

Regenerating Grasslands and Sustaining the Beef Industry

Regenerative ranching and sustainable practices are imperative to the future of the beef industry.

By **Macey Mueller**

Environmental stewardship is a critical component of the beef production system. This is the first in a series of four articles that will highlight the conversations, the practices and the outcomes related to ensuring a long-term food supply and a positive environmental impact.

As consumers' demand for beef continues to increase, so does their desire to know more about how that beef was raised and what producers are doing to ensure responsible beef systems.

Although farmers and ranchers have long been good stewards of the land, the topic of sustainable agriculture has gained significant traction over the last several years in light of consumer concerns about animal welfare, environmental protection and climate change.

While it's not a completely new concept, regenerative agriculture — the practice of using land to improve or restore the overall quality of water and soil — is starting to make its way into the conversation.

Both sustainable and regenerative agriculture focus on building resilience to climate change and bringing strength and vitality to the global food production system, but Phillip Lancaster, research assistant professor at Kansas State University's Beef Cattle Institute, said in thinking about the two terms, sustainability has implications of maintaining the status quo, whereas regenerative has an implication of enhancing and increasing.

"Oftentimes, the practices involved — improving soil health, increasing productivity, matching cattle to their environment and avoiding overgrazing — are similar," he said. "It's really more about the context in which it's done. For example, if you are using these practices to add soil organic matter, you are using regenerative agriculture to reach the achievable maximum, but if you've already reached that maximum in the soil, you are using these practices to sustain that level of soil organic matter."

Sustainability and soil

Soil organic matter is important because it provides nutrients for growing plants and crops and is an integral part of the carbon sequestration process in which carbon dioxide is removed from the atmosphere and stored in the soil carbon pool.

Lancaster said to achieve long-term carbon storage, it needs to be absorbed deep into the soil through plants with deep roots that eventually die and decay, leaving the carbon in the soil longer. Carbon sequestration is highly dependent on the environment — arid regions have slower rates compared to more temperate climates with abundant forage production.

"By managing healthier above-ground forage production, we are getting more root development and depth and getting more carbon down into the soil," he said.

Grasslands are estimated to contain 20% of the world's soil organic carbon, and regenerative agriculture is generally used to replace soil carbon lost to soil tillage or overgrazing. Lancaster said the adoption of management-intensive grazing, no-till and cover cropping practices has been instrumental in replacing soil carbon during the past 30 years.

While soil health is imperative to maintaining a sufficient global food supply, Lancaster said there are other aspects of the ecosystem such as plant and animal biodiversity that also fall under the idea of regenerative agriculture.

"Researchers are beginning to understand how grassland and rangeland management impacts plant species composition and wildlife

populations and are developing novel management strategies such as patch burning to enhance plant and animal biodiversity," he said.

One of the biggest challenges related to sustainable and regenerative agriculture is often measuring success. Lancaster suggests taking a visual appraisal of a piece of land each year at the same time and in the same location to gauge improvements in vegetation.

"Cattle tend to congregate around water sources, shade and close to wherever you're putting out feed, so often those areas are going to get grazed much more heavily than areas that are half a mile from water," he said. "So if I put in some additional water sources and implement a rotational grazing program, then I should see those overgrazed areas start to recover.

"By taking pictures of those areas, I'm going to see that the vegetation is better year after year, and if the vegetation is better, I'm going to be increasing the soil carbon because I'm going to have more plant roots in the soil that are decaying year after year."

Measuring success is important, not just from a land management standpoint, but from the consumer's perspective as well.

Consumer demands

Lancaster said consumers are becoming much more aware of what's happening in the environmental arena, and it's putting pressure on the beef supply chain to better explain the drastic improvements made over the past several decades and the efforts to continue progress.

According to Environmental Protection Agency (EPA) and USDA data, the U.S. cattle herd decreased 8%, yet produced 3% more beef and lowered greenhouse gas emissions 2% during the 20-year span from 1997 to 2017. Despite the dramatic improvements in efficiency, Lancaster said society has to continue to see value in the beef production system.

"From a consumer/social standpoint, the value in beef cattle ranching is producing human food," he said. "To keep that value and maintain beef demand, we've got to continually make improvements and address some of these bigger issues such as greenhouse gases, sustainability and soil health.

"We have to maintain our credibility with the consumer and show that we're making continuous improvements."

Kim Stackhouse-Lawson, director of AgNext and professor of animal science at Colorado State University (CSU), said consumers really care about the impact their choices have on our planet.

"They're a group of consumers who really believe their investments can influence climate change. It's less about them knowing we met a sustainability goal and more about them having permission to feel good about the product they are purchasing," she said. "They want to feel beef is aligned with who they are on an emotional and ethical level.

"The beef industry is dealing with a challenging reputation where more consumers than perhaps we would like to acknowledge believe beef's environmental impact is quite large, and so we need to be proactive in developing solutions to reduce impact and connect with our consumers to help them see we are passionate about improving and making a difference."

Stackhouse-Lawson said while there are efforts being made to create a prescribed and branded system of regenerative agriculture, best practices in animal agriculture are determined by the size, location and management of the operation, and there is no one-size-fits-all approach for producers to be successful.

“When we define sustainability to include environmental, economic and social factors, producers need to be able to flex and adjust based on the needs of their operation,” she said. “That doesn’t mean there are not practices that are still important to implement, it just means silver bullets don’t exist in sustainability, and we need much more of a silver buckshot approach.”

Regenerating grasslands

However, when talking about regenerating grazing landscapes, Stackhouse-Lawson said there are three important things producers can do, including preserving rangelands, converting marginal lands back to grazing lands and practicing adaptive livestock management.

She explained adaptive livestock management is about matching the cattle and the technique to the landscape — something producers have been implementing for years — but technology currently in the works could make it trackable and measurable in the future. For example, producers may be able to harness precision herding technology and the use of GPS-collared animals in virtual fencing to strategically get cattle immediately to a field where grass is growing at the absolute perfect moment to enhance the soil and carbon sequestration without a significant investment in labor and fence.

“Adaptive management has been practiced for a very long time, as producers really think about the landscape and managing their cattle to account for biodiversity, heterogeneity and wildlife species,” Stackhouse-Lawson said. “But we’re in this exciting, pivotal moment where technology could really define what that looks like for ranchers and to help make some of those finite management decisions more cost effective.”

Producer efforts to improve soil health also affect the industry’s overall impact on the environment. Stackhouse-Lawson said according to EPA data, cattle are responsible for approximately 3.8% of all man-made greenhouse gases in the U.S., but that number doesn’t include a systems approach that also tracks carbon sinks, or the amount of carbon being stored in the ground.

That number also doesn’t consider the many other benefits grazing lands and ranges provide to society beyond carbon sequestration, and Stackhouse-Lawson said oftentimes these benefits get left out of the conversation.

“Grazing lands provide a range of ecosystem services like water quality, wildfire suppression, wildlife habitat and biodiversity, and those open spaces mean something to society,” she said. “I get worried we might get so focused on carbon, we actually damage some of those other really important ecosystem services.”

“Of course, climate change is exceptionally important, but so are those other ecosystem services. We need to continue to stay very balanced in our approach.”

Furthermore, Stackhouse-Lawson said approximately 29% of the land in the U.S. is grassland that is too rocky, steep or arid to support growing crops for food and yet can support ruminants. So it not only provides ecosystem services, but also contributes to improving food security domestically and globally.

“Those are really important sustainability attributes, and we cannot lose sight — not as an industry, not as academics, not as a society — on how important those things are to us,” she said. “We’ve got to be very practical and very system focused and patient as we attempt to understand solutions that aren’t going to create further challenges.”

Animal agriculture continues to be an integral part of our global food system and essential to food security, our culture and ecosystem health, Stackhouse-Lawson said. Regenerative practices can play into the broader goals set by individual producers and the industry as a whole.

“When we talk about regenerative and sustainable agriculture, to me, they are one in the same, but sustainability is perhaps a broader descriptor of an overarching kind of system health and regenerative is more about homing in on a micro system to ensure the system is in balance,” she said. “We tend to define regenerative agriculture as something that focuses on maximizing and restoring natural resources, while also limiting the amount of disruption to the soil and natural ecosystems. So, in our mind at CSU, it’s more about an outcome rather than the implementation of a practice.” **HW**

“Silver bullets don’t exist in sustainability, and we need much more of a silver buckshot approach.”

— Kim Stackhouse-Lawson

According to EPA and USDA data,
the U.S. cattle herd decreased **8%** yet
produced **3%** more beef
and lowered greenhouse gas emissions **2%**
during a 20-year span from 1997 to 2017.

