Grazing of cattle pastures can improve soil quality

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A team of U.S. Department of Agriculture (USDA) scientists has given growers in the Piedmont guidance on how to restore degraded soils and make the land productive. Researchers with the USDA's Agricultural Research Service (ARS) found that if cattle are managed so that they graze moderately, soil quality can be restored and emissions of carbon dioxide (a greenhouse gas) can be reduced.

ARS is USDA's principal intramural scientific research agency. The research, published in the *Soil Science Society of America Journal*, supports the USDA priority of responding to climate change.

Cotton, soybean, sorghum and wheat are widely grown in the Piedmont, an area which stretches from Alabama to Virginia. But decades of plowing have degraded the soil and growers have slowly allowed much of the land to revert to forests and pastures, according to Alan Franzluebbers, an ecologist at the ARS J. Phil Campbell Sr. Natural Resource Conservation Center in Watkinsville, Ga.

Franzluebbers led a project where grasses were planted on rolling, eroded land in northeastern Georgia and pastures were grazed by beef cattle to assess grazing effects on soil quality. Coastal bermudagrass was planted initially. After five years, tall fescue was drilled into the bermudagrass to extend the grazing season from five months to 10 months of the year. The research team included retired ARS scientists John Stuedemann and Stan Wilkinson.

The researchers varied the number of cattle per acre and assessed how the soils responded to different grazing scenarios. Under each scenario, they looked at the amount of soil compaction that occurred, the amounts of organic carbon and nitrogen in the soil, and the amounts of surface plant residues, which help prevent erosion. They also looked at how the soil responded to three different fertilizer treatments (inorganic, mixed inorganic and organic broiler litter, and organic broiler litter).

From an environmental standpoint, grasslands have traditionally been viewed as best managed by leaving the land unused. But the team found that while fertilizer type made little difference, different grazing scenarios produced different effects, and the grazed land produced more grass than the ungrazed land and had the greatest amount of carbon and nitrogen sequestered in soil. Sequestering carbon and nitrogen in soil has become a major goal for agriculture, because that sequestration reduces greenhouse gas emissions.

More information: Read more about this research in the March 2011 issue of Agricultural Research magazine. www.ars.usda.gov/is/AR/archive/mar11/soil0311.htm

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