



THE RAPIDLY EVOLVING CARBON MARKET IN AGRICULTURE

AN OVERVIEW IN QUESTIONS & ANSWERS

WHAT IS HAPPENING NOW?

A combination of current events, societal shifts and technology developments have led to an increased interest in and focus on the potential of agriculture to reduce levels of atmospheric carbon dioxide (CO₂) and other gases commonly associated with climate change. This situation has resulted in many organizations, both inside and outside of agriculture, working to create a system of rewards and incentives for owners and operators of agricultural working lands who adopt management practices that reduce the levels of these gases in the environment.



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Presented by Truterra, LLC, the only *farmer-owned and farmer-driven Sustainability program in the United States*, connecting agriculture with precision conservation results.

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DOES GREENHOUSE GAS REMOVAL TYPICALLY HAPPEN IN AGRICULTURE? OR DO THINGS NEED TO BE DONE DIFFERENTLY?

Agriculture is both a source of greenhouse gases (primarily methane from animal agriculture, nitrous oxide from fertilizer production and carbon dioxide from soil tillage and diesel emissions) and a way to remove these gasses from the atmosphere in the form of carbon sequestration. Carbon sequestration in agriculture involves storage of carbon in biomass such as the roots of cover crops or commercial crops in a no-till system.

HOW IS THIS FOCUS ON CARBON SEQUESTRATION IN CROP PRODUCTION DIFFERENT FROM THE PAST?

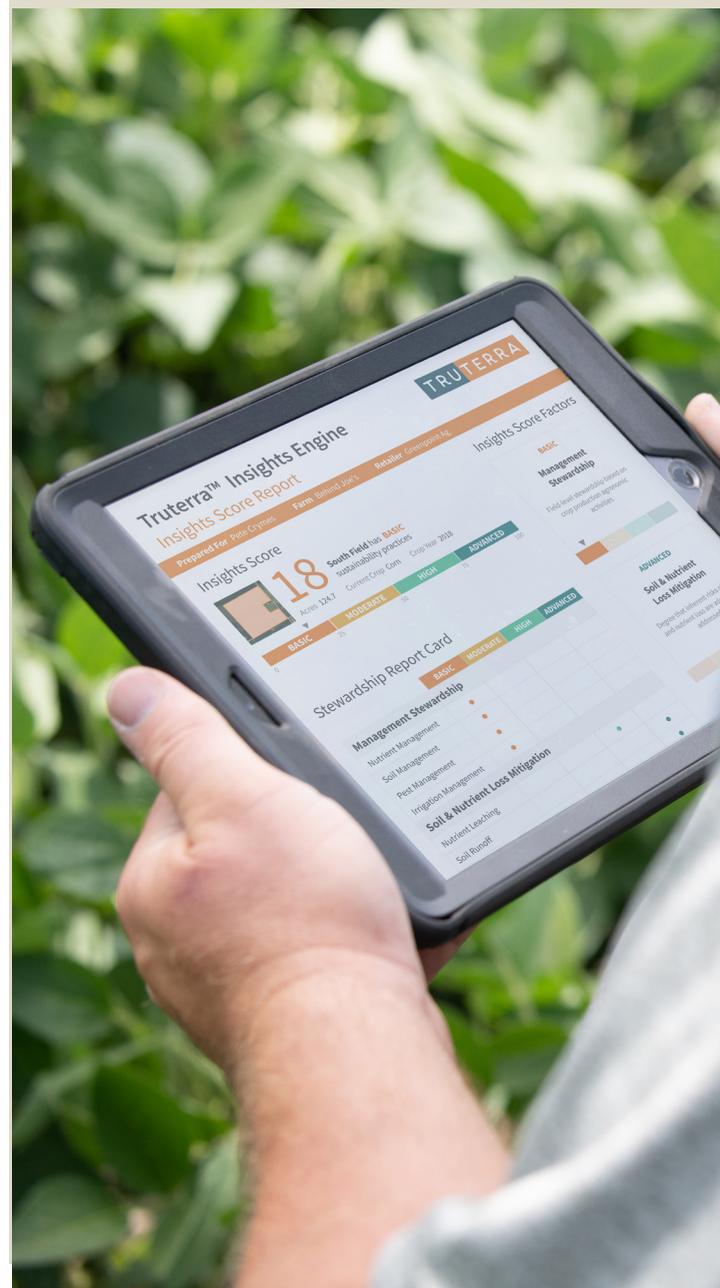
The business of farming has always focused on producing crops for sale or on-farm use and involves making management practice decisions aimed at producing maximum yields within the best possible return on input investment. Historically, the sequestration of carbon has not been a primary focus of management practice decisions. Likewise, buyers of commodity crops historically focused on ensuring a consistent supply of quality grains at an affordable price. Increasingly, commodity buyers are being asked to make purchases that not only procure necessary products, but also contribute to organizational sustainability commitments, such as commitments to reduce the amount of greenhouse gases (GHG) generated in the production of any commodity purchases.

HOW DO THESE ORGANIZATIONAL SUSTAINABILITY COMMITMENTS WORK?

Sustainability commitments related to GHG emissions are categorized as Scope 1, Scope 2 or Scope 3 under the GHG Protocol, a global GHG accounting standard. Scope 1 emissions are defined as direct GHG emissions from owned or controlled sources such as company vehicles. Scope 2 emissions are the indirect emissions created by generating the electricity that a company uses in its operations. Scope 3 emissions are all other indirect emissions, including the emissions associated with procurement. For example, a food company purchasing wheat to use in their products would have to include the emissions that went into producing that wheat (diesel fuel, emissions from fertilizer production, etc.) in their Scope 3 accounting.

HOW IS TRUTERRA, LLC WORKING TO HELP FARMERS CAPTURE NEW VALUE FROM THIS EVOLVING OPPORTUNITY?

Truterra is designed to meet farmers and their trusted advisors where they are, and to rapidly scale conservation practices on the rural landscape while working within the existing infrastructure and economics of modern agriculture. When it comes to carbon markets, Truterra is working to improve the accessibility of these markets in the future to create a more efficient and less cumbersome process for farmers who wish to participate.



HOW SERIOUS ARE COMPANIES ABOUT ADDRESSING THEIR CARBON FOOTPRINT? WILL THIS TREND FADE AWAY IN A FEW YEARS?

Business leaders are continuing to build momentum for action on climate issues, including an economy-wide price on carbon. In September 2020, the U.S. Business Roundtable publicly released 11 policy principles aimed at achieving the goals of the Paris Agreement, a landmark agreement dealing with GHG emissions mitigation, adaptation, and finance across the globe. In January 2020, the CEO of Blackrock, the world's largest financial asset manager, predicted that climate change and the risks it entails would reshape finance, and stated his company would avoid investing in companies that presented a "high sustainability-related risk."

Within agriculture, the American Farm Bureau Federation and the National Farmers Union are among more than 20 agricultural organizations that have come out to advocate for policies and practices to help farmers improve the resilience of their operations in the face of climate change.

WHERE DO FARMERS PLAY A ROLE?

Farmers can participate in either carbon insetting or carbon offsetting schemes. Carbon insetting is when companies commit to reducing emissions within their operations, including supply chains. Carbon offsetting is when companies "offset" their emissions by purchasing carbon credits, which represent removal of carbon from the atmosphere. For farmers, carbon insetting requires working with a particular company - of whom the farmer is a part of the supply chain - to reduce emissions or sequester additional carbon. Alternately, farmers can track, estimate and sell the carbon they are sequestering on open carbon markets as offsets. For some companies, it is cheaper to buy carbon "offset" credits than it is to reduce or "inset" their own emissions.

IF COMPANIES ARE THIS MOTIVATED TO ADDRESS THEIR EMISSIONS, WHY ARE CARBON MARKETS SO CHALLENGING?

There is widespread agreement that the opportunity exists for agriculture to harness carbon sequestration and reduce carbon levels. However, there are economic, quantification-based, technical and social barriers to capitalizing on this opportunity.

HERE'S HOW TRUTERRA IS WORKING DIFFERENTLY:

BRINGING CONSERVATION EXPERTISE TO FARMERS' TRUSTED ADVISORS

The Truterra™ platform focuses on helping farmers access conservation and stewardship planning information in a way that is comfortable and familiar to them. We believe scaling carbon sequestration requires respecting these important relationships. We are investing in training agricultural retailers and other qualified professionals in rural areas to deliver these planning services via the decision support tools in the Truterra™ Insights Engine.

REMOVING ECONOMIC BARRIERS

Conservation and stewardship practices are only successful when they help keep a farm profitable. Truterra helps farmers access both public and private resources to improve their on-farm stewardship and the financial burden of adopting new practices. The Truterra™ Insights Engine also enables farmers and their advisors to model and test a variety of practices to evaluate the economic impact of those practices on the operation before any decisions are made.

SHAPING THE MARKET FOR ECOSYSTEM SERVICES

As a wholly owned subsidiary of Land O'Lakes, Inc., Truterra can take advantage of relationships up and down the agricultural value chain, from input providers such as Winfield United to the consumer packaged foods business of Land O'Lakes Dairy Foods. Our exposure to the full value chain has resulted in multiple collaborations and engagements with a variety of value chain partners including Nestlé-Purina, Cargill, Campbell Soup Company, Tate & Lyle and more. We are joining these leading companies on their sustainability journeys to explore and implement what is possible in responsible sourcing of commodities as well as opportunities to help meet corporate commitments on Sustainable Development Goal (SDG) issues including climate change.

Economic barriers: Many of the practices linked to reduced carbon levels require an upfront investment by the farmer:

- Equipment (e.g. new equipment to enable no till)
- Inputs (e.g. cover crop seed)
- Services (e.g. the added cost of applying nutrients at variable vs. standard rates on a field.)

While farmers have shown they are ready to take this leap, many of the management practices required for carbon sequestration have a longer timeline for return on investment than is typically acceptable, especially as farming remains a low-margin business.

Quantification barriers: Carbon sequestration is a biological process and is subject to a range of variables and thus, a range of outcomes. In addition, as carbon levels change over time, the process must be repeated on a regular basis to both measure change and confirm ongoing performance. Seeking to quantify these processes can be done via modeling, which requires a significant data set, or actual measurement, which currently requires both labor and outside costs (e.g. regular soil testing.) Regardless of the method used, the costs of quantifying carbon removal, cannot exceed the value of the carbon itself or the system becomes unsustainable.

Technical assistance barriers: Crop and livestock production is a highly specialized field that is constantly changing as environmental conditions and knowledge bases evolve. Farmers must therefore rely on their local, trusted advisors, including ag retailers and crop consultants, to advise them on adjusting their management practices to accommodate these new developments and technologies. Yet farming to increase carbon sequestration requires a different skill set than farming to generate maximum yield at lowest cost. Rural areas currently face a gap in the number of technical advisors skilled in balancing carbon sequestration with profitability, and the individuals who have these skills frequently are not located where they are most accessible by farmers in the process of making production decisions.

Social barriers: With its reliance on variable weather patterns and global market shifts, farming is a high-risk business which rewards those producers who find and stick to a system focused on producing the highest yield at the lowest cost. Changes to this system frequently are viewed as high-risk unless there is an immediate, corresponding financial reward. While farmers have historically included long-term stewardship of soil and water resources in their planning process, they may be viewed negatively in their communities if they adopt practices aimed at these goals which are considered to be outside of the norm.

HERE'S HOW TRUTERRA IS WORKING DIFFERENTLY:

TECHNOLOGY PARTNERING

As a company operated by a farmer-owned cooperative, Truterra understands that we are all in this together and that it is only by working together that everyone can survive and thrive. We continue to seek out and engage in collaborations with leading technology companies including Microsoft and Nori, as well as important players in the agricultural space including Winfield United, EFC Systems, Ag Growth International and Bayer. The sheer complexity of monitoring, recording and tracking carbon requires collaboration and cooperation, and we are committed to sharing our knowledge and our platform with anyone who likewise seeks to improve the sustainability of the ag supply chain and boost farmer livelihoods while preserving and protecting natural resources.

FOCUSING ON THE SCIENCE BEHIND CARBON REMOVAL AND ACCOUNTING

The market for agricultural carbon is rapidly evolving, and many questions remain in regard to how long carbon credits are valid, what practices must be undertaken and for how long, and whether current accounting systems prevent or allow double-counting of qualifying credits. Truterra is advocating for the interests of farmers and their retail business partners and working to chart a path for them to maximize their return on their carbon removal activities. As with all of our operations, we are basing our processes and recommendations on sound science and regionalized, agriculture-specific data.

Insights Score



78

SE MN C slope stream has an **ADVANCED** level of stewardship

Acres **62.3** Current Crop **SOYBEANS** Current Year **2018**



WHAT CAN AG RETAILERS DO TO HELP PREPARE FOR CARBON MARKETS?

Ag retailers can play a key role in helping their farmer-customers participate in carbon and other ecosystem markets. Adoption of precision conservation tools, such as the Truterra™ Insights Engine, can assist them in guiding their farmer-customers in adopting field-specific carbon sequestration practices while also addressing whole-farm profitability. In addition, successful carbon market participation, as well as on-farm profitability, is increasingly dependent on consecutive years of accurate data capture. Retailers can work with their customers now to collect accurate, non-duplicative, year-on-year data to help prepare for these opportunities. In addition to capturing quality data, retailers can encourage and incentivize their agronomy staff to build new skills around sustainable agronomic practices to advise growers on the benefits of improved soil health, as well as related practices such as cover crop management.

WHAT CAN FARMERS DO TO HELP PREPARE FOR CARBON MARKETS?

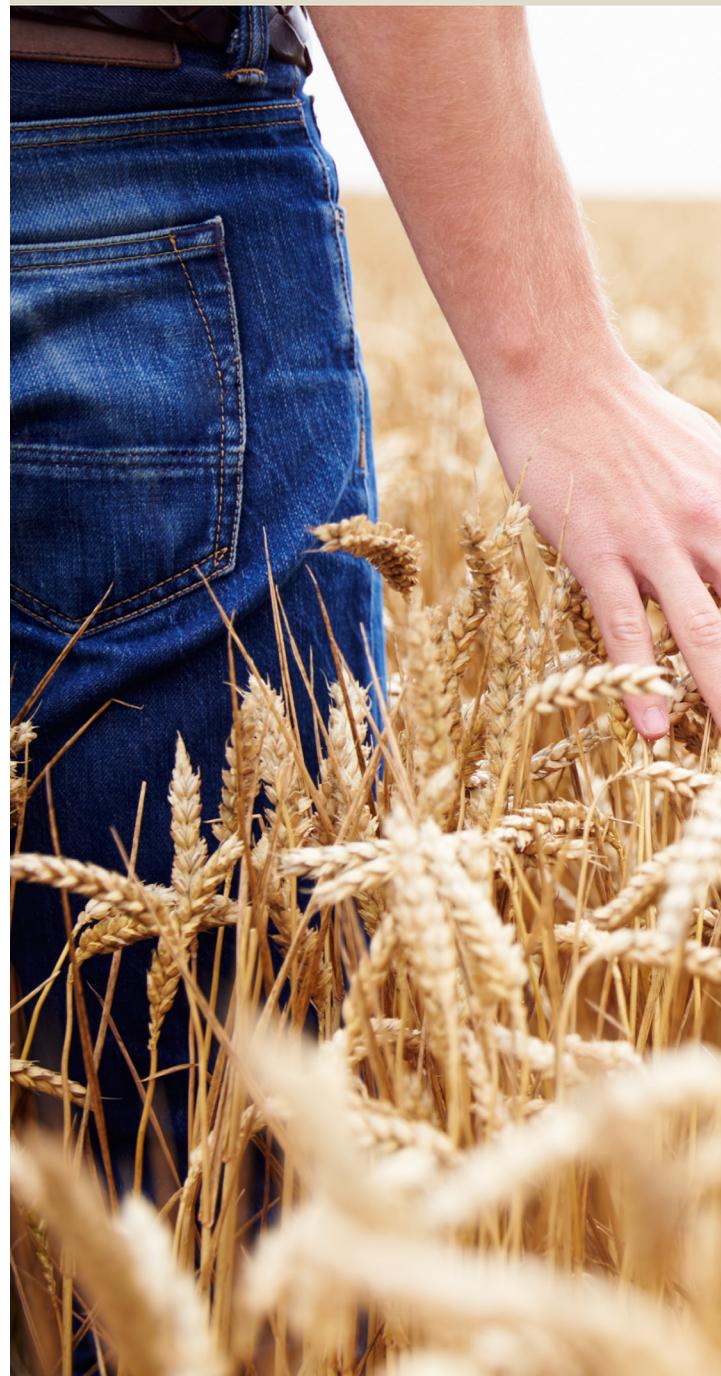
Carbon markets, similar to sustainable commodity sourcing programs, are reliant on a combination of management practices, accurate reporting and analysis of data. It will be important for growers to use a data capture platform to establish a stewardship benchmark to measure and analyze year-over-year change. Tools such as the Truterra™ Insights Engine can provide such a benchmark, creating a baseline not only for stewardship but also for profitability.

WHAT SHOULD FARMERS CONSIDER WHEN EVALUATING A CARBON MARKET OPPORTUNITY?

Multi-year, on-farm data is at the heart of carbon markets, so farmers should have a thorough understanding of how their data is being collected, used and shared before enrolling in carbon market opportunities. Since all carbon market participants have different data practices, it will be important for farmers to get data privacy and usage information for each opportunity they consider. In addition, farmers should examine the required time horizons and contract length terms to insure those horizons fit their management goals and their land tenure situation.

ADVOCATING FOR AGRICULTURE

As a nearly 100-year-old member-owned cooperative, Land O'Lakes has a legacy of advocating on policy issues on behalf of its members. Now, Truterra is following in the same vein, becoming the only private entity to testify in front of Congress on the Growing Climate Solutions Act. With a long-term mindset and a business model grounded in the realities of farming, Truterra is approaching the carbon market with the same focus on sustainable products, programs and processes that are designed to weather shifts in markets, public policies and financing trends.



WHAT SPECIFIC MANAGEMENT PRACTICES LEAD TO ASSETS THAT CAN BE SOLD IN CARBON MARKETS?

The most common management practices used to increase carbon sequestration currently include planting cover crops (creating a living root year-round) and reducing tillage (minimizing soil disturbance.) Extended crop rotations, such as those that rotate three crops over a period of three years instead of two crops every other year, also have potential to sequester additional carbon. Enhanced nitrogen management practices, such as split and Variable Rate Technology applications, are also important for maximizing production success while minimizing the risk of loss of nitrogen to the atmosphere. All of these practices may be new to farmers using a conventional management program, such as a corn-soybean rotation with no cover crop and conventional tillage.

DO ANY OF THE TRUTERRA™ PROJECTS NOW IN PLACE PAY FARMERS FOR THE CARBON THEY SEQUESTER AND MEASURE THROUGH THE TRUTERRA™ INSIGHTS ENGINE?

No. Current contracts do not specify farmer payments for carbon. As new opportunities arise, it is Truterra's intention to position farmers currently participating in projects as the first to benefit from emerging carbon revenue opportunities. By enrolling acreage in Truterra™ Insights Engine, farmers are preparing for these future opportunities. Truterra is committed to being a trusted advisor in this market and will continue to work with the best interests of farmers in mind.

JOIN US

Truterra works with public and private companies, ag retailers, farmers, conservation organizations, non-governmental organizations, state and federal agencies and individuals. Visit Truterraag.com to learn more about what we're doing. If you are interested in learning more about collaboration opportunities with Truterra in carbon or other ecosystem services markets, including licensing opportunities with the Truterra™ Insights Engine platform, please contact your Truterra™ representative or email us at info@truterraag.com.

