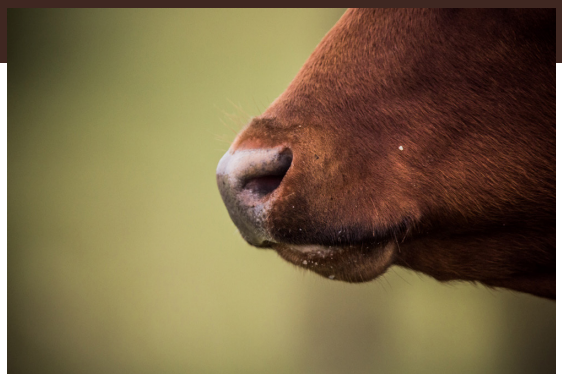
METHANE

Updated Jan. 2024



BACKGROUND

The majority of concerns about greenhouse gas (GHG) emissions associated with cattle involve methane (CH_4). Methane emissions from cattle are primarily from enteric fermentation in the rumen, which allows cattle and other ruminants to digest forages, plant-life and crop by-products that humans cannot.

THREE MAIN GREENHOUSE GASES

Cattle production contributes to the emissions of three main GHGs, all differing in their impact according to their strength, lifespan and rate of emittance:

- **Methane (CH_4)** is the most abundant GHG produced by cattle, formed during rumination as a natural by-product of forage digestion. It is a short-lived gas,breaking down after about 12 years.
- **Carbon dioxide (CO_2)** comes from the burning of fossil fuels for transportation, feed production, etc. and is a long-lived gas, taking centuries to break down, resulting in constant accumulation in the atmosphere.
- **Nitrous oxide (N_2O)** is from excess nitrogen, which may come from fertilizer or from the urine and manure of animals as a by-product of consuming and digesting excess protein in the diet.

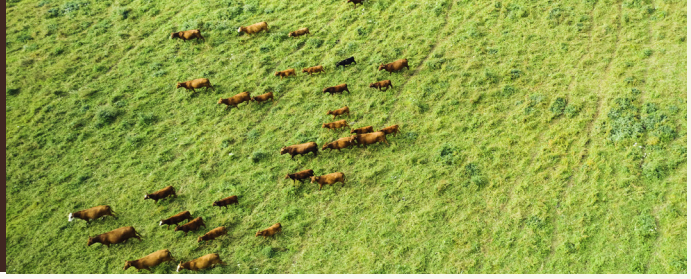
KEY MESSAGES

- **Canada is a leader in reducing GHG emissions associated with beef production.** Since 2014, producing and consuming 1 kg of beef creates 15% less GHGs than it did in 2021, due to an increase in production efficiencies.
- As part of the **2030 Beef Industry Goals**, we are working together to reduce primary production GHG emission intensity of Canadian beef by a further 33% by 2030. The sector is on track to meet this goal.
- **Cattle are upcyclers** transforming grasses and other human inedible feed into nutrient-dense protein[1] and natural fertilizer which contributes to increased soil health[2], crop productivity and human nutrition[1]. They can do this thanks to their unique digestive system, primarily the fermentation capabilities of the rumen. The process of breaking down human inedible feed produces methane as a by-product[3].
- **Methane from cattle is part of the biogenic carbon cycle**. Released through belches, methane goes into the atmosphere for a period of approximately 12 years until it breaks down into biogenic carbon. During photosynthesis, plants capture this carbon and store it until a grazer comes along, digesting it and releasing the carbon as methane, for the cycle to continue[4].
- **Methane is a short-lived GHG** compared to emissions from fossil fuels that stay in the atmosphere for thousands of years[5].
- There is ongoing research and innovation in the methane reduction space, including a **new Canadian Food Inspection Agency (CFIA) approved feed ingredient** commercially available as 'Bovaer' (3-NOP), which has shown to reduce methane by 45% on average in the feedlot.

Canadian Cattle Association

CANADIAN BEEF™
Public & Stakeholder Engagement

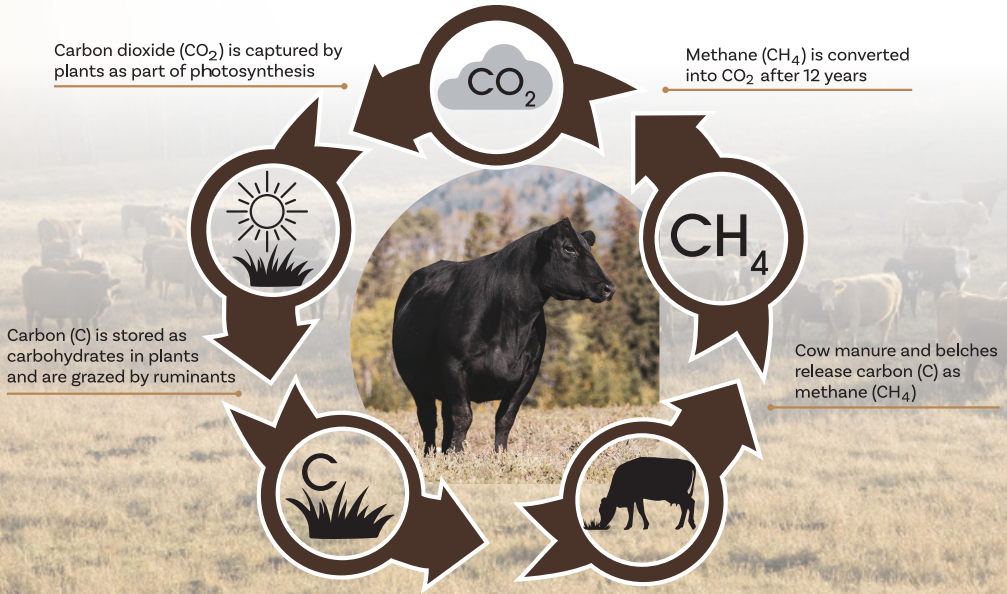
GLOBAL WARMING POTENTIAL



GWP100 and GWP*

- GHGs are compared by a system referred to as **GWP100** (Global Warming Potential over 100 years), which standardizes the Global Warming Potential (GWP) of all GHGs to the equivalence of carbon dioxide (CO_2 = 1, CH_4 = 28, N_2O = 265). In other words, methane and nitrous oxide have a warming potential 28 times and 265 times higher than 1 tonne of carbon dioxide over 100 years, respectively. This method does not account for the short-lived behaviour of gases like methane.
- GHG emissions of a product or process are typically evaluated through Life Cycle Assessment (LCA) methodology which utilizes GWP100.
- To incorporate the behaviour of the gas, **GWP*** was developed out of Oxford University.
- According to GWP*, if cattle herds remain stable the methane emitted will be destroyed at the same rate it is produced, thanks to the biogenic carbon cycle.
- Using GWP* shows that the global warming potential of methane is significantly lower when taking into consideration the short-lived behavior of the gas[5].
- Since 2016, Canada's national herd has shrunk by 16% and the industry has reduced its biogenic methane emissions due to improvements in production efficiency. Combined, this has resulted in a carbon offset of around 0.26 million tonnes between 2000 and 2021, resulting in a cooling effect or negative GWP* value in 2021[6].

THE BIOGENIC CARBON CYCLE



Scan to learn more about the biogenic carbon cycle with Dr. Karen Beachemin

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