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CARBON CREDITS, CARBON FARMING, AND CARBON PROGRAMS

Since plants use carbon dioxide [CO₂] during photosynthesis, it is obvious that they are sequestering carbon [C] from the atmosphere. However, when these plants die, they begin to decay and their sequestered C is released back into the air. Thus, farming that involves the growing of crops is considered a major source of C emissions. That is why there is increased interest in promoting farming practices that sequester C in the soil so that it is not released back into the air.

Carbon farming is a term used to describe C as a crop similar to other crops that farmers produce. Thus, agricultural practices that increase C sequestration in the soil are being promoted so that a farm's C sequestration can be turned into cash from the sale of carbon credits.

A soil carbon credit is a certificate that represents one metric ton of CO₂ equivalent that is either not emitted into the atmosphere or is removed from the atmosphere as the result of a C reduction practice. Carbon credits are a form of exchange that are used to offset CO₂ emissions under "Cap and Trade" guidelines. Simply stated, entities responsible for emitting CO₂ must reduce their emissions (cap) or pay others such as farmers who are removing CO₂ from the air (trade).

Carbon markets consist of a supply that is created by entities who develop projects or adopt practices that will reduce or avoid C emissions. These projects and/or practices are certified by an independent third party that validates the methodology that is used or the practices that are adopted. Financial value comes about when carbon credits are sold to entities that use them to offset their C emissions. Buyers purchase the certified credits in order to claim them toward a climate target. Carbon prices, like those of other commodities, are subject to market forces.

The carbon market creates a potential new revenue source for farmers. Entities can buy carbon credits from farmers [usually through a broker] for about \$15-20/ton of C to offset their own emissions. This provides farmers a financial incentive to transition to conservation farming practices such as planting cover crops, converting to no-till or reduced tillage, and/or using more diversified crop rotations that will sequester more C in the soil. Thus, the conservation practices that generate carbon credits can provide revenue to farmers that is in addition to the potential financial gains from increased crop yields, lowered production costs, and improved soil health that arise from the adoption of those conservation practices.

The soy checkoff supported the compilation of the [USB Carbon Toolbox](#) to help farmers explore the carbon market topic. The subjects covered in this resource are "Introduction to Carbon", "Agricultural Carbon Market Programs", "Farming Practices", "Public Resources", and "Legal Considerations". Of particular interest to farmers who are interested in exploring carbon market opportunities are the sections on "[Introduction to Carbon](#)", "[Agricultural Carbon Market Programs](#)", and "[Farming Practices](#)". This toolbox is likely the most up-to-date source for information about the carbon market and how it works, and also will be updated as new information and programs become available. Carboncredits.com has produced an article titled "[What are Carbon Credits in Agriculture?](#)" that is also an excellent source of information about the carbon credit topic.

Producers who have already adopted [conservation farming practices](#) that may qualify for carbon credit payments are encouraged to explore this new revenue opportunity. Those producers who are not using conservation farming practices but may in the future be encouraged to explore how their transitioning to conservation production methods may qualify them for the additional revenue provided by the carbon market.

Shelley E. Huguley, Southwest Farm Press Editor, has authored a series of articles to inform producers about carbon credit contracts and what they should be aware of. Click on the following links to access these articles.

[Carbon contracts: 8 items to consider before signing.](#) This article appeared in Southwest FarmPress on Mar. 9, 2023, and presents a list of items to consider before a producer signs a C contract. The list of items and their details are provided by Texas A&M Extension Agriculture Law Specialist Tiffany Lashmet, and provides guidance for producers who desire to sell carbon credits to corporations that have pledged to become C neutral at some later date. Producers should pay particular attention to the difference between "payment for outcome" and "payment for practice" contracts.

[Carbon Contracts: Understanding Your Legal Obligations.](#) In this article dated Mar. 10, 2023, Dr. Lashmet discusses the importance of 1) understanding the length of a C contract, 2) methods used to measure the amount of C that is sequestered by a particular conservation practice, 3) who pays for the measuring/testing, 4) the requirements or penalties for terminating a carbon contract, and 5) the "legal" terminology used in the contract and what it means



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to the producer.

[Carbon Markets, Contracts: Proceed with Caution.](#) In this article dated Mar. 17, 2023, Dr. Trent Milacek, Oklahoma State Univ. Agricultural Economics Specialist, raises the subject of the cost and return implications when switching to practices that may sequester C to generate carbon credits that can be sold. He also cautions producers to ensure that 1) they are rewarded for the adoption of past as well as new conservation practices in carbon credit contracts, and 2) they are not selling carbon credits that they themselves may need in the future.

As with all things that are related to contracts and legal issues, producers should understand all aspects of carbon contracts—e.g. agreed-upon-practices, payment terms, who pays for what—before signing and committing to a relationship that could prove detrimental to them in the long-term.

In a Mar. 2023 Delta FarmPress article titled “[Carbon credits new ‘hot button’ issue for agriculture](#)”, author Forrest Laws presents information about and links to entities that desire to partner with farmers in navigating the carbon credit market. Major points of that article follow. Updates to the various programs will be provided here as they are developed.

- It is unrealistic for farmers to expect that sequestering C is an easy way to earn extra money from their adoption of accepted conservation farming practices.
- Producers must spend a significant amount of time to examine their past production practices and the potential for their adoption of new practices that will generate high-value carbon credits.
- Truterra LLC, the sustainability business of Land O’Lakes, Inc. [a farmer-owned cooperative], has launched [Truterra Sustainability Services](#) in an effort to encourage farmers to adopt regenerative farming practices that can provide extra income to partially offset the cost of adopting those practices. Click [here](#) to see the details of this program and how it can benefit producers who decide to participate.
- Carbon credit programs such as [ForGround by Bayer](#) will provide carbon credits to farmers who adopt practices that encompass cover crops or minimum tillage. The company continually updates their [Bayer Carbon Program](#) that involves an expansion of 1) geographical footprint [added more eligible states], 2) eligible practices, 3) eligible crops, 4) payment for historical practices, 5) renewal potential, and 6) a renewal bonus.
- [BASF Agricultural Solutions](#) recently initiated field trials that will focus on sustainable practices that will sequester C in the soil and reduce C emissions at the farm level.

Results from these trials should lead to practices that farmers can adopt to capture the most C.

- Companies such as [Nutrien Ag Solutions](#) have recently started carbon credit programs to enlist interested farmers.
- Finally, as stated above, growers need to carefully read all documents related to carbon credit contracts from any entity to ensure they understand their responsibilities, liabilities, and potential monetary gains.

Additional resources that can be accessed to find additional details about Carbon Credits follow.

- [ForGround by Bayer—E-book—The Cost-Saving Secrets of Soil Health](#)
- [Agricultural Carbon Credits and Carbon Farming Guide—What Are Carbon Credits in Agriculture?](#)
- [Agricultural Soil Carbon Credits \[from EDF\]](#)

An Iowa State University Fact Sheet titled “[Net Returns to Carbon Farming](#)” [File A1-78] by Plastina and Jo presents facts about carbon farming, some of which follow.

- Current carbon programs seek to incentivise the development and adoption of less environmentally-contaminating practices such as cover crops and reduced tillage intensity in agriculture.
- Scientists have developed conversion factors to express global warming potential of greenhouse gas emissions [GHG] into a CO₂ equivalent [CO₂e]. For example, the global warming potentials of nitrous oxide [N₂O] and methane [CH₄] over a 100-year period are 298 and 28 tons of CO₂e, respectively.
- Agriculture is one of the few sectors of the U.S. economy that can remove GHG’s from the atmosphere and store C in the soil using existing technologies.
- U.S. carbon programs for farmers involve contracts that have them adopting regenerative farming practices such as minimum/no-tillage and cover crops, and certifying this environmental service in exchange for financial compensation from a private company. The stipulated regenerative practice or practices vary by carbon program.
- Some carbon programs compensate producers by type of practice that is adopted [“payment per practice”—less common], while most compensate producers for the amount of service the adopted practice provides [“payment per outcome”]. With the latter, a dollar amount is offered per ton of CO₂e reduction.
- The measurement of the amount of CO₂e reduction varies across carbon programs [click [here—ISU File A1-76](#) for details], but all measurements involve a comparison of GHG emissions with the baseline of the current production system. The decline in emissions



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- from the baseline is the carbon farming output or yield.
- Currently, carbon farming with “payments per outcome” is challenged by the lack of reliable measurement of the reduction in CO₂e [click [here–ISU File A1-77](#) for details] resulting from adoption of the various conservation farming practices.
 - Calculations for carbon programs with “payment per outcome” payments assume that the only penalty for less CO₂e being produced than projected is a decline in the payment to the producer.

Publication File A1-78 also provides access to a decision tool for U.S. states that can be used to estimate the CO₂e that is realized from a producer’s carbon farming. This tool is organized into four sections as follows: 1) location by county within each state; 2) current farming practices; 3) carbon farming plan; and 4) expected annual returns to adoption of a carbon farming practice or practices. The attributes for each of the sections are selected from drop-down menus once a state is selected.

[Decode 6](#), a resource from the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, provides information to the U.S. agricultural sector about carbon and ecosystem services. This free and accessible online resource is available to those interested in adopting carbon programs or creating policy or policies that are designed to help curb climate change..

Decode 6 provides educational resources that can be accessed so that producers can be fully informed about the components of soil health and how the adoption of certain production practices can qualify for the accumulation of carbon credits that can be used to supplement farm income. These resources include [Articles](#), [Podcasts](#), and [Videos](#) that can be accessed to learn about:

- Carbon, to include total soil carbon, soil organic carbon, carbon credits, soil carbon measurement, additionality in a carbon market, and carbon contracts;
- Water conservation and quality and how conservation farming practices affect both;
- Cover crops, including their benefits and drawbacks, their sequestration of soil carbon, their effect on soil water and water quality, and how they can counter nutrient loss from crop fields; and
- A [Classification system](#) used to account for all GHG emissions.

One of the Decode 6 articles is titled “[How Are Carbon Credits Priced and Sold?](#)” by D.J. May. Information in this article explains 1) what a carbon credit is, 2) the difference between a carbon market and a carbon program, 3) the

importance of verifiers and registries to ensure carbon credit quality, 4) why the value of a carbon credit fluctuates, and 5) the reasons carbon credit prices are expected to increase.

There is no doubt that the subjects covered in this White Paper will further evolve as the carbon farming component of agriculture in the U.S. expands and more producers decide to participate. The potential monetary gain from participating in the carbon farming market will likely prove attractive to those producers who need a financial incentive to adopt conservation farming practices.

JUNE 2024 UPDATE

The above-mentioned evolvement will necessarily involve upgrades to carbon programs offered by companies. Examples follow.

- The [Bayer Carbon Program](#) extended the historical performance period for fields with eligible practice changes that include no-till/strip till and/or cover crops. Now, eligible fields may be eligible to receive up to 4 years of historical practices payment for a one-time total of up to \$48/acre.
- The [Carbon by Indigo](#) program offers the potential for more farmer profitability, a reduction in their data input time, and allowance for more carbon sequestration credit for numerous practices they adopt. Their expanded program works in partnership with the Bayer Carbon Program to expand their carbon removal supply, which should help turn farmers’ regenerative efforts into tangible carbon credits that can produce monetary value.

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