COLORADO SOIL HEALTH FUNDAMENTALS

PRIMER 12: MARKET SIGNALS

PRIMER 12 SUMMARY

The goal of the Colorado Soil Health Primer series is to demonstrate the core principles related to soil health management as practiced and researched within the boundaries of the State of Colorado. Colorado scientists studying the effects of management practices and the state's farmers and ranchers implementing and measuring the changes on the land participated in this project.

This series is not about instructing the exact tactics a farmer or rancher would need to improve soil health. The individual tactics and strategies must change from property to property — or even field to field – depending on the goals of the land manager, and the available natural and financial resources. This series of information will give readers the resources to understand and evaluate practical and proven ideas to explore and adapt into a new or existing operation.

This primer is about market signals and how Colorado farmers can look forward to achieving better economic returns when they adopt regenerative practices. While there is no crystal ball we can consult in agriculture, we can see that the trajectory of demand for food produced via regenerative methods is sharply upward. This, coupled with the reduced need for external inputs when regenerative practices are used, as well as the long-term benefits in productivity resulting from improved soil health, means that farmers employing such methods should be able to realize more profit.

"Markets are sending clear signals to farmers: regeneratively and sustainably grown products are in high demand."

Many producers, in fact, report significantly improved "bottom lines" as they have transitioned away from conventional practices — both as a result of decreasing input costs and from accessing premium pricing that can be associated with goods produced and marketed as regeneratively produced. Labeling systems are designed to help growers distinguish their products in the marketplace and to inform consumers of how and where their food is grown. Direct marketing, for example through farmer's markets or other direct-to-consumer strategies are also ways regenerative producers may be able to receive premium prices while simultaneously enhancing the health of their soils.

COMMON TERMS

Cover Crops: The act of keeping the ground covered and maintaining living roots are two principles of soil management, and cover crops are a key tool to help farmers transition and measure the gains.

Pasture: Fields for grazing, wildlife passage or soil remediation are common across the state of Colorado.

Soil Biology: The life in the soil, from the smallest microbes to earthworms and dung beetles. The biology is responsible for helping break down organic matter and turning it into available nutrients for your crops.

Soil Chemistry: The ratios of elements in the soil are important and go beyond N-P-K.

Soil Health: The concept of maximizing an ecosystem's ability to feed soil microorganisms, leading to efficient nutrient cycling and turnover, which creates more nutrient availability for plants, increases soil water storage, and improves ecosystem sustainability and resiliency.

Soil Testing: The process of quantifying certain attributes of soil, including macro- and micro-nutrients, soil organic matter, cation exchange capacity, soil biology, water and/or air.

NRCS: The Natural Resources Conservation Service.

Source: Jim Ippolito & Megan Machmuller, Colorado State University

USDA-NRCS
Soil Management Principles

1. Limit disturbance
2. Keep soil covered
3. Strive for biodiversity
4. Maintain living roots
5. Integrate animals

▲ Local market places are key for orchard growers — and many organic and local food growers as well — across Colorado. *Source: Colorado Department of Agriculture and Cynthia Hansen*

Market Signals — Consumers

Markets are sending clear signals to farmers: regeneratively and sustainably grown products are in high demand.

Few farmers who consider themselves "regenerative" or "sustainable" certify their farms as organic with USDA, and certification is no guarantee of better growing practices.

However, certified organic is a useful proxy for judging the demand for regenerative products, and that demand is clearly growing. Organic products have shown double-digit growth almost every year since the 1990s and are now available in three out of every four grocery stores around the country. With estimated sales increasing from $21.6 billion in 2010 to $51.6 billion in 2020, some producers benefited significantly from the increased market demand; chicken, milk and eggs rank as the top items consumers prefer organically.

Younger people in particular are increasingly conscious of the type of food they eat and express more interest than past generations in food grown in sustainable ways. According to the International Food Information Council, while 52 percent of the general population believes their food and beverage choices have an impact on the environment, a full 70 percent of Generation Z give "a little" or "a lot" of thought to whether their food is sustainably sourced.

Whether certified organic or not, "local" food can itself receive a premium. Locally grown is a marker that is increasingly being looked for by consumers. According to the USDA National Agricultural Statistics Service (NASS), sales of local edible farm

products rose 35 percent from 2015 to 2017 alone.

Stores in Colorado sell the 14th most quantity of organic products of any state, but the state's growers are not meeting all of this demand. Opportunity clearly exists for Colorado farmers to expand their offerings of regeneratively grown food.

Market Signals — Processors

Across the country there is a groundswell of activity around the processing of commodities grown without chemical inputs. Producers who are contemplating changing their practices should do so with a plan in mind for how they will sell their product to ensure they can capture the premium pricing associated with implementing the STAR soil health strategies outlined in this series.

In order for crops grown in regenerative ways to receive premium prices, they need to be stored and distributed separately from conventionally grown products. This most obviously applies to grains grown as certified organic or non-GMO, but it also applies to crops that are not under a certification regime.

Some operators in this situation choose to build their own storage facilities and to contract with specific buyers — rather than the local grain mill — to market what they grow. This requires additional marketing know-how — and desire — but it can pay off.

An example of an operation that does this is Golden Prairie Farm in Nunn, Colorado. They grow certified-organic millet — along with wheat, and yellow clover as a cover crop — on several thousand acres. Years ago they decided to build their own grain storage facilities and to market their grain to specific buyers who would give them a premium. They sell their grain to national brands for inclusion in various foods, to retailers like Whole Foods who sell it in bulk bins, and to breweries and distilleries.

Golden Prairie has expanded over the years and today serves as a grain distributor for organic millet grown on over 20,000 acres. They have become an important part of their local agricultural community, serving dozens of their neighbors.

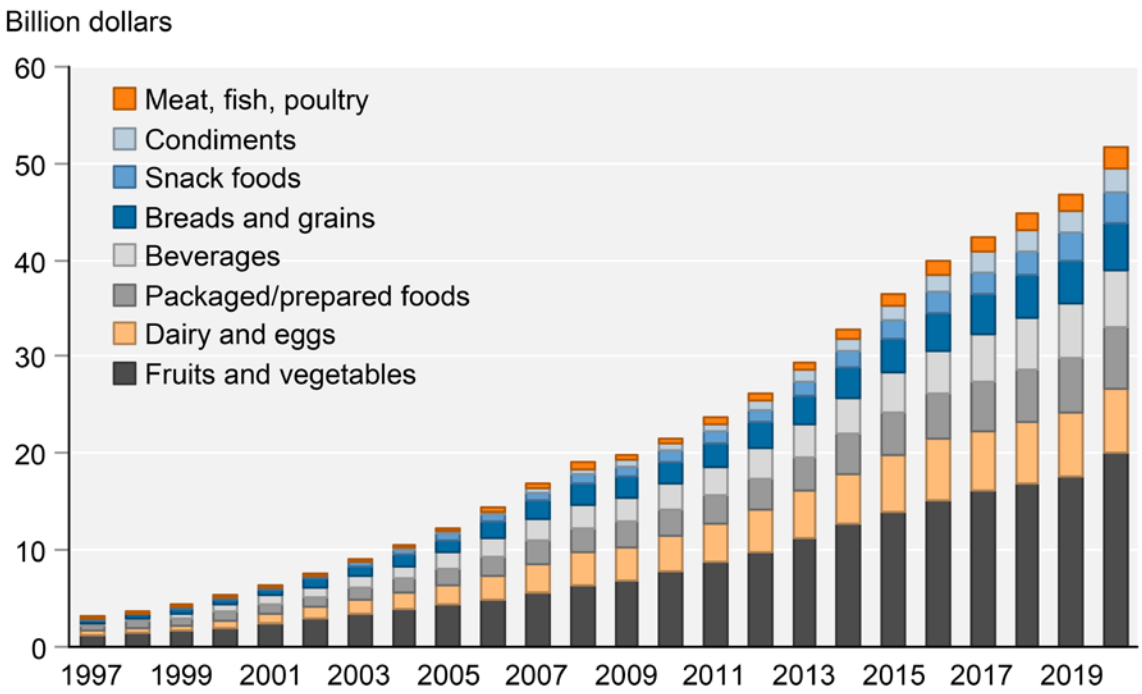
Challenges do exist, however, with processing and distributing some types of alternative grain products. Trademarked genetic traits require processors to conduct tests for each batch of grain that comes in; failing to pass the test can mean a frustrating loss of premium for producers.

Improving Farm Profitability

There are a host of benefits for regenerative producers — even if they choose not to navigate the complexities of USDA organic or other certification processes.

As noted above, regeneratively grown products, when appropriately marketed, can command premium pricing. Most organic products — again, as a proxy for sustainably grown products — are sold at a higher price, especially milk and eggs, according to

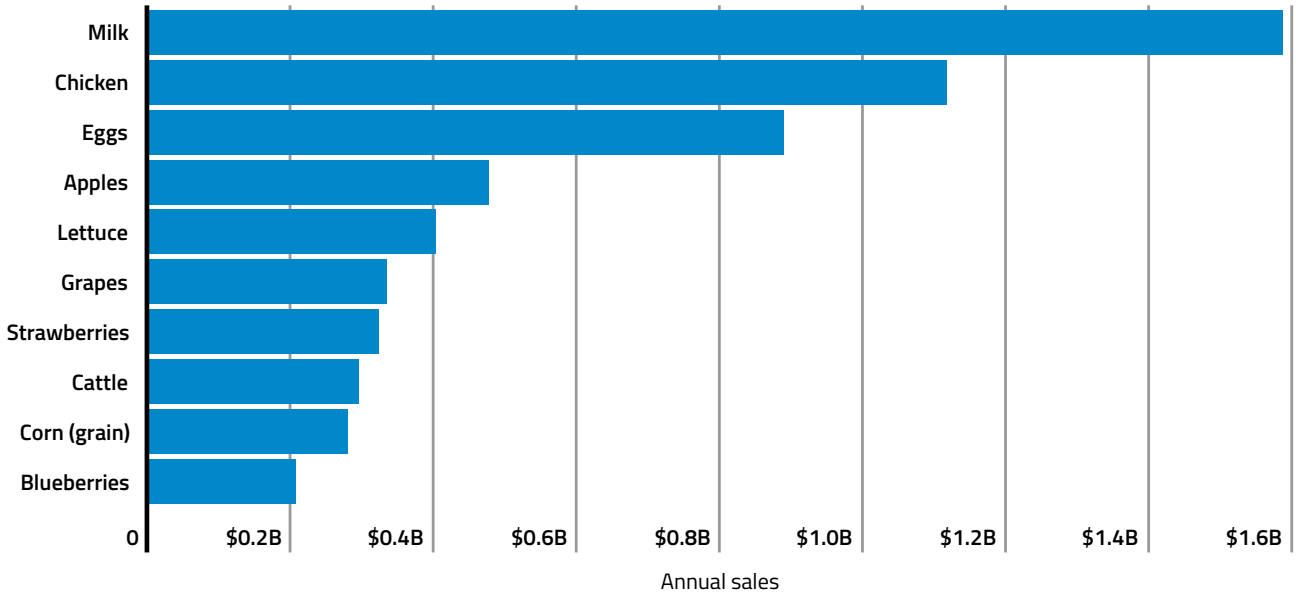
U.S. organic food retail sales by category, 1997-2020



Note: Nutrition Business Journal estimates of U.S. organic food sales are somewhat lower than Organic Trade Association estimates.

Source: USDA, Economic Research Service usig data from Nutrition Business Journal

Milk and chicken are the top two organic commodities, with more than $1B in sales each



Source: United States Department of Agriculture

the USDA's 2021 figures. While some buyers may be deterred by the expense, it is clear from the data that there is an increasing segment of the consumer market that is willing to pay the premium and associates the increased cost with the extra labor and other costs required by the farmer to operate more regeneratively.

Farmers who use regenerative methods should also expect to be able to reduce their external inputs. This can be significant, especially with recent increases in fertilizer rates; prices during most of 2022 for monoammonium phosphate (MAP), for example, were double the five-year average.

Adopting regenerative methods may have some short-term impacts on yield, however the case for implementing these methods rests on overall increased profitability plus a suite of other benefits such as reduced erosion and improved water retention in the soil, as discussed in detail in the other primers in this series.

Ecological Gains

An additional benefit for the regenerative producer — and one that adds to the balance sheet over time — is the ecological gains from such methods of farming.

A consistent refrain from those who practice organic and regenerative agriculture is to make the land better than they found it, by increasing soil function through regenerative practices. In a true regenerative system, the producer is able to reduce inputs like fertilizer or pesticide because the biology in the soil makes nutrients available to the plants; the plants are healthier and are thus more disease and pest resistant.

On a purely economic level, minimizing unnecessary inputs makes a lot of sense, but it does take time for a formerly conventional system to adapt. This adaptation time has to be built into the transition timeline. A producer can work toward addressing any soil health imbalances using practices based on the STAR principles, including integrated pest management, rotational grazing, and the use of natural products such as compost or other carbon/nutrient amendments.

Allan Andales, professor and extension specialist in irrigation and water science at Colorado State University,

offers one example of how implementing STAR soil health practices can support Colorado ecosystems: fighting soil erosion.

"In Colorado and most of the High Plains," he said, "soil erosion is caused by occasional high-intensity rainfall, high-intensity irrigation, and high winds. Agricultural practices that remove ground cover, compact the soil, or apply irrigation water at rates that lead to excessive runoff can all cause soil erosion."

Practical steps can help reduce soil erosion, he added.

"Soil erosion can be mitigated by maintaining soil cover, avoiding cultivation of sloping areas or practicing contour farming, applying irrigation at non-erosive rates, and reducing wind speeds," Andales said, adding that many Coloradans are also using natural wind breaks.

Planting cover crops is one way to deposit new resources into the soil bank and prevent erosion. While annual cover cropping may be a continuous expense for the producer, when done correctly, this input deposits important ecological resources into the landscape. On the other hand, perennial cover crops can be a "one-time" economic expense that can continually deposit ecological value into the landscape, but by their nature, can be harder to terminate.

Other Labels

A "Clean Label" is a product that generally doesn't contain ingredients that a consumer may perceive as harmful to their health, such as processed ingredients or certain types of chemicals. This type of labeling is not strictly defined, and each farm or brand can

▼ Consumers are becoming more interested in where food is grown, and how food is grown, according to some Colorado growers. *Source: Colorado Department of Agriculture and Julianne Drake*

"We're working to develop market premiums for products grown regeneratively, and rewarding continuous improvement through the STAR framework."

Cindy Lair
Program Manager,
Colorado State Conservation Board

choose to emphasize the ingredients they do or do not have in their products, and the way they are grown or raised.

The Clean Label trend could be seen as an effort to share production information without organic certification. This trend is an attractive solution to many producers who don't want the hassle of dealing with national labeling rules and regulations, nor the extra costs.

Selling local food at farmers markets is becoming more popular for farmers and ranchers, as proven by the strong growth in these markets in Colorado before the pandemic. And as pandemic restrictions and fears are lifted, we are seeing a return to these markets.

The Colorado Farmer's Market Association has been providing support for markets and growers for more than 25 years, providing multiple resources, along with peer-to-peer networking and technical assistance to farmers' market managers. The 501c6 organization also advocates at the state and local level for farmers and farmers' markets.

Kelly Miller owns and operates three farmers markets in Colorado — Louisville Farmers Market, Erie Farmers Market, and Sol Farmers Market on 6th in Denver — and has been managing farmers markets for 14 years. She says that what she sees most is a need for education.

"When I started my very first market 14 years ago I realized instantly that the focus of my job was mainly going to be education," Miller said. "And I'm finding that even more so now. I have a market in Denver on Sundays, and people are just standing there wanting to be educated about, not only the growing practices for the fruits and vegetables, but also why they should have a really high-quality olive oil, and what the benefits are. So they want to be educated on why they should not go to the grocery store and buy the cheapest olive oil, but also on the health benefits of having high quality oils."

This year vendor demand is high. "I am finding that the growth has been 50 percent," she said. "For example, in my Louisville market I have been averaging 45 vendors, and I am up to 70 this year." Miller finds that her customers gravitate toward local foods with a "clean" label. "People in Boulder County definitely want local foods," she explained. "They want to know where the food is grown, what the food miles are, certified organic. That's a tough one. I've been running farmers markets for a long time now and so I've found that there's different labeling that drives different demographics. Some people have big families to feed and can't afford to buy products with the certified organic label, some people that's all they want. So that just really depends on preference and economics."

State & Federal Programs

Colorado Proud is a state program that is designed to let the consumer know, "You are receiving high-quality fresh products and helping Colorado's economy, local farmers, ranchers, greenhouses, manufacturers and processors in your area."

The program was started in 1999 and designed to be a free resource to producers and consumers alike.

The program's website notes that 90 percent of Coloradans would buy more Colorado produced products if they were available and identified as grown in Colorado. "Choose Colorado" is an extensive database developed by the program to list all the food and food-related businesses within Colorado. They provide free artwork to producers to use for labeling, as well as a newsletter and calendar.

The STAR (Saving Tomorrow's Agricultural Resources) program is an exciting state program that was implemented to help farmers and ranchers implement soil and nutrient loss preventative measures, and to educate the public by translating farmland management into a STAR rating. The STAR rating system educates consumers about the conservation practices on individual farms and ranches.

As producers across Colorado implement the STAR program on their operations, and begin to market their products with the STAR rating as a signal that they are regeneratively grown, consumers will come to recognize its value. And as the STAR program expands, its value as a market signal to other producers and to consumers will also increase.

The STAR program, with its suite of recommended regenerative practices, also offers producers an opportunity to think about the development of new revenue streams associated with

providing ecosystem services to our society. For example, there are interesting opportunities emerging for farmers to be paid for sequestering carbon in their soils and even for trading credits related to reducing nutrient pollution. The market is providing numerous new options that add up to a diverse range of ways to be paid for soil stewardship, and working with the STAR Soil Health program is a great way to get started. One immediate step Colorado producers can take is to connect with the Zero Foodprint program, which offers grants to STAR producers. Consumers can support sustainable farming in Colorado when participating restaurants add a 1% fee on food/drink sales to support producers who want to expand their STAR field practices.

Conclusion

The STAR program and other federal and state conservation programs are helping producers invest in soil health practices, and at the same time enhancing consumer awareness of the need for ecologically beneficial practices on agricultural land in the state.

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The STAR program was originally developed by Champaign County Soil and Water Conservation District (CCSWCD) in Illinois and is now also administered in four other states: Colorado, Indiana, Iowa, and Missouri. The Colorado STAR Plus program grew out of a stakeholder process launched by the Colorado Department of Agriculture and other partners in 2019 that was facilitated by the Colorado Collaborative for Healthy Soils, involved more than 250 stakeholders and resulted in passage of HB21-1181 and SB21-235, which authorized and funded the launch of a state soil health program based around STAR. This state stimulus funding and additional grant funding received from the Gates Family Foundation, Colorado Department of Public Health and the Environment, Colorado Water Conservation Board, NFWF, and NRCS have enabled the launch of the first round of the STAR Plus program.

Getting Involved with Colorado STAR

In the summer of 2021, legislation was passed in the Colorado House of Representatives funding the Agricultural Soil Health Program for 2022. The Colorado Soil Health Program is built around the framework of an Illinois program called STAR, which stands for Saving Tomorrow's Agriculture Resources. STAR was developed to be a free resource for farmers and ranchers, helping them evaluate their current land practices, and particularly focusing on nutrient and soil loss. The STAR program encourages best soil health practices, and rewards producers with recognition, a high rating, and a field sign. While the STAR rating system is a useful metric for farmers to measure their own conservation efforts, it is also a tool for consumers interested in a farmer's soil health practices.

The program was originally created in the Champaign County Soil & Water Conservation District in 2017, with the assistance of the Illinois Department of Agriculture, as a means to facilitate specific environmental and agricultural goals that were outlined in the state's Nutrient Loss Reduction Strategy. Colorado, as well as Iowa and Missouri, have adopted this program framework.

Best management practices for agricultural land use have been developed since the 1930s by the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS). The STAR program utilizes these best practices, and also relies on a panel of experts, including university researchers and scientists, to establish appropriate ranking systems based on different resource factors. STAR Plus is an additional level of producer support that "facilitates capacity building by providing matching state funds towards the cost of these projects and activities within each district". This means that the state provides technical and financial assistance to producers over the course of three years, through grants and services like soil testing that are facilitated through the state's conservation districts.

Any farmer or rancher can visit the STAR website and fill out these forms in order to receive this rating. The first 100 participants in a year also receive a free soil test.

To participate, the only requirement is that the farmer or rancher fill out a form to the best of their knowledge, describing their farm practices in detail for a specific field chosen by the producer. The forms include questions about cropping practices, tillage regimes, fertilizer and nutrient applications, and other management practice information. The producer then receives a STAR rating from 1-5 that demonstrates their incorporation of the five principles of STAR: Soil Armor, Minimize Soil Disturbance, Plant Diversity, Continual Live Plant/Root, and Livestock Integration in their cropping system. Earning five stars in a field means that a farmer or rancher is implementing all five soil health principles on that field, while earning one star means that they are following only one.

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