"Working Grasslands, Agriculture's Secret Solution"

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Can you keep a secret? Because I have just learned the most amazing fact. Agriculture doesn't destroy the environment and doesn't cause global warming. Instead, livestock and rangelands help improve air quality for us and future generations through a process called carbon sequestration.

Why should we care? According to the Natural Resources Defense Council, global warming is a big deal. It occurs when carbon and other air pollutants collect in the atmosphere and absorb sunlight. Carbon dioxide is the most abundant greenhouse gas, and the increased concentration of it is the issue (MaMillan, 2021). The impacts of global warming are many. Icecaps are melting, rivers are shrinking, plant and animal habitats are shifting, growing seasons are impacted with trees and crops blooming sooner (Shaftel, 2022). The Environmental Protection Agency states, "Projected increases in temperatures, changes in precipitation patterns, changes in extreme weather events, and reductions in water availability may all result in reduced agricultural productivity," and affect food quality (Environmental Protection Agency, 2022). In addition, rising carbon dioxide levels directly affect the nutritional value of crops by reducing protein and essential minerals in many plants. This is a threat to human health (United States Environmental, 2022).

How do we minimize the impact carbon dioxide has on the Earth? Carbon naturally cycles from the ground to living organisms, then to the air, and then back to the ground. Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide into the ground deeper, for longer periods of time. This process reduces the amount of carbon dioxide in the atmosphere and decreases global climate change

(Environmental Protection Agency, 2022). Our livestock and rangelands are two very effective, efficient, and natural tools that aid in carbon sequestration and storage.

While livestock produce delicious and nutritious foods for human consumption, they also utilize grasslands that sequester significant amounts of carbon in the form of soil organic carbon, which reduces climate change. Grasslands store carbon in the soil, even preventing its release back into the air during wildfires (Kerlin, 2018). An acre of grass will sequester approximately 3,600 pounds of carbon dioxide per acre annually. Project Drawdown estimates that, combining trees and grazing livestock operations on the same land "can sequester almost two tons of carbon per acre per year, making it one of the most effective carbon-storing tools in agriculture" (Nargi, 2018).

Working grasslands are key to carbon sequestration. Not only are rangeland grasses feed for livestock consuming carbon, the University of California in a 2020 study found, "Grasslands and rangelands are more resilient carbon sinks than forests" (University of California, Davis, 2020).

Rotational grazing allows for increased carbon sequestration in the soil. When livestock graze, forage is provided with carbon and nutrients from manure. This stimulates plant growth and keeps it in the growing cycle, working longer (Rodale Institute, 2020). As a result of the higher photosynthetic rates, more carbon is captured into the plant leaves and released by the roots into the soil in the pasture ecosystems. Grazing encourages plants to send out deeper roots. Those roots are continually cast off to decompose in the ground, increasing soil biomass. (Rodale Institute, 2022).

As reported by the University of California Agricultural and Natural Resources, "The management of rangelands, through grazing, can lead to increased forage

production and longer growing seasons, which can both meet ranch goals and increase the carbon sequestration on rangelands" (Larson, 2017). Rangelands account for 48% of forage land area and more than one-third of the world's natural carbon preserves (Larson, 2017). Because of the large area, grasslands have the potential to sequester a significant amount of additional carbon from the atmosphere with planned rotational grazing. In addition, based on industry standards, rangelands sequester at a rate of 2.15 tons per acre, while croplands although they still sequester carbon, only do it at a rate of 0.6 tons per acre

Unfortunately, our rangeland prairies and grass habitats are being converted into croplands at an increasingly alarming rate. Landowners converted 54.7 million acres of grassland to cropland in the northern Great Plains from 2009 through 2017 (Augustine, 2021).

While there are many problems contributing to global warming, with proper management, livestock and rangeland can be part of the solution, not part of the problem as is often portrayed. Carbon is sequestered in soil by range grasses through photosynthesis and stored as soil organic carbon. Livestock completes the picture by grazing and providing manure as natural fertilizer, which triggers additional plant growth. Agriculture is not the enemy in the attempts to manage our planet correctly; our working grasslands, could very well be the answer and the best kept secret in agriculture. I've never been good at keeping secrets, and to be honest, I do not know why we are keeping this a secret. So, I am going to share it, and I hope you to share it too.

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