ONA REPORTS

published in

THE FLORIDA CATTLEMAN AND LIVESTOCK JOURNAL

September 2009

Ecological benefits of pasturelands in Florida

Maria L. Silveira
University of Florida/IFAS

For questions or comments regarding this publication contact
Maria L. Silveira

Pasturelands provide more than just grass for grazing animals. Native and improved pastures are the dominant land use in the USA and worldwide, covering nearly 130 million acres in the southern USA. Pasturelands are a major resource utilized for food production and are critical for maintaining environment sustainability. They provide important ecological services that mitigate drought and flooding, protect water and soil quality, maintain biodiversity, provide wild life habitat, and contribute to climate stability.

Although the effects of increased atmospheric carbon dioxide (CO_2) concentrations on global climate remain unclear, there is a general scientific consensus that elevated atmospheric CO_2 concentrations can lead to serious environmental issues worldwide. The concentration of CO_2 in the atmosphere has risen from approximately 280 ppm (by volume) in the mid-1800s to 371 ppm in 2001. This increase is largely related to the increase in fossil fuel combustion and changes in land use. Multiple approaches have been proposed to stabilize atmospheric CO_2 concentrations. Increasing carbon storage in terrestrial ecosystems, also referred as carbon sequestration, has been promoted as a means by which substantial amounts of CO_2 may be removed from the atmosphere. Pasturelands, because their large extent and diversity, have significant impacts on the earth's carbon and can potentially sequester large amounts of carbon. Research has estimated that from 29.5 to 110 Tg (1 Tg= 100000 metric ton) carbon can be annually sequestered in pasturelands in the USA. Unlike tropical forest where the majority of the carbon is the vegetation, as much as 90% of carbon stocks in pasturelands are located in the soil. Storage of carbon in the soil represents the best long-term option for carbon storage in terrestrial ecosystems because most soil organic matter has a longer residence time than most plant biomass.

Carbon additions to soil are favored by management practices that increase plant residues

and reduce soil organic matter decomposition. Pasture management is a crucial factor that can dramatically impact forage production and, therefore, carbon sequestration potentials. Current pasture management practices are generally aimed at increasing above-ground biomass yield. However, management strategies may also promote carbon storage in the soil. Within established pastures, soil carbon can be increased by eliminating soil disturbances and increasing primary production through improved grazing management, fertilization, sowing improved forage species and legumes, or irrigation. Conversely, management practices that degrade pastures such as overgrazing often result in decrease in soil carbon concentrations. Besides the important ecological benefit, increasing the storage of carbon in soils can offer significant accompanying advantages: improved soil and water quality, decrease nutrient loss, reduce soil erosion, better wildlife habitats, and increase forage yields.

Although the use of biomass as an alternative renewable energy source has not been implemented yet on a large scale, pasturelands in Florida can potentially become important sources of biomass fuel and play a critical part of the overall carbon management strategy in the USA. Opportunities for increasing soil carbon sequestration in pasturelands in Florida and the co-benefits of biofuel production are expected to provide significant long-term benefits. Carbon trading-related markets and the growing interest in carbon sequestration as mechanisms for environmental protection are also expected to enhance the economic value of the ecological services provided by Florida's pasturelands. Research is being currently conducted at the Range Cattle Research and Education Center to investigate the potential of pasturelands for generating synergies between carbon management and sustainable energy production. Our goal is to provide science-based information that addresses the ecological benefits of enhancing carbon sequestration in pasturelands in Florida, thus farmers can potentially earn income from carbon sequestration credits for adopting practices that promotes soil carbon storage.