

CARBON SEQUESTRATION

Carbon sequestration refers to capturing carbon dioxide (CO_2) in the atmosphere and “sequestering” or storing it as carbon in soil in the form of soil organic matter.

On Canadian farms, carbon is stored mostly in soil organic matter. The vast majority of soil carbon comes from plants.¹ As plants grow and die, they leave behind carbon-rich organic compounds in the soil, often referred to as **soil organic matter** or **humus**.

Soil carbon sequestration, or **carbon farming**, is one way that agriculture helps reduce global greenhouse gas emissions.² It also creates healthy, productive soils that have high levels of soil organic matter.

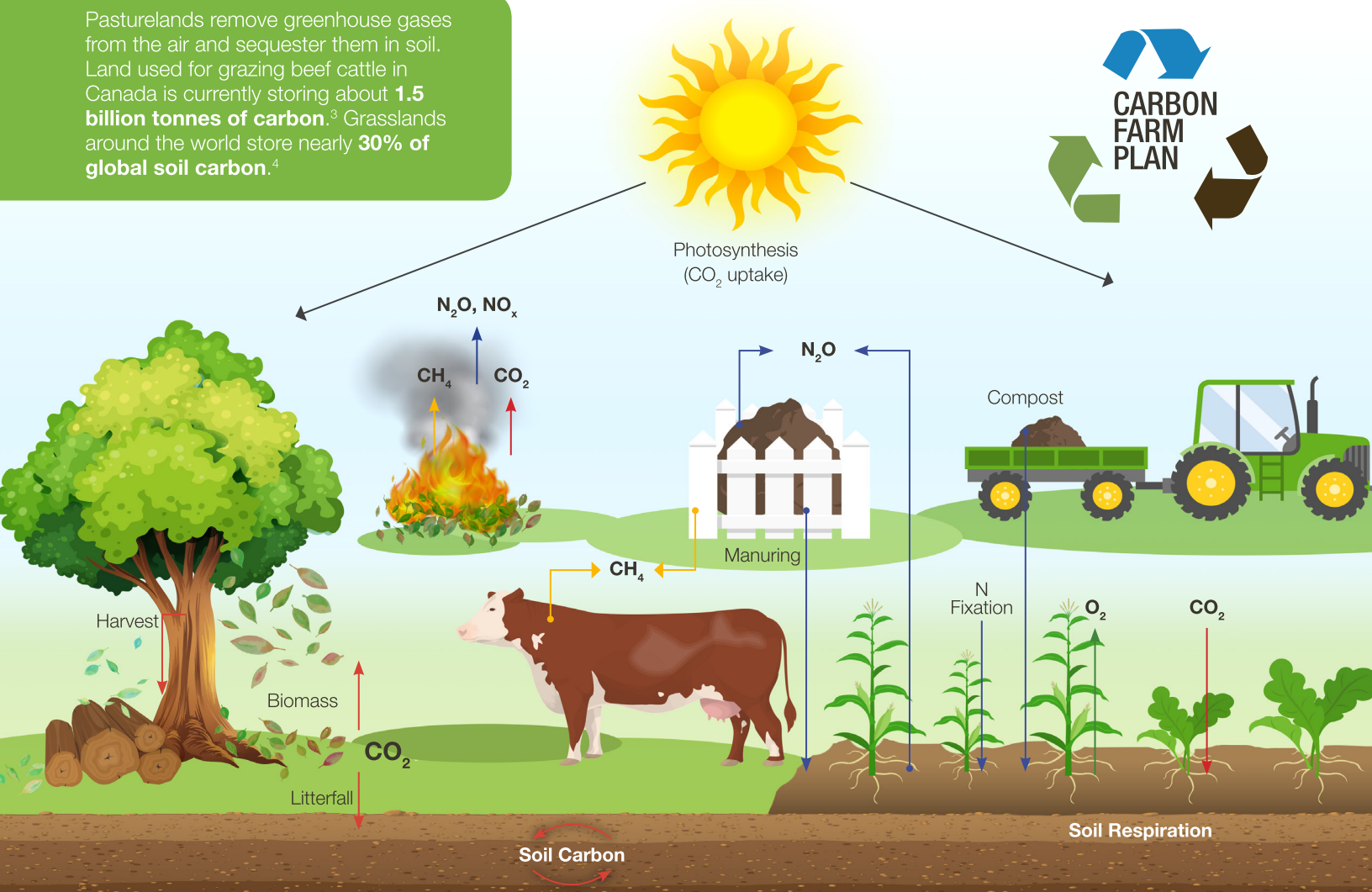
Pasturelands remove greenhouse gases from the air and sequester them in soil. Land used for grazing beef cattle in Canada is currently storing about **1.5 billion tonnes of carbon**.³ Grasslands around the world store nearly **30% of global soil carbon**.⁴

THE CARBON CYCLE IN AN AGRICULTURAL ECOSYSTEM



Nature uses carbon to store energy. In the air, carbon exists mostly as carbon dioxide (CO_2). Through photosynthesis, green plants use CO_2 . Plant materials are then eaten by microbes, cattle and humans that use the energy contained in the plants to live and grow, and release CO_2 in the process. The unconsumed plant material eventually decomposes and adds organic matter containing carbon and nutrients to the soil.

Cattle help recycle carbon from the atmosphere, too. Cattle manure contains plant nutrients (carbon, nitrogen, phosphorus, etc.) that, after they decompose provide nutrients for plants to grow. Some of the manure decomposes into soil organic matter.



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AGRICULTURAL ACTIVITIES THAT SEQUESTER CARBON^{6,7,8}

By managing soils for growing healthy crops and raising healthy livestock, the world's farmers are managing soil carbon reservoirs. If the rate of carbon input exceeds the rate of loss, carbon accumulates. This is called a **carbon sink**.⁹

Some energy-rich carbon materials can be stored for thousands or millions of years before being slowly cycled back to CO₂. For example, soils contain vast amounts of carbon held in organic matter. Fossil fuels such as coal, oil and natural gas also come from plant carbon sequestered eons ago.⁵



Some 'best management practices' that build the soil carbon sink are:

- Conservation tillage results in more plant material (residues from the previous year's crop) being returned to the soil to be converted into soil organic matter and stop soil erosion
- Adding animal manures to soil
- Growing legumes like peas, lentils, beans, chickpeas or alfalfa which help produce nitrogen, an important soil nutrient, to create healthier soil capable of sequestering more soil carbon faster
- Converting land not suitable for growing crops to grasslands for grazing livestock
- Planting trees and shrubs for wildlife habitat
- Moving grazing cattle from pasture to pasture (rotational grazing) to ensure plants and soil remain healthy



In addition to sequestering carbon in the soil, these practices also increase soil productivity, enhance the quality of water running off or draining from agricultural land, and provide a more hospitable environment for wildlife.¹⁰

In the year 2000, for the first time in Canada's history, agricultural soils sequestered more carbon than was emitted as result of a strong commitment to improve soil health and stop soil erosion.¹¹

Conservation tillage

