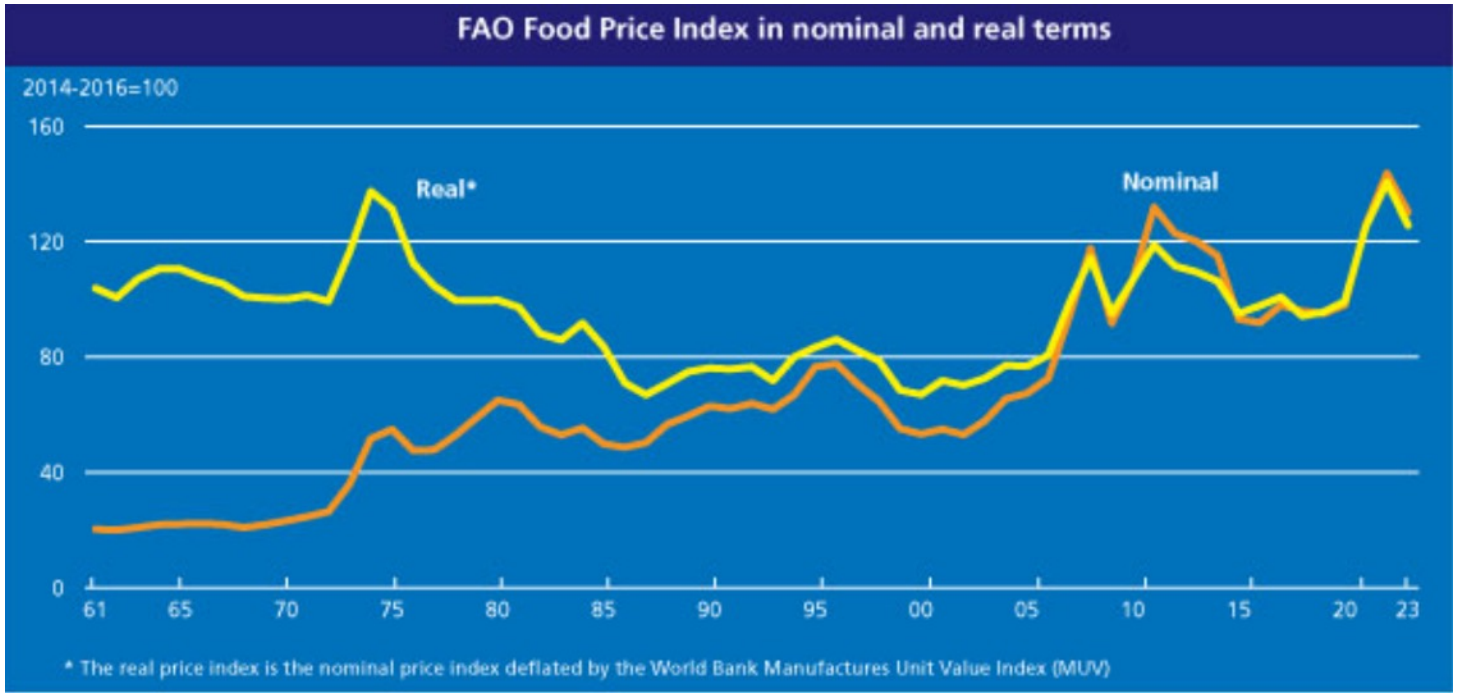
Despite only having **3%** of Canada's **arable land**, the Netherlands produces the equivalent of **60%** of Canada's annual **agriculture GDP**

1 2014 Agriculture GDP, value added (constant 2010 US$), World Bank national accounts data, and OECD National Accounts data files

SOURCE: World Bank http://data.worldbank.org/indicator/NV.AGR.TOTL.KD

Protein Production Decrease

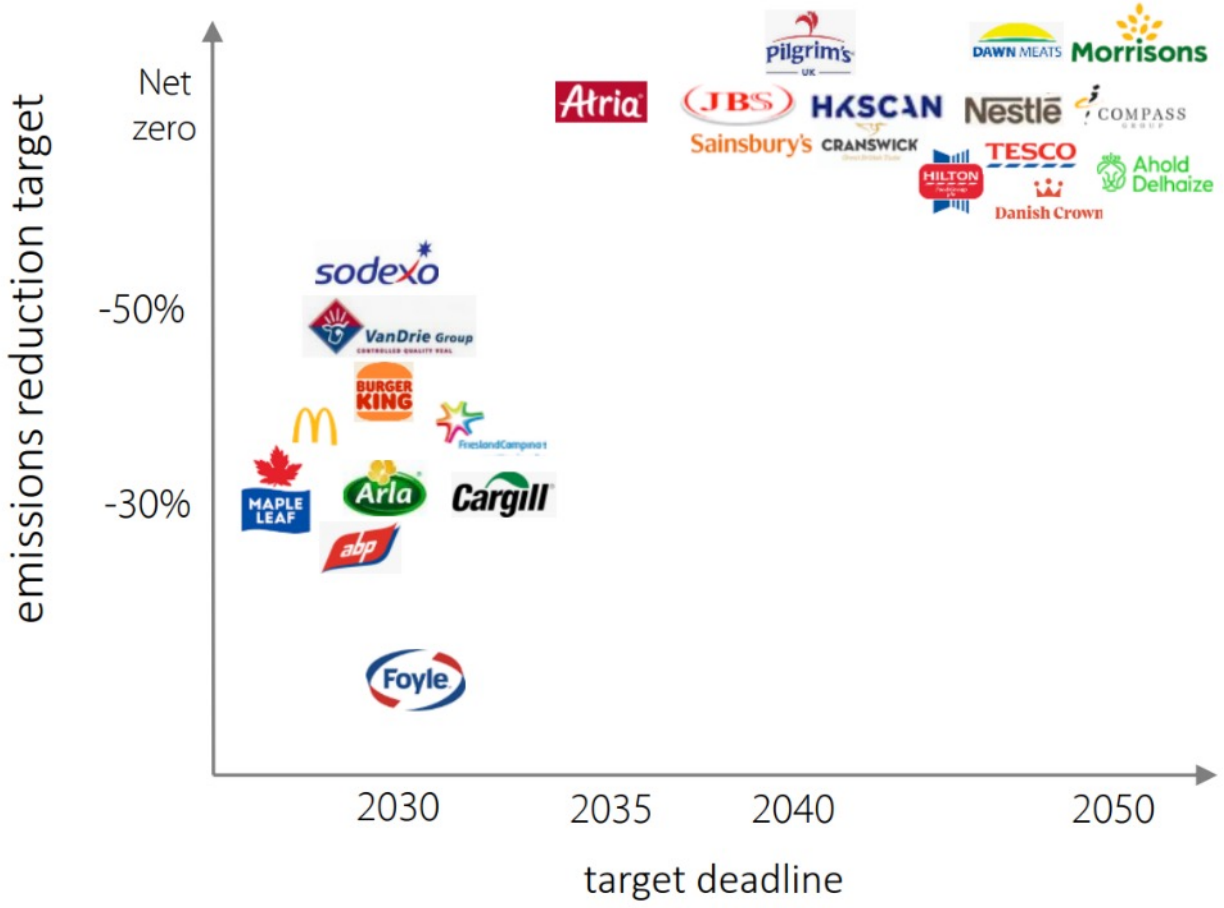
World Food Prices on the rise



- [FAO Food Price Index | World Food Situation | Food and Agriculture Organization of the United Nations]

Voluntary commitments on sustainability are gaining ground, especially in Europe

Scope 3 emissions reduction targets are set through the supply chain



Source: SBTi, Tesco, AH, Morrisons, company websites, Rabobank, 2022

Tesco's asks of suppliers:

1. Provide details of current emissions by the end of 2021
2. Establish net zero ambitions by the end of 2022
3. Set science-based targets to support the delivery of these ambitions by the end of 2023

By 2025, only deforestation-free soy for animal feed

Morrisons's asks livestock farmers to reach net zero by 2030.

Beef farmers receive at least GBP 0.10/ kg extra for rearing one cattle breed, under 18 months on a sustainable diet.

Danish Crown pays a premium of EUR 0.13/kg cw for pig farmers feeding their pigs with feed with lower CO_2 footprint

Mandatory ESG Reporting for Canadian Public Companies
The Canadian Securities Administrators (CSA) are working to establish requirements for Canadian publicly traded companies to make climate-related disclosures in response to demands from investors and other stakeholders for “complete, consistent and comparable” reporting.

Loblaws

BURGER KING

rbi restaurant brands international

Saputo

Tim Hortons

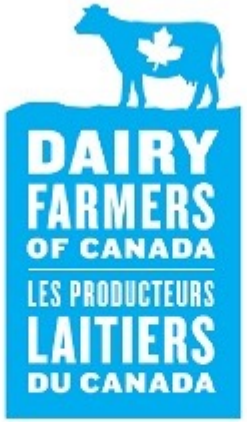
SHOPPERS DRUG MART

POPEYES

metro

WESTON FOODS

The Canadian Government has pledged to cut climate-warming emissions 40-45% below 2005 levels by 2030.



NET ZERO BY 2050

McDonald's has entered the race to net zero.

Dairy Farmers of Canada **Les Producteurs laitiers du Canada**

Ted Bilyea

Distinguished Fellow of Strategic Trade at CAPI & former board chair

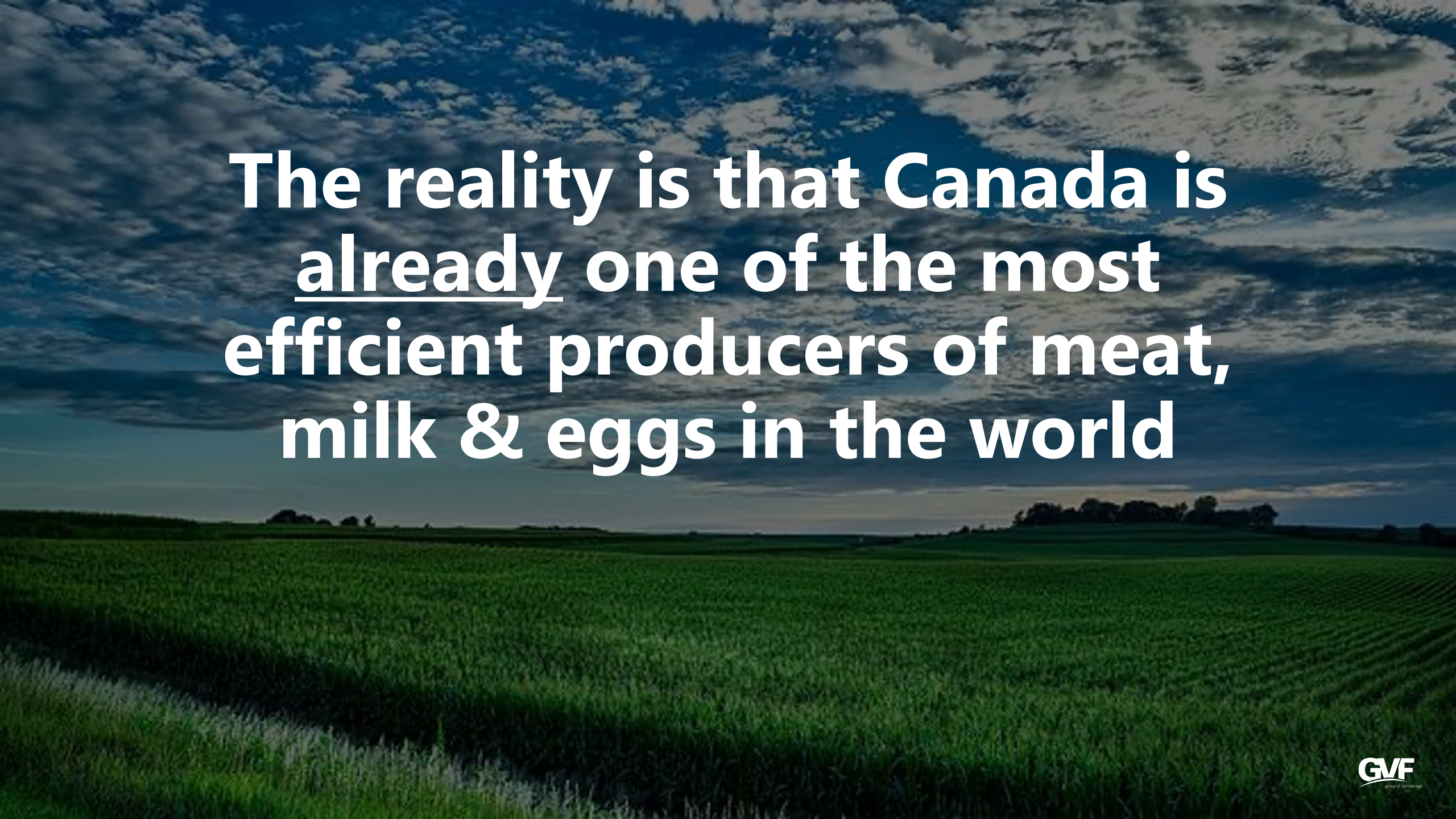
"We need to ensure that **we do no harm** unto production while we are doing good on the climate scene.

The reason I say that is because whatever we don't produce is going to be produced somewhere that is a lot more carbon intensive and a lot worse for everyone."

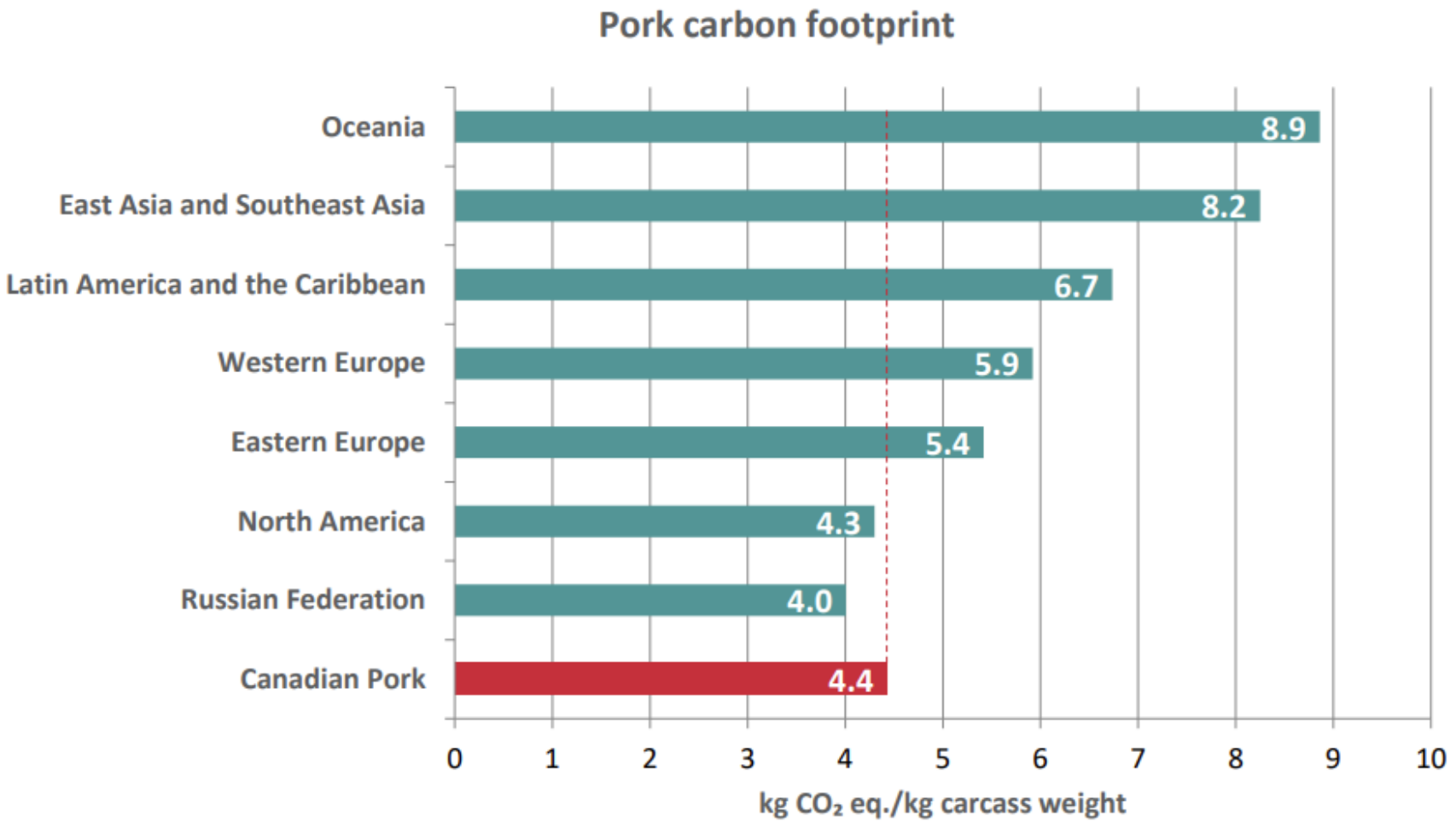
AgriFood Conference

January 2023

If livestock production moves from developed nations to undeveloped nations

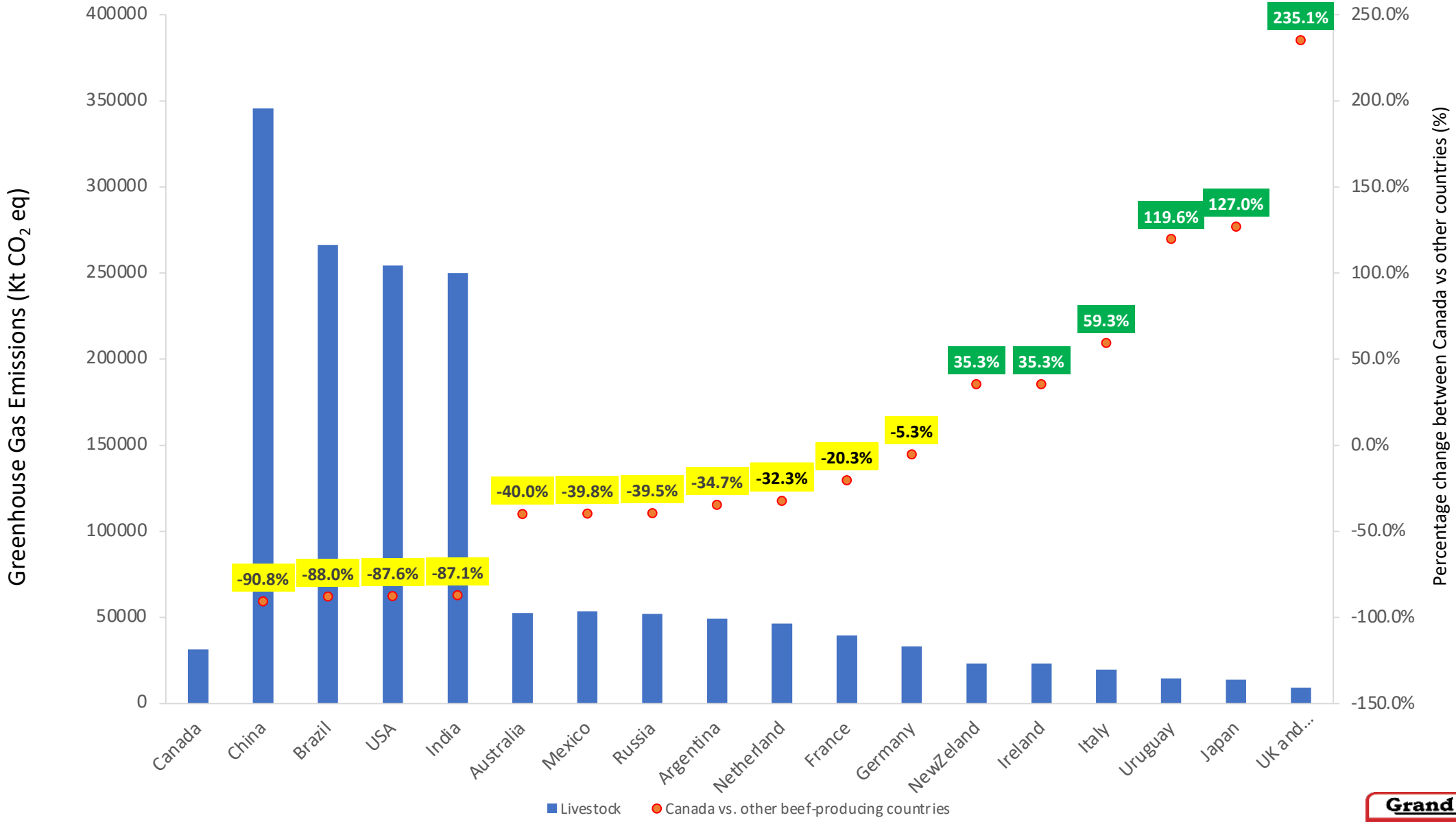

The reality is that Canada is already one of the most efficient producers of meat, milk & eggs in the world

Carbon Footprint International Benchmark



Source: FAO. 2017. Global Livestock Environmental Assessment Model (GLEAM) [online]. Rome. www.fao.org/gleam/en/

Canada vs. Other Beef-Producing Countries Enteric and Manure Management Emissions



https://unfccc.int/topics/mitigation/resources/registry-and-data/ghg-data-from-unfccc

Grand Valley FORTIFIERS
FOR SOUND NUTRITION

When considering the average carbon footprint of chicken in different regions around the world, Canadian chicken production has the lowest carbon footprint overall.*

Global Emissions for Fat Corrected Milk Production by Region

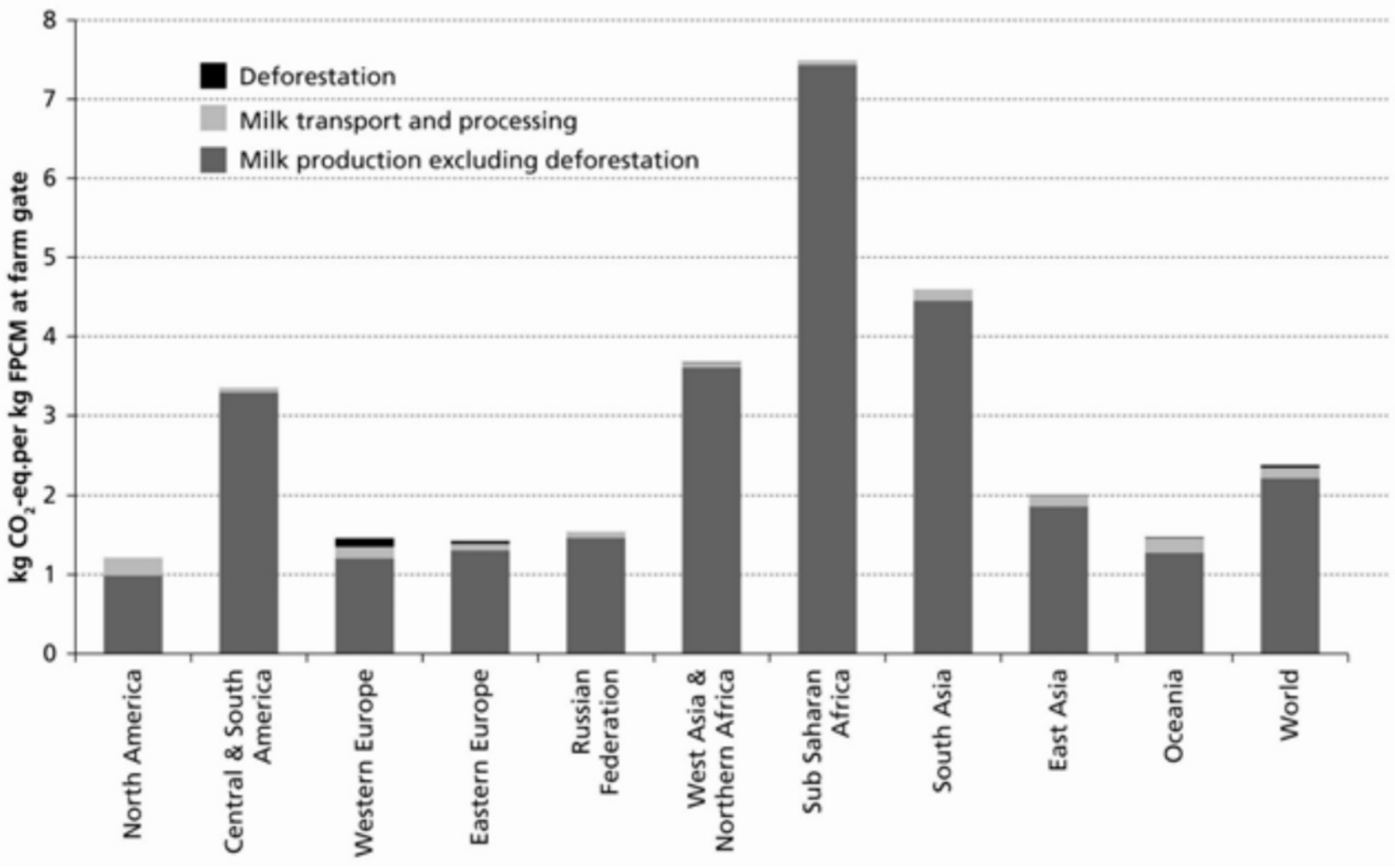


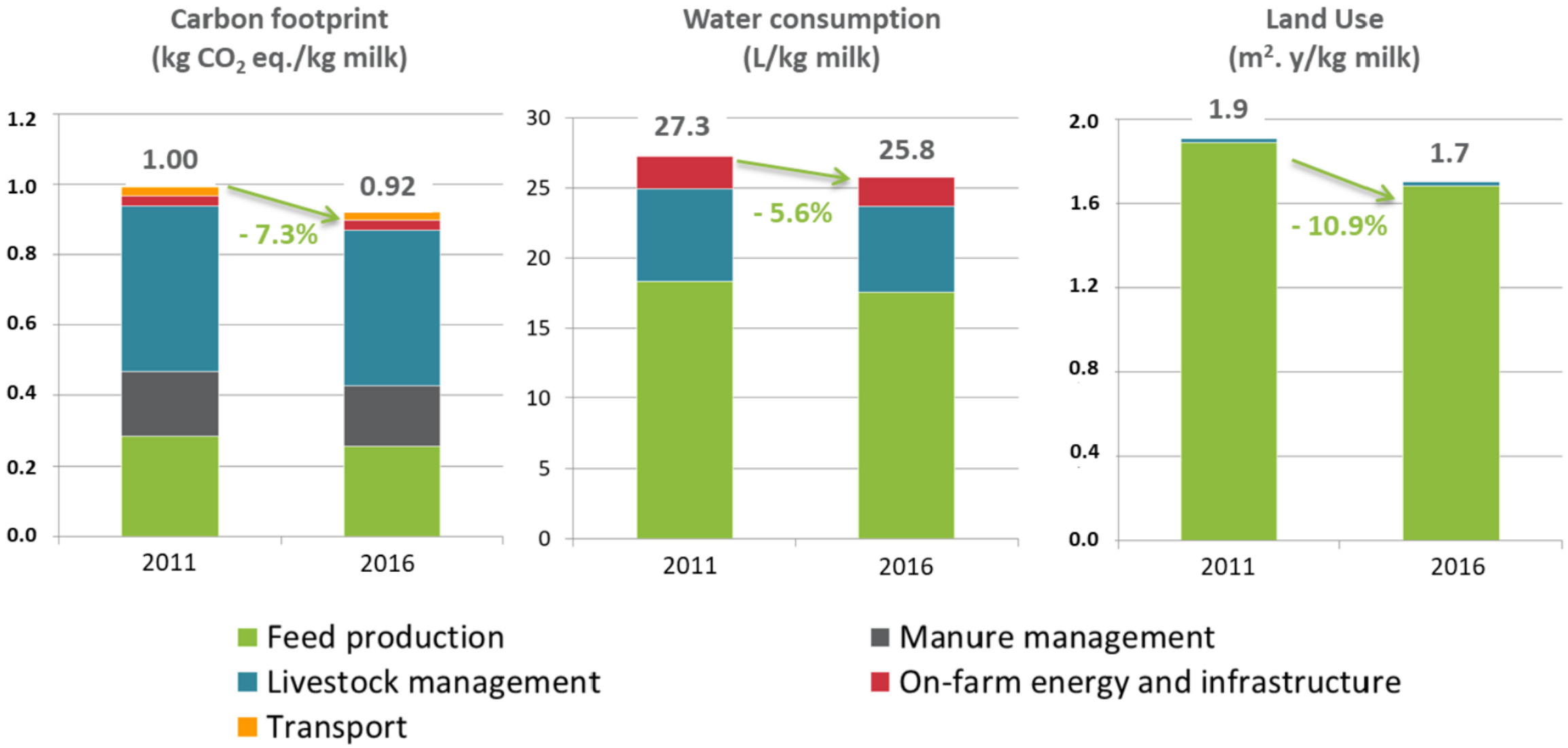
Figure 4.1. Estimated GHG emissions per kg of FPCM at farm gate, averaged by main regions and the world

Green house gas emissions from the dairy sector

A life cycle assessment

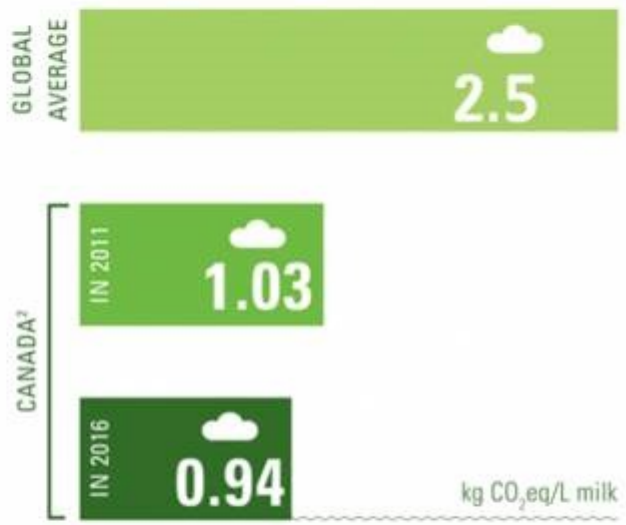
FAO, 2010

Relative contribution of the life cycle stages to the average environmental profile of producing one kilogram of Canadian milk



Improved environmental impact

Producing one litre of milk in Canada emits less than half the greenhouse gas (GHG) emissions as compared to the global average.(1)



Consumers can enjoy their daily dairy products knowing that the footprint of milk produced in Canada has decreased over time. Between 2011 and 2016, carbon footprint, water consumption and land use associated with milk production decreased by 7%, 6% and 11% respectively.

7% LOWER CARBON FOOTPRINT

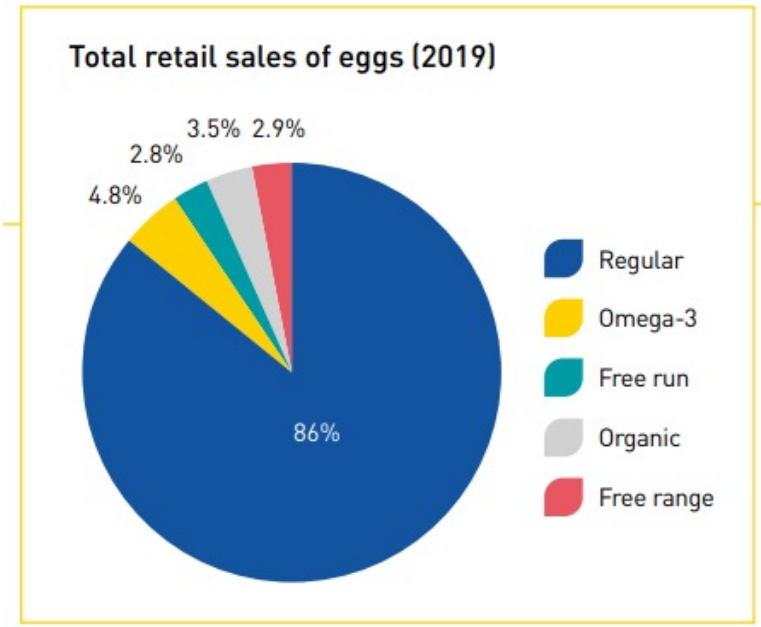
6% LOWER WATER CONSUMPTION

11% LOWER LAND USE

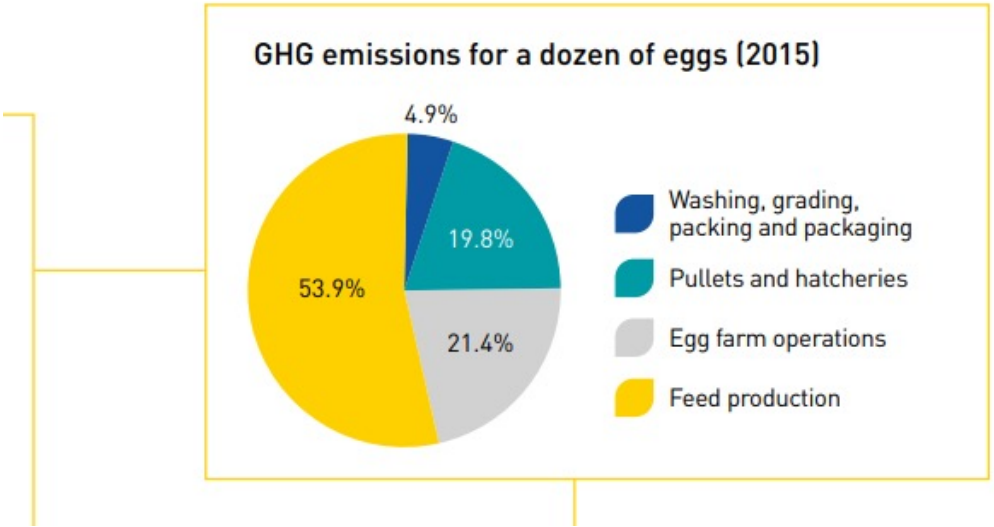
Improvements in Egg Production/Hen/Year

1947 – 150 Eggs

Current – 340 Eggs



Egg farming contributes **$1.37 billion** to Canada's economy.



Canadian Egg Sustainability

- 1.44 CO2e/dozen

Global Average

- 5.0 CO2e/dozen

- 70% higher than Canada

Doing what we can to spread the word!

Doing what we can to spread the word!


We are still improving
by deploying Science and Technology

DSM

Introducing Bovaer

30%
Reduction in methane emissions

Grand Valley FORTIFIERS
FOR SOUND NUTRITION

45% Reduction in Methane

DSM

Introducing Bovaer

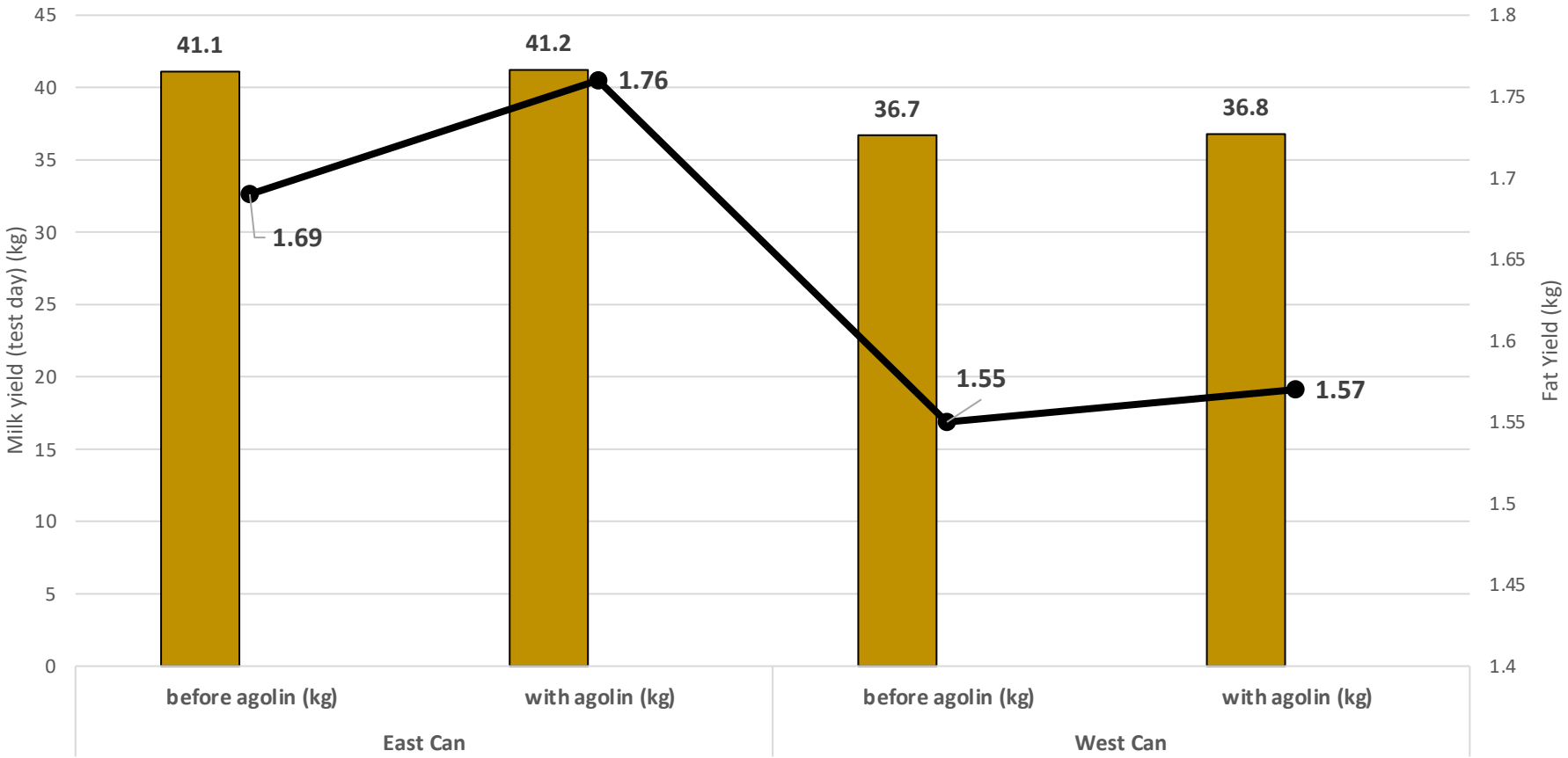
½ the emissions or almost double the cows with the same methane emissions

Grand Valley FORTIFIERS
FOR SOUND NUTRITION

Certified by the Carbon Trust to benefit dairy farmers, their cows and the environment.

To develop Agolin, researchers tested more than 100 different plant extracts to determine their effects on the rumen microbiota and how they can improve fat and protein yield and feed efficiency while lowering a cow's methane production. Agolin is the first product certified by the Carbon Trust to provide benefits to not only the environment, but also to dairy farmers and their cows.

Agolin - Preliminary data looking at east/west herds – change in milk and fat yield



First-ever carbon credit payments to Canadian dairy farmers for reducing enteric methane.

What is a carbon credit?

- 1 carbon credit = 1 tonne of CO_2 equivalent that is not released into the atmosphere
- A credit is certified and can be bought/ sold by public or private organizations
- Reduces methane from enteric fermentation
- 1 cow on generates 0.4 credits / year

ROI + Carbon Payment

- 10:1 ROI without credits, FE, milk, components
- Credit goal of $25 USD
- Goal is to get 85% of credit value to the dairy
- 1 cow on generates 0.4 credits / year
- $11 CND/ cow / year

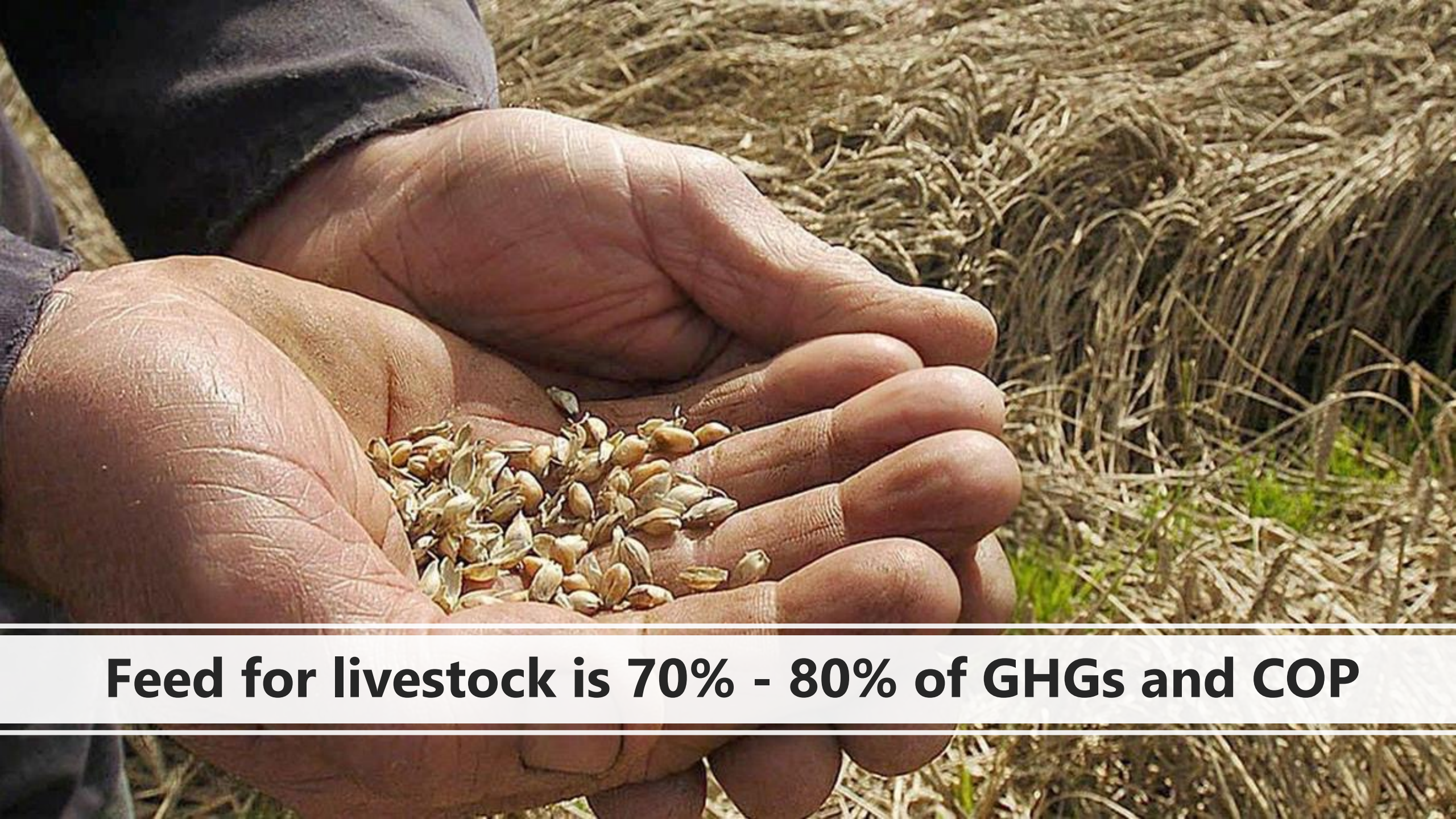
Timeline

Credits retroactively to November 2022

Sign up for Nov & Dec 2022 and 2023 by **Feb 1 2024**

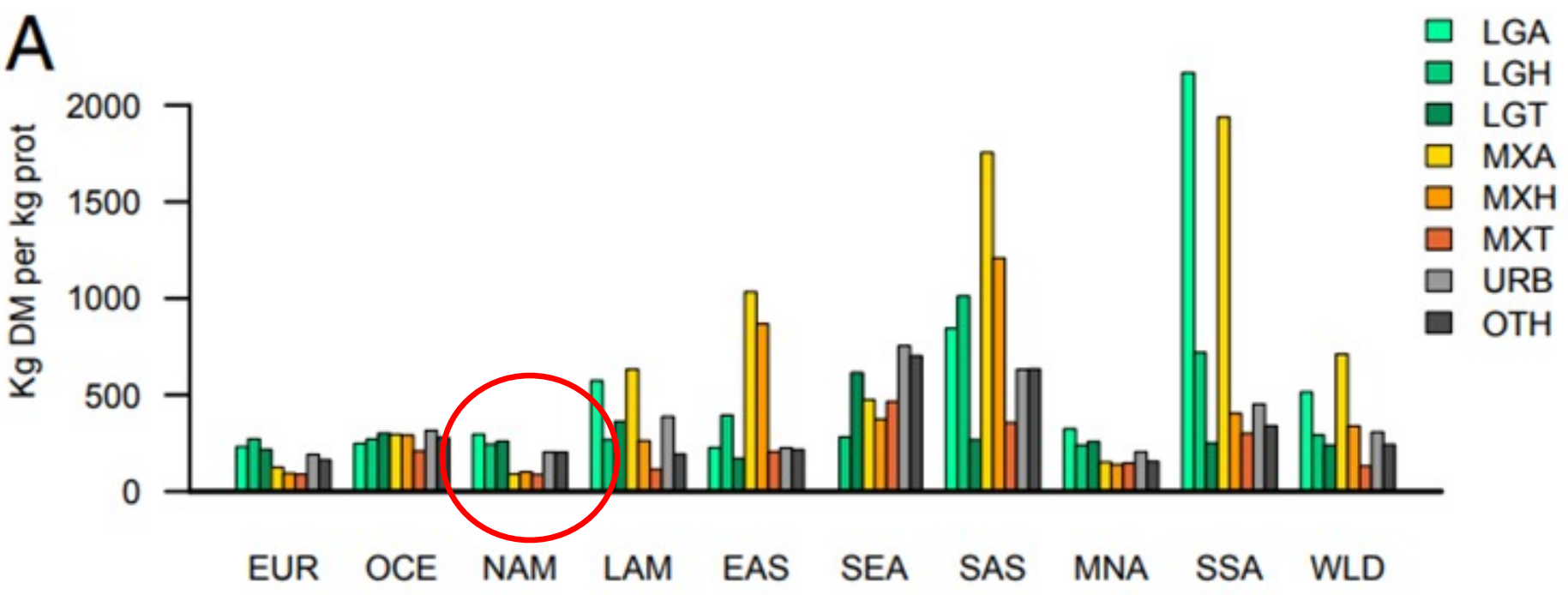
Payments expected summer 2024 for 22/23

Sign up for 2024 credits by September 2024



Feed for livestock is 70% - 80% of GHGs and COP

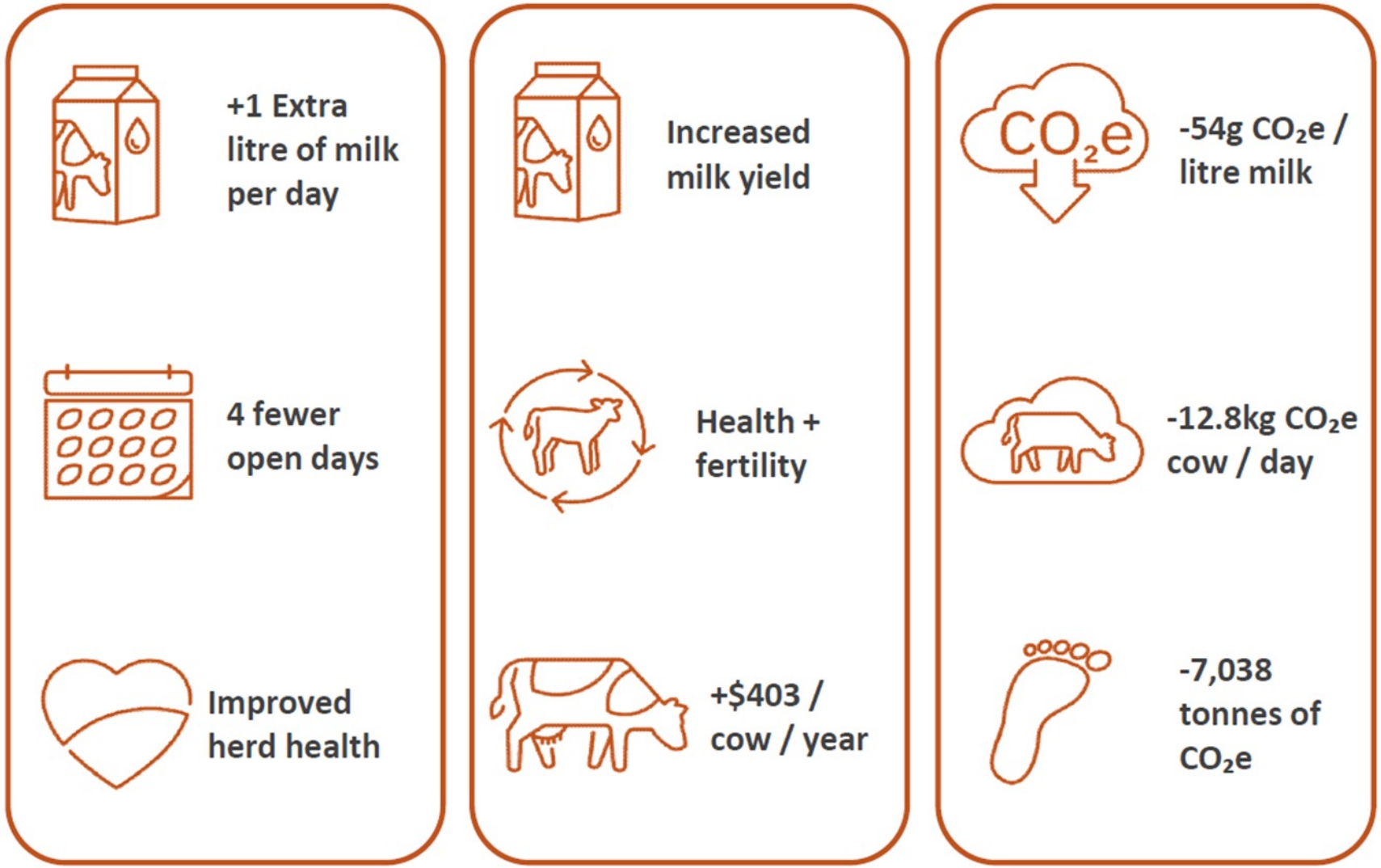
Comparative Feed Efficiency in Beef and Dairy by Region and Production System



LGA: livestock grazing arid
LGH: livestock grazing humid
LGT: livestock grazing temperate
MXA: mixed arid
MXH: mixed humid
MXT: mixed temperate
URB: urban systems
OTHER: other systems

Production regions: Europe and Russia (EUR), Oceania (OCE), and North America (NAM), and the developing regions of Southeast Asia (SEA), Eastern Asia (EAS), South Asia (SAS), Latin America and the Caribbean (LAM), sub-Saharan Africa (SSA), and the Middle East-North Africa (MNA).
Source: Herrero et al., 2013.

Monitoring your farm's performance is vital to help improve overall efficiency. It is well documented that efficient farms are more profitable with lower greenhouse gas emissions. Producers who improve their herd's health and fertility KPIs not only improve their milk yields, they also reduce their carbon footprint. Below are the average improvements achieved by 58 dairy farms during a study conducted by Alltech.



MORE EFFICIENT, MORE PROFITABLE, MORE SUSTAINABLE

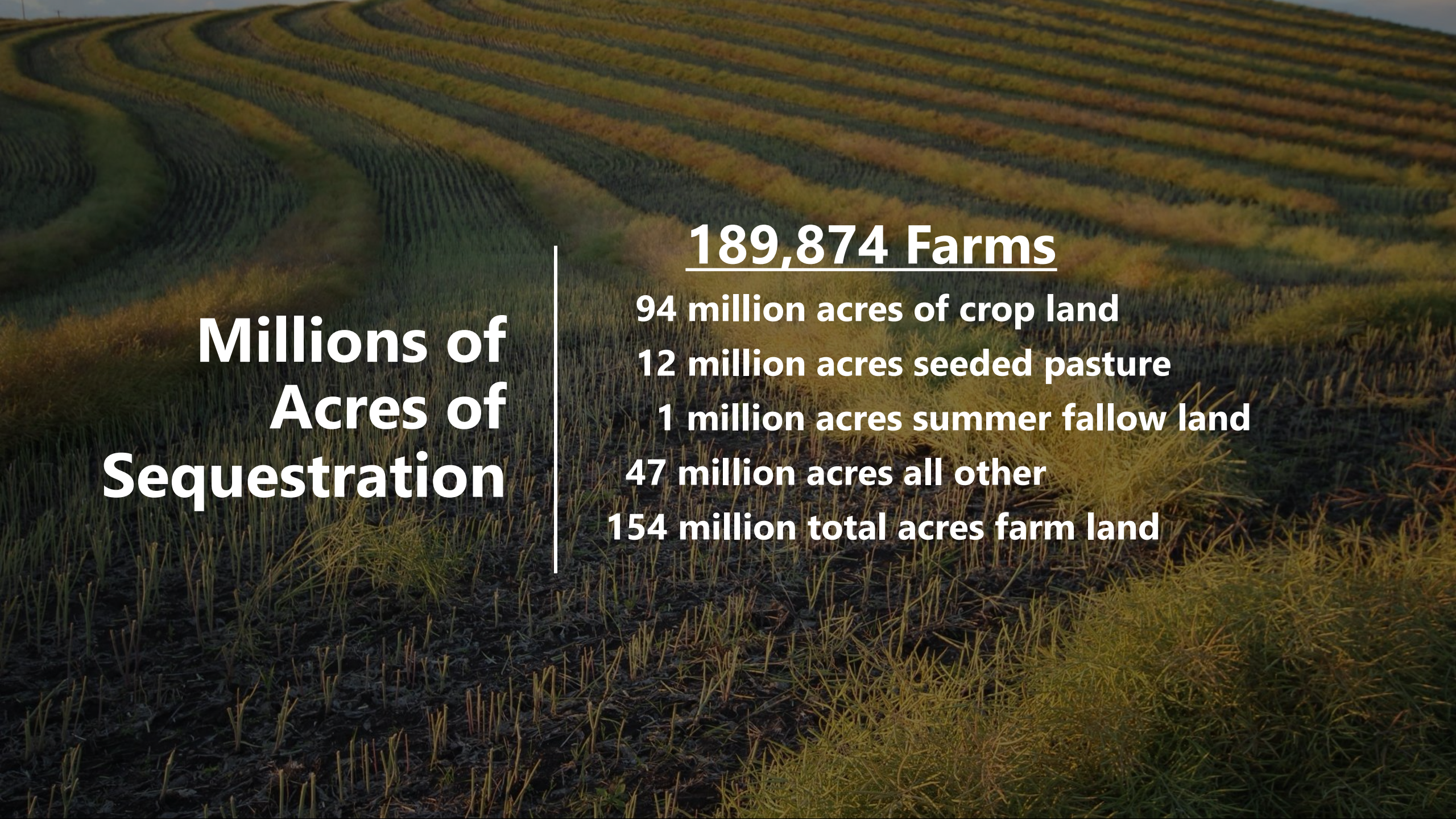
Enabling Sustainable Livestock Farming

Enabling livestock operations with data-driven insights, our innovative business intelligence solutions optimize feed & production efficiency, profitability, and resource stewardship, fostering ever-improving meat, milk and egg production.

We don’t want to feed less animals, more.
We want to feed more animals, with less.


Sequestration
Giving Credit where Credit is Due
What other sector owns millions of acres and billions of trees?

2.5 Billion Acres


Millions of Acres of Sequestration
189,874 Farms
94 million acres of crop land
12 million acres seeded pasture
1 million acres summer fallow land
47 million acres all other
154 million total acres farm land

Nature Based Climate Solutions

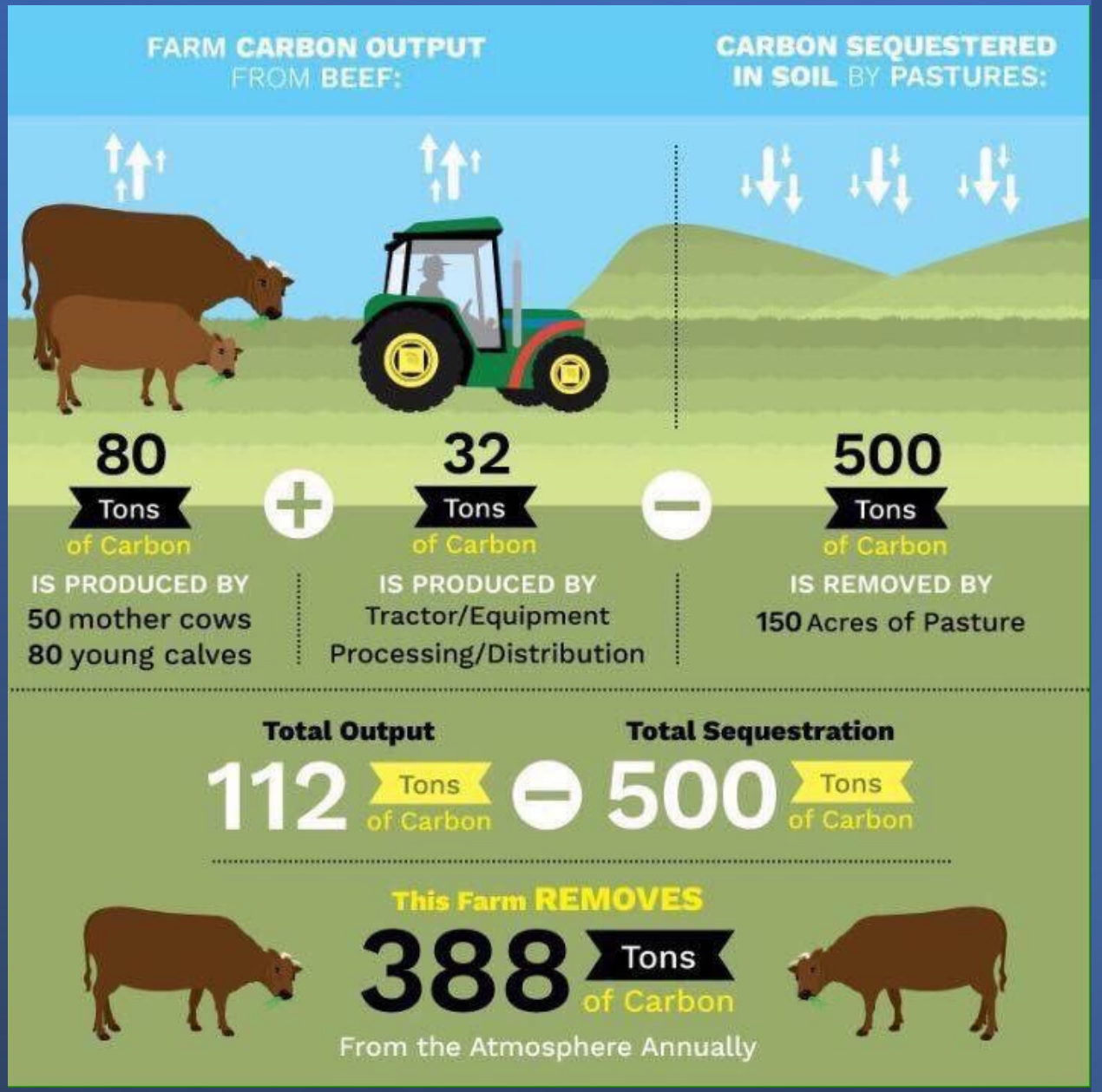
"Forest, agricultural land, grassland and peatland NBCSs have the highest national GHG mitigation potential over the next three decades."

"Cropland management & avoided grassland conversion hold the greatest potential for carbon sequestration in agriculture and grasslands."

Expert Panel on Canada's Carbon Sink Potential

December 2022


Maximized Sequestration and Nature Based Solutions
• Measure, Report, Verify


FARM CARBON OUTPUT
FROM BEEF:
CARBON SEQUESTERED
IN SOIL BY PASTURES:
80
Tons
of Carbon
IS PRODUCED BY
50 mother cows
80 young calves
32
Tons
of Carbon
IS PRODUCED BY
Tractor/Equipment
Processing/Distribution
500
Tons
of Carbon
IS REMOVED BY
150 Acres of Pasture
Total Output
112 Tons of Carbon
Total Sequestration
500 Tons of Carbon
This Farm REMOVES
388 Tons of Carbon
From the Atmosphere Annually

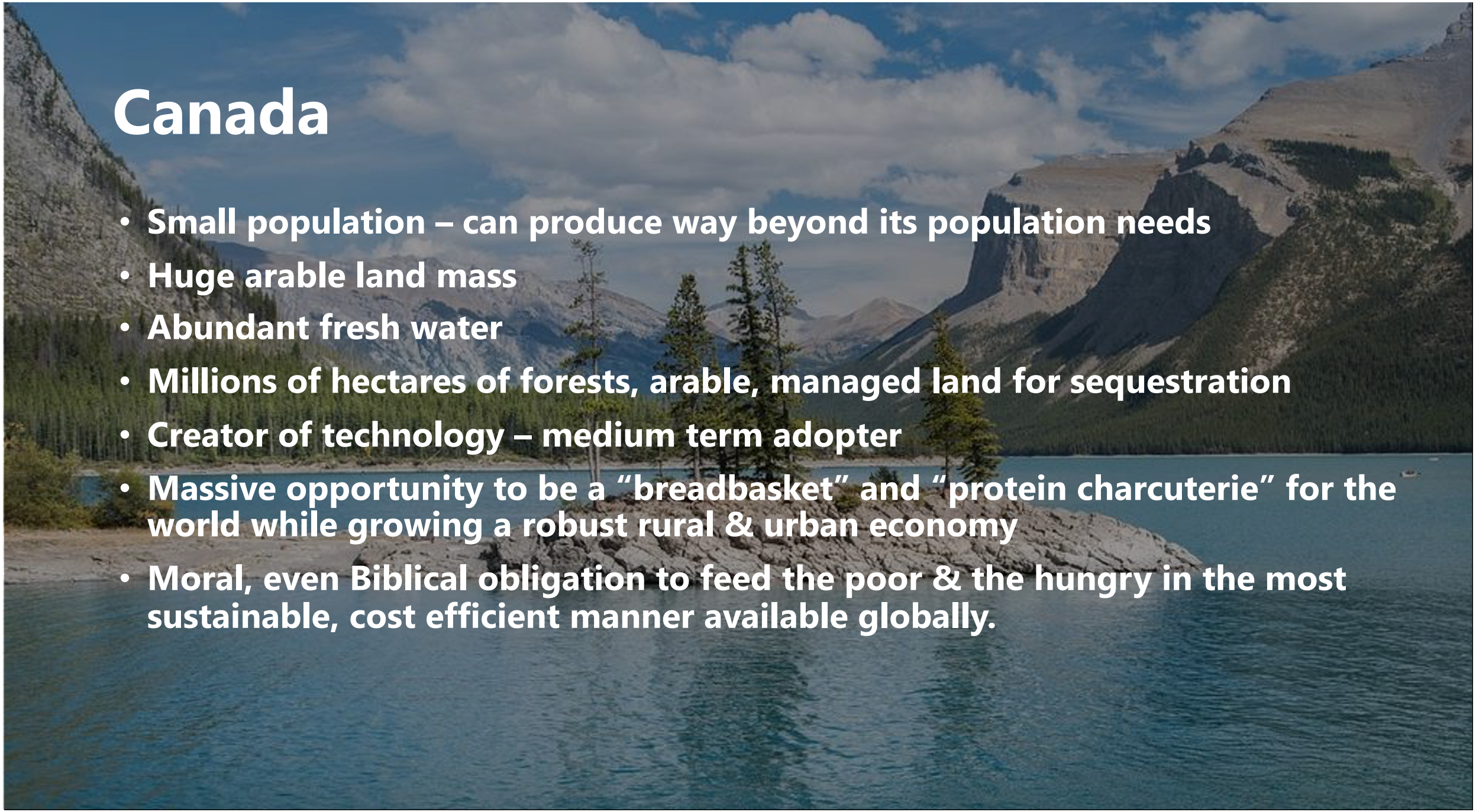
Carbon footprint at Buck Island Ranch

- **Previous calculated values (1998-2008):**
  - Emissions: 10,884 metric tons of CO_2e/year
    - Enteric fermentation: 64%
  - Estimates of sequestration by Bahia grass pasture: 17,813 metric tons CO_2e/year
  - ***NET POSITIVE sequestration of 6,929 metric tons CO_2e/year***
- **Life cycle analysis opportunity to manage environmental impact**

Alltech®


Proud Participants in the Largest
Carbon Sequestration Industry
in the World.


Canadian Agriculture
Ground Zero for Net Zero



Canada

- Small population – can produce way beyond its population needs
- Huge arable land mass
- Abundant fresh water
- Millions of hectares of forests, arable, managed land for sequestration
- Creator of technology – medium term adopter
- Massive opportunity to be a “breadbasket” and “protein charcuterie” for the world while growing a robust rural & urban economy
- Moral, even Biblical obligation to feed the poor & the hungry in the most sustainable, cost efficient manner available globally.

Rabbi Jonathan Sacks

"A nation becomes strong when it cares for the weak. It becomes rich when it cares for the poor. It becomes invulnerable when it cares for vulnerable."

Ted Bilyea

"As Canadians we often set out to do good or look good, but sometimes that gets in the way of doing the right thing."

What is the right thing to do?

1. Become the most sustainable producers of meat, milk, eggs, oilseeds, grain in the world.
2. Maximize production of digestible protein in order to feed the world.
3. Enact government policies that encourage & finance much greater productivity and production in an increasingly GHG emission efficient manner.
4. Invest in infrastructure for cost & time efficient transportation to Canadian & global populations (roads, rail, ports).
5. Encourage agri-food capacity expansion, facility modernization, technology development & adoption through ease of access to capital.
6. Develop & agree upon sequestration metrics and measurements, encourage sequestration maximizing management practices (education & carbon credits) and allow farm land and crown land to take credit where credit is due.


Canadian Agriculture.
A Force For Food.
A Force for Good.
Grand Valley
FORTIFIERS
FOR SOUND NUTRITION