

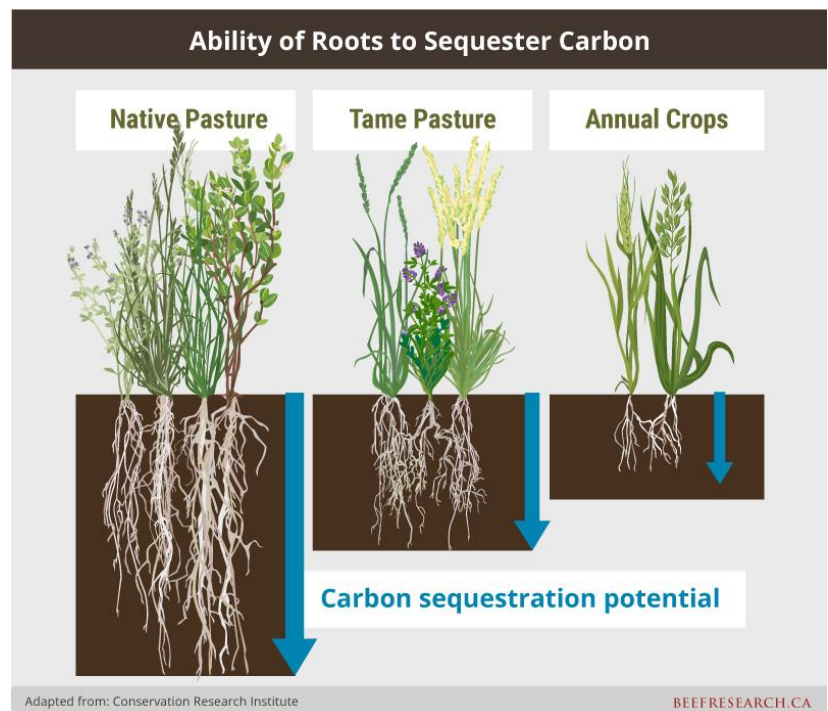
Grasses and Climate Resiliency

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When we think of grasses we often think of lush green pastures or hay fields. What we may not think of are the complex system of roots beneath the soil surface. It is these roots that convert nutrients to forage, prevent the erosion of topsoil and store carbon (soil sequestration) in the ground.

Carbon sequestration is a vital process involving the transfer of carbon (C) from the atmosphere into the soil. This occurs primarily through plants, which absorb carbon dioxide during photosynthesis. Some of this carbon is stored in the parts of the plants that grow above-ground, while the rest of the carbon travels down to the roots, where it promotes further growth and nourishes soil microbes. As plants and microbes die, some of the carbon they stored becomes part of the soil.

Forages, including native grasslands, are a critically important part of the carbon cycle because of their sequestration potential. Studies from Florida and the United Nations estimate that 90 to 97% of carbon storage in grazing lands is located underground. By storing carbon in their roots, grasses can help regulate levels of carbon dioxide in the atmosphere. Over time, this process helps remove carbon dioxide from the atmosphere and, when occurring in soil that may be depleted in soil organic matter, can help boost soil carbon stores, offsetting a portion of the rise in atmospheric carbon.



Greenhouse gases, which include carbon dioxide, methane, and nitrous oxide, have always existed in the atmosphere, but since the Industrial Revolution, greenhouse gases have been released at a higher rate.

In agriculture, the carbon cycle occurs naturally, and sequestration is only one step in the cycle.

Ruminant animals, including cows, produce carbon dioxide and methane. But cows are grazing on ranches that have pastures, wetlands, and woodlands, and those ecosystems that the animals live and range on absorb carbon too.

Grasslands and forage crops play a valuable role in sequestering carbon. Worldwide, grasslands store up to 30% of the world's organic carbon.

Grazing practices are pivotal in this process. When cows graze on grass, it stimulates root growth by removing some of the plant's leaves, thus increasing the land's capacity to store carbon. Conversely, without grazing, plants may invest more energy in above-ground growth at the expense of root development, leading to less soil carbon storage. According to Boughton, (Archbold Biological Station, Florida) if you remove grazing from a pasture, grasses start to disappear and shrubs take over. The shrubs invest in the above-ground growth at the expense of root development, leading to less soil carbon storage.

The outcome is that a well-managed pasture can sequester more carbon than they emit, while overgrazing can have the opposite effect.

Indicators of a healthy, carbon-sequestering pasture include lush, green grass and robust growth. Conversely, areas with bare soil and unhealthy plants are not as likely to contribute positively to carbon storage.

Producers can implement several practices to enhance carbon sequestration on their lands. The main thing is to not overgraze pastures. Rotational stocking, where a pasture is given a period of rest, may help avoid overgrazing and promote root growth. If rotational stocking isn't feasible due to just one pasture on the operation, stocking rate should be adjusted to avoid overgrazing.

Other beneficial practices are to include legumes to enrich the soil with nitrogen which helps promote grass growth and consider including native grasses when rejuvenating perennial grasslands due to their higher root to shoot ratio..

By adopting these strategies, producers can improve their pastures while actively contributing to the reduction of atmospheric carbon dioxide, fostering a more resilient agricultural landscape.