Legislative Council Staff
Nonpartisan Services for Colorado's Legislature

Issue Brief
December 2025

Regenerative Agriculture

By Leena Vilonen

Regenerative agriculture includes farming and ranching practices that reduce environmental impacts, maintain soil longevity, increase soil nutrients, and retain soil moisture, while simultaneously increasing or maintaining crop production. This issue brief provides information to policy makers about commonly used regenerative agriculture practices, and highlights state and federal resources to assist producers in implementing these practices.

What is Regenerative Agriculture?

Currently, there is no legal definition of regenerative agriculture in the Colorado state law, but practices commonly associated with regenerative agriculture include:

- cover cropping;
- fertilizer management;
- changes to tilling practices;
- residue management; and
- livestock integration.

The goal of these practices is to increase the long-term stability and health of the soil, while also reducing environmental impacts and increasing farm productivity or crop yield. Examples of potential environmental impacts include soil degradation, erosion, and runoff from fertilizers and pesticides.

Soil Health and Nutrients

A key aspect of regenerative agriculture is increasing soil nutrients, such as carbon and nitrogen to improve soil health. The United States Department of Agriculture Natural Resources Conservation Service (NRCS) defines soil health as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans." Soils contain minerals (i.e., broken down rock), organic matter (i.e., dead plant, animal, or microbial material or waste), water, and soil organisms that allow crops to grow. Scientists and producers often measure the amount of soil nutrients to assess the health of the soil. Stored organic carbon is of particular interest, because it creates aggregates that stabilize soils and increase nutrient storage, improves water retention, and supports soil organisms. These organisms then break down and decompose the organic matter in order to perpetuate the flow of nutrients. The by-products of this breakdown process create forms of nitrogen and phosphorous that plants are then able to uptake. Plants further supply carbon to these microorganisms either though dead plant matter or through carbon obtained from photosynthesis that is released by root systems (i.e., root exudates).

Cover Cropping and Fertilizers

Cover crops are crops, grasses, or other vegetation that can be planted in between growing seasons to maintain soil health, control erosion, and enhance water storage and soil organism activity. Cover crops can also increase soil carbon, which as previously mentioned, can further improve soil health and reduce carbon in the atmosphere. Using a diversity of cover crops can also attract pollinators and increase biodiversity.

Regenerative agriculture also encourages the proper management of synthetic fertilizers, which can impact bodies of water and increase costs. Instead, some cover crops can be used to increase non-synthetic forms of nitrogen in the soil. For example, legumes, such as clover or certain peas, increase nitrogen in the soil by converting atmospheric nitrogen into nitrogen that plants can use and in return, pull carbon from the plant. This allows nitrogen to build up in the soil over time. Research has also shown that some cover crops, especially legumes, can increase crop yield over time.

In water-limited dryland systems, drought-tolerant cover crops should be considered, as some cover crops used in semi-arid regions of Colorado have shown mixed results for crop yields. Examples used in Colorado include buckwheat, cowpea, millets, hairy vetch, sorghum, and yellow sweet clover. The benefits of cover cropping often take years to realize, can be challenging to measure, and vary with specific climates and soil types.

Tillage and Residue Management

Changes to tilling practices and residue management have also been shown to increase soil nutrients, benefit soil aeration, reduce compaction, increase soil water capacity, and improve soil aggregate formation. Conventional tilling removes crop residue and prepares the top layer of soil for planting. Removing crop residue and tilling the top layer can reduce nutrients returning to the soil, cause erosion, decrease soil moisture, reduce soil organisms, and deplete organic matter. However, tradeoffs for farmers should also be considered as reduced tilling and no-tilling practices can have high upfront costs to purchase or rent new equipment. Similar to cover cropping, it may also take time to detect increases in soil carbon.

Livestock Management

Livestock integration is another important aspect of regenerative agriculture that can help reduce weeds and increase nutrient return to the soil via manure. Another form of livestock intervention is called adaptive multi-paddock grazing (AMP), where ranchers move livestock through smaller sections of grazing land to allow for the recovery of grazed lands. Overgrazing can deplete vegetation and leave the soil bare, while AMP can help improve soil health by increasing carbon stored in the soil and reducing atmospheric carbon.

Federal and State Resources

The NRCS has federal programs to assist farmers and ranchers in implementing conservation practices including practices used in regenerative agriculture. The Environmental Quality Incentives Program (EQIP), which provides financial and technical assistance to farmers and ranchers to integrate conservation practices that improve water quality, conserve water, increase soil health, reduce erosion, and improve wildlife habitat. The Conservation Stewardship Program (CSP) helps farmers and ranchers develop conservation plans, including cover crops, and provides personalized advice and financial incentives to improve conservation efforts.

The Colorado State Land Board (SLB) and the Colorado Department of Agriculture (CDA) have also developed assistance programs to help farmers and ranchers implement regenerative agriculture practices. The SLB's regenerative agriculture program provides education, partnerships, and innovative lease stipulations that incentivize land stewardship. CDA's Colorado Soil Health Program offers soil health guidance, resources, and troubleshooting, to farmers and ranchers through its Colorado Soil Health Hotline. The Agricultural Stewardship Tax Credit, created through House Bill 24-1249, offers refundable tax credits through 2030 to encourage farm and ranching practices that improve soil health and water efficiency, or create more diverse and beneficial ecosystems while maintaining productivity.

Senate Bill 25-283 also transferred $500,000 from the Colorado Water Conservation Board Construction Fund to the Plant Health, Pest Control, and Environmental Protection Cash Fund within CDA to assist in the continuation of the department's soil health program.

Mutual Benefits

Overall, the goal of regenerative agriculture in Colorado is to ensure that farming and ranching is sustainable in the long term by increasing nutrient storage in soils and reducing potential impacts, resulting in mutual benefits to both farmers and the environment. While benefits to crop yield can be variable, especially in dryland systems, recent trends to increase production over time have been positive. Finally, a multi-pronged approach that combines several regenerative agriculture practices has been shown to have better outcomes than using a single approach.