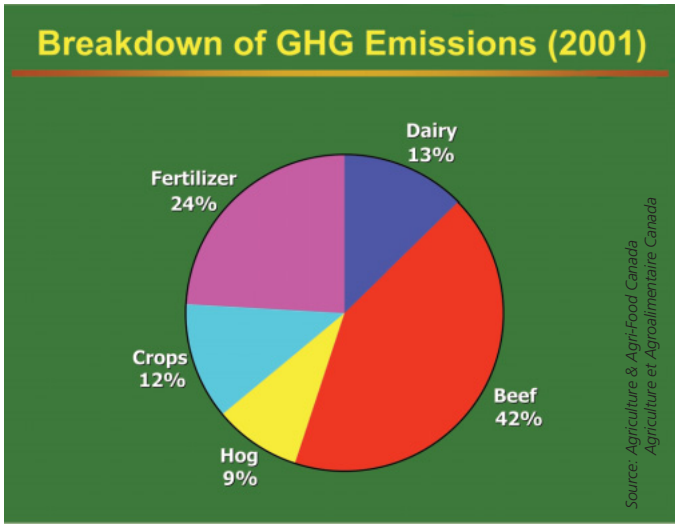
Good Management
practices

Greenhouse Gases and the Canadian Beef Cattle Industry

GREENHOUSE GAS emissions

Based on methods developed by Agriculture and Agri-Food Canada (AAFC), Environment Canada has determined the agriculture sector is responsible for about 10 percent of total emissions of greenhouse gases (GHG) in Canada.

Nitrous oxide, methane and carbon dioxide are considered to be the main greenhouse gases. Carbon dioxide (CO_2) is the main greenhouse gas emitted by most industries. The primary gases emitted by agriculture are methane from livestock digestion and manure, and nitrous oxide from manure handling and storage and commercial fertilizer.

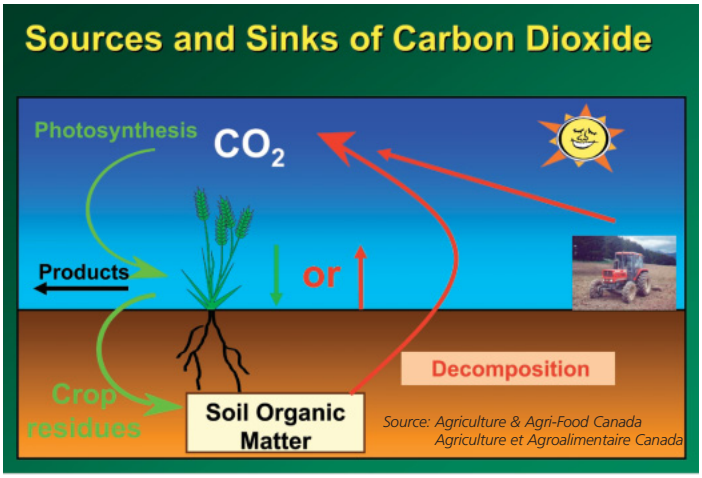


Carbon Dioxide Equivalent (CO_2-e) is a measure used to compare the emissions from various greenhouse gases based on their global warming potentials (GWP).

Methane has 21 times the GWP as carbon dioxide; and nitrous oxide has 310 times the GWP of carbon dioxide.

Carbon is given off as carbon dioxide when plant material decomposes in the presence of oxygen. If oxygen is absent the decomposition process emits methane.

Microorganisms in the soil will convert methane to carbon dioxide and thus soils are able to absorb methane.



When organic materials decompose in submerged or water-laden soils, the water reduces the oxygen supply causing the release of large amounts of methane. In the

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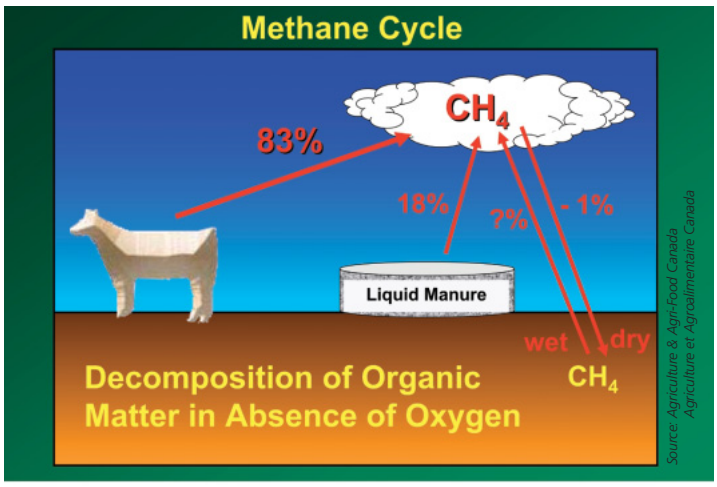
GREENHOUSE GAS emissions

agricultural soils of Canada, methane emission is confined to localized wetland areas and to brief periods when low-lying soils are submerged during snowmelt or after high precipitation.

Soils can either release methane or absorb it, depending largely on moisture content.

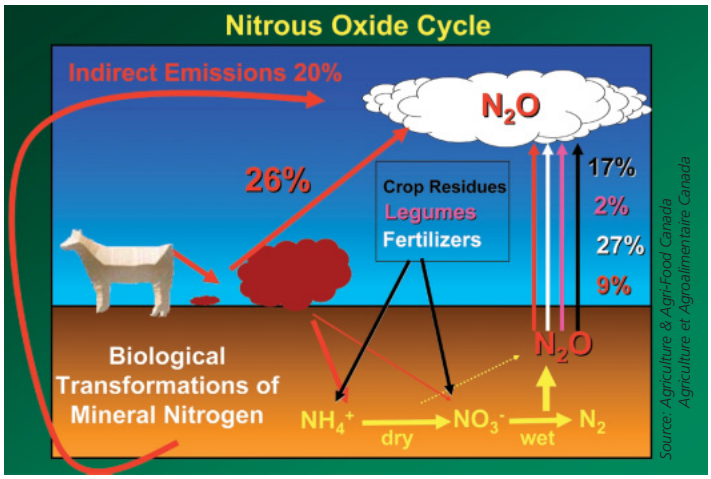


There are also natural sources of methane. These include wetlands, permafrost, termites, oceans, lakes and wildfires. It is estimated that these sources are about 30 per cent of worldwide total methane emissions.

Ruminant animals such as cattle, sheep and goats digest forages through a process that happens anaerobically (without oxygen). This process happens in the rumen, the first of four stomachs.

While all animals produce methane during digestion, cattle and other ruminants produce more due to relatively slow feed fermentation in the rumen .

When manure decomposes in the presence of oxygen as would happen in a pasture situation, carbon dioxide is released. If the manure is stockpiled or stored in a liquid form the lack of oxygen forces the decomposition pathway to produce methane.



Nitrous oxide release from the soil is most significant when moisture content is high, oxygen levels are low and nitrate and carbon concentrations are high.

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